



A Decision Support System for  
Replacement Analysis

By

Duangkhae Samatthanan

A PROJECT

Presented to the Faculty of Graduate School of  
Computer and Engineering Management

In Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

in

COMPUTER AND ENGINEERING MANAGEMENT

ASSUMPTION UNIVERSITY

December, 1998

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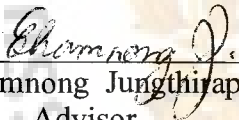
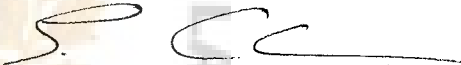
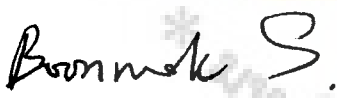

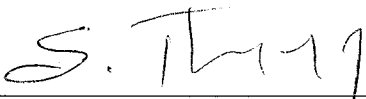
**December 1998**

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The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

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December 1998



## ABSTRACT

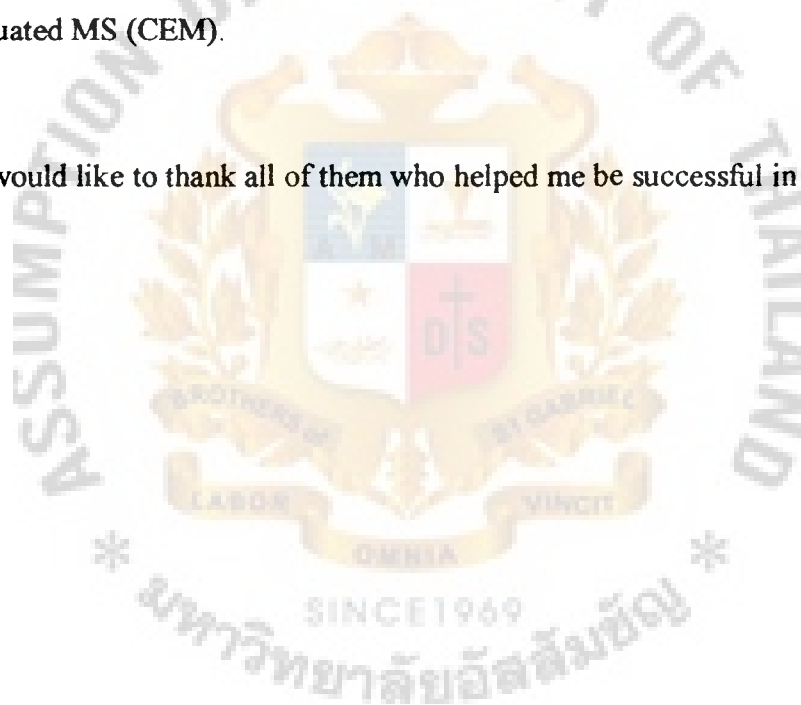
This research has the main aim of presenting a Decision Support System for Replacement Analysis in the industries or other types of business. The decision support system is developed with Microsoft Excel'97 by using Visual Basic to write the command to run the program smoothly and more comfortably. This program consists of six parts: 1) Inquiry for Replacement machine for calculating the replacement analysis, 2) Depreciation Calculation, 3) Search Information for keeping the information of any company that is involved in the business of the company, 4) Calculation Payment for the user know-how; annual payment in case of using the loan, 5) Supporting Information for knowing the short cut of Replacement Analysis and Depreciation Analysis, 6) Maintain Information for adding and changing the information for Search Information.

The analysis management subsystem is divided in two main categories: the economic life of the defender, and the replacement analysis which is composed of three parts: a) Capacity expansion analysis, b) Comparison between the defender and the challenger, and c) Lease or buy analysis.

## ACKNOWLEDGEMENTS

This project succeeded by help of Dr. Chamnong who is my advisor. He is the one who gave me advice, idea and points me the way to succeed the obstacles. He is always helpful until I finished this project and graduated from MS (CEM). I cannot expressfully the word of thanks to him with honesty. I would like to thank you my friends who help me find the information and any help for this project. The last persons that I would like to thank them are my parents who give me the opportunity for studying till graduated MS (CEM).

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## I. INTRODUCTION

This report will show the purpose of the research and the importance of problem of the research. The inducement cause and the procedure to execute the study and the research by making the scope of study to obviously research and the last showed the utility that will be expecting from this research.

The purpose of this report is to take the reader to the target and the method of this research.

### A. Objectives of the Research

The objectives for this project are as follows:

- Study the economic engineering in the part of Replacement Analysis thoroughly to useful execution.
- Study and collect the basic theory though general of Decision Support System for being basic to analysis in this field.
- Propose the software program to help in making decision in replacement of the equipment for user.

### B. The Vital of Problems

A kind of decision that's mostly found in the manufacturing or other business is the decision to the equipment. The cause may came from the old machine and

equipment, which made faulty production or increase the production. It has more new machines and equipments or changed them to better system, to big and effective system.

Normally this decision depends on the higher executive or owner which get information from executive section or responsible engineer and get information from involved department, procurement department who will find details of new machines and equipments.

The problem that often occurred is that an executive usually decided by using their former experience (that they had on their own satisfaction and their needs without standard analysis systems and other affecting factors) which mistakes in their decisions easily. The mistaken decision can not be see easily but it will be know after long period of investment. That makes it difficult to change and use until too late.

The Industrial Engineering in the faculty of economic engineering studies about the analysis of replacement of machine and equipment. We should understand the problems for periods and try to think about other affective factors to help using them as soon as possible to make less mistakes.

The knowledge in this field is not widespread to general executive or other fields of business, because the theory and calculation are difficult and consumes times. Therefore, the executive is not interested it in and they also are not paying attention to the replacement by machine and equipment.

The knowledge in this field can be spread to other executives, it can reduce chances of making wrong decision and help to find suitable machines and equipment for production in the future. We should not hesitate to expand and complete the market, and it executes and plans for other departments, for example: - human resources department, marketing department, and procurement and finance department.

### C. The Causes of Motivation

There are many causes to study this project are as follows:

- The technical knowledge in replacement analysis is that it had been used in some groups of persons, which studied some of the details, although before they understand they have wasted their time.
- The executive in the middle and small business, need to make decisions of the replacement of their machine and equipment. They use information or their old experiences and self-satisfaction and will not use the technique of engineering economic. This may be because of they did not study the details or think that it wasted their time to read.
- If the method of decision in replacement is not complicate or over investment. It will not be difficult to make a decision to cover all factors. In case that has many details involved, it has a chance to make a mistake. Then if they can less the risk, it good for investment that the executive and expand the business.
- If the knowledge of replacement analysis is widespread to all level of the executive. It can reduce the problem of making wrong decision and help the executive to see all factors in short time.

- If there is a software program that helps the replacement analysis instead of using the desirable satisfaction. It will help the executive to know more knowledge and understand how the replacement analysis can do because this program will act as a textbook to help them in the calculation.

#### D. Study of the Procedure

The procedure follows these steps:

- i. Study the theory involved in the Replacement Analysis.
- ii. Survey the documents require.
- iii. Study the possibility of scope and the achievement of the program.
- iv. Study the general character of Decision Support System and how to apply.
- v. Consider the model and create a program to support the decision in the concept of replacement analysis by using easy language, faster synopsis and easy to develop the program.
- vi. The exercises in the textbook were used to test the program.
- vii. Use case study from real situation to test the program.
- viii. Summarize the result of this project.

#### E. Scope of the Study

This project will scope into:



- Study the theory and research in analysis of replacement and consider other factors that affect the decision making.

- Study the Decision Support System by emphasizing the general characteristic to find out the important factors that is included in the analysis of replacement.

- The program will help analysis by separating into : -

- Part of knowledge
- Part of analysis

This report will not include the inflation because there are little change in the technology of machine and equipment in the future.

- The program will give the final suggestion to user to make the decision in the replacement of machine and equipment. The user like to use or make another judgement depends on the factor of the company. Whether the result of the program is correct or not depend on the input information.

The program considered on the factor of the industrial machine, but does not cover every parts of the business, but this program can be applied to develop the business.

#### F. Expectation Utilities

- Widespread knowledge of the economic engineering in the concept of replacement analysis to middle business executive or other business for more effective.

- Helping to know the whole factors in reducing the risk in the decision-making, money and also wasting time.
- The program is created to develop till the program can cover other business.

#### G. Summary

The concept of Decision Support System for Replacement Analysis is to help the user to use easily and make the decision but not to decide the alternative for the user.



## II. REPLACEMENT ANALYSIS

The business or Industries function uses equipment to run the business and the equipment has their own length of life. Therefore, the replacement is done for the business to save cost and improve quality of work together with receiving high income.

The replacement also has problems that are classified as follows:

- The continued use of a piece of equipment after the expiration of its estimated useful life.
- The continued use of a piece of equipment after repairs has been made to it at the end of its estimated useful life.
- The replacement of a piece of equipment at the expiration of its estimated useful life.
- The replacement of a piece of equipment before the expiration of its estimated useful life.

Although the calculation of replacement needs more the information to analyse, it made the business save the cost and increases high quality and quantity. The result of an alternate evaluation process is the selection and implementation of a project, asset, or service that has a planned economical life. As time passes, it is necessary to determine how the selected and in-place alternative will be replaced. This replacement analysis may be necessary before, or after the expected economic life. The basic results of a

replacement analysis are answers to the following questions: Has the economic life of this asset or project been reached? Which alternative should be accepted as its replacement? Or is it desirable to continue the service provided by the equipment that has failed? Therefore the replacement of equipment has two basic reasons:

i. It ceases to function physically for one reason or another. Pipe systems corrode, roofs weather, and machine elements wear or break to the extent that they must be replaced if the purpose they serve is to continue to be served. Equipment failure provides an opportune time to consider a change of objective. If it is decided that the service of a failed machine should be continued, the next step is to determine how best to replace the machine.

ii. Replacement of a facility is that it does not provide a needed service as economically as a replacement apparently would. Whereas the failure of a machine forces consideration of its replacement, a machine that is uneconomical in comparison with another that is available may go unobserved for long periods of time. (Joseph L. Trecker, in an address on "the Economics of Machine Tool Replacement" before the Society for the Advancement of Management, Milwaukee, Wisconsin, March 8, 1945.)

Whether unplanned or anticipated, replacement is commonly considered because of several reasons. Some are:

- Reduced performance - Due to the physical deterioration of parts, the ability to perform at an expected level of reliability and productivity is not present. This

usually results in increased costs of operation, higher scrap and rework costs, lost sales, and larger maintenance expenses.

- Altered requirements - New requirements of accuracy, speed, or other specifications have been placed upon the owners. The existing equipment or system can not meet these requirements. Often the analysis is between complete replacement and enhancement through retrofitting which may result in the new requirements being met.

- Obsolescence - the rapidly changing technology of automation, computers, and communications makes currently used systems and assets perform acceptably, but less accurately or productively than equipment coming onto the market. Replacement due to obsolescence is usually possible, but a formal analysis is performed when management determines that competitive forces or newly offered equipment may force the company out of markets due to increased requirements from consumers or contractors. The decrease in time of the development cycle of new products is the cause for much of the replacement analyses performed prior to the completion of the expected economic life.

#### A. The Objective for the Replacement Analysis

The objectives of the replacement analysis's that it should be able to do the following:

- Describe the concepts of consultant's viewpoint and sunk cost for replacement analysis; state the value of the first cost and the other attributes for

defender and challenger alternatives; and determine any sunk cost present.

- Select the better of a defender and a challenger plan over a specified planning horizon.
- State the difference between the conventional and cash-flow approaches to replacement analysis, and use both to perform an analysis.
- Use the one-additional-year replacement analysis procedure to determine if a defender should be retained for one more year or replaced, given the data for defender and challenger plans.
- Determine the minimum-cost life of an asset using an EUAW analysis, given the first cost or market value, estimated salvage values, operating costs, and required return.

B. Replacement should be on Economy

Where profit is a motive, replacement should be based on economy of future operation. Though production facilities are inanimate and should be considered to be means to an end, namely production at lowest cost, there is ample evidence that motives other than economy often enter in to thinking concerned with their use and replacement.

The idea that replacement should occur when it is most economical rather than when an item of equipment worn out contrary to the fundamental concepts of thrift of many people. Most of the owner of the old equipment felt that it used until the whole useful life but it spends a lot of maintenance cost. Therefore, the replacement of equipment requires a shift of enthusiasm. The commitment for the long useful life, low



initial cost, low maintenance cost and low operation cost of the replacing equipment is the main factors for making the decision.

### C. The Defender and Challenger Concepts

The Defender and Challenger Concepts in Replacement Analysis could be compared to two or more alternatives; however, we, the company, now own one of the assets, referred to as the defender, and are considering its replacement by one or more challengers.

For evaluation purpose, we assume that we own neither assets. In order to “purchase” the defender, therefore, we must pay the going market value for this used asset. We then use the estimated market value as the first cost of the defender. There will be an associated salvage value, an economic life, and annual operating cost for the defender. Even though the values may all differ from the original data, it makes no difference for the evaluation because we are using the consultant’s viewpoint and are thus making all previous data irrelevant to the present evaluation.

In replacement analysis this irrelevant data is sometimes used to calculate what is known as a sunk cost. The sunk cost of an asset is computed as

$$\text{Sunk cost} = \text{present book value} - \text{present realisable value}$$

The present book value is the remaining investment after the total amount of depreciation has been charged; that is, the book value is the current worth of the asset as established by acceptable accounting procedures.

If incorrect estimates have been made about the utility or market value of an asset, there is a positive sunk cost, which cannot be recovered. A sunk cost is a result of a bad decision that was made at some time in the past, and past economic decisions must not be allowed to influence decisions of the present. However, some analysts try to “recover” the sunk cost of the defender by erroneously adding it to the first cost of the challenger. This penalises the challenger, making its costs seem higher than they really are, and thereby jeopardising the validity of the conclusion. The sunk cost, should be charged to an account entitled “Unrecovered Capital” or which will ultimately be reflected in the company’s income statement for the year in which the sunk cost was incurred. Therefore, for replacement analysis a sunk cost should not be included in the economic comparison. The following example illustrates the correct data to use in a replacement analysis.

#### D. Methods of Replacement Analysis

The replacement analysis has several methods to solve the problem which will be shown as follows:

- Conventional Approach To Replacement Analysis. There are two equally correct and equivalent ways to handle the first cost of alternatives in a replacement

analysis. The conventional approach uses the defender's current market value as the first cost of the defender and uses the initial cost of the replacement as the challenger's first cost. Thus, for the defender, the first cost ( $P$ ) is the highest value attainable through its disposal (sale, trade-in, scrap, etc.) when it is compared to a given challenger. This approach is cumbersome when there is more than one challenger with each offering a different trade-in value for the defender, thus possibly causing a different  $P$  value for the defender when compared with each challenger.

- **Cash-Flow Approach To Replacement Analysis.** This approach recognises the fact that when a challenger is selected, the defender's market is a cash inflow to the challenger alternative; and if the defender is selected, there is no actual outlay of cash. This is the cash-flow approach to replacement analysis. In this approach, if the defender and challenger have the same life value, set the defender first cost to zero and subtract the trade-in value from the challenger first cost. It is important to recognise that this approach can only be used when the lives of the defender and challenger are the same or when the comparison is to be made over a specified or preselected planning horizon.

E. Equipment Replacement Analysis (วิศิษฐ์, กิตติ, และ ธนากร, 2523)

The efficiency of an equipment depend on their own characteristic and also the way to use of users. Useful life and quantity of producing are measured to the decision making. The value of machinery and /or equipment are concentrated on the quality of output, long useful life which one has more quantity of output and long useful life was

better than the one that came out the low quantity, quantity and short useful life.

The investment of equipment will consider the high production with high quality, but after the equipment had been used for the whole life, it is the time to think about the replacement of the old equipment.

The replacement of the equipment will begin when the damage has occurred and the effectiveness of production has been reduced. These factors will increase the high maintenance expense. The other thing that we will concentrate is the progress of technology that could make higher quality and quantity than the old equipment.

The decision making will consider the expenses and investment between the old equipment and new equipment and also consideration of the forecasting of the old equipment, what is the level of useful life it should be replaced?

In the consideration of equipment replacement we should know when the equipment should be replaced or further used for 1-2 years. The factors that is used for forecasting are:

- The old equipment will be considered about the remaining useful life.
- The new equipment will be considered about the salvage value, the operation expenses and interest rate.

Although the companies know the equipment has more capacity, they still use the old equipment because the market price or trade-in is lower than the price that should be. These are major factors when owner hesitates to change their equipment. So, the companies will consider that when the old equipment is still useable or less maintenance cost. If the new equipment is more capacity, it will start with the lower initial cost with the lower maintenance cost and more case than the old equipment. Therefore, it is the time to change with no hesitation.

#### F. Criteria of the Consideration in Equipment Replacement Analysis

The way to run the business should be to consider the feed back and the profit in the future than other factors. The equipment replacement has the same concept that considers the profit and expenses that came from the old and new equipment, then compare both of them and analyse the benefit that companies will receive.

The factors, that company should consider, for both pieces of equipment will be summarized as follows:

##### **The Defender**

1. First Cost
2. Operating Cost
3. Life, estimated
4. Salvage value, end of life
5. Present age

##### **The Challenger**

1. First Cost
2. Operating Cost
3. Life, estimated
4. Salvage value, end of life
5. Interest Rate

### The Defender

6. Salvage or resale value at present age  
(Market value or Trade-in value)
7. Interest Rate
8. Reasons for replacement

### The Challenger

6. Reasons why this is a good replacement

In the case of the old equipment it does not consider the book values in the analysed plan because this value had exhausted and not included in the profit and loss of the replacement.

An example of the mistake of analyses in the time investment is as follows: The old equipment had been bought for 4 years with the initial cost THB 20,000.- and the useful life is 10 years. The salvage value is THB 6,000, if it is sold in this time. If the companies will replace it with the new one, that has 10 years of the useful life. The companies should compare both pieces of equipment with 6 years useful life because THB 6,000 is the value of the remaining life. The comparison of replacement should be considered in the same useful life.

Sunk Cost will not be included in the replacement analysis. Sunk cost of the old equipment is not related to the new investment but may be effected with the tax at the end of the year.



## G. Useful Life

The consideration in the proper useful life, the normal consideration of the old equipment is for checking the efficiency and decline of engine that contrasts with the vision of the economic engineering. It will consider which equipment increases the average cost and average maintenance cost that made high cost of production. Therefore, the proper useful life is the time that made the average cost in a year lowest. The replacement of equipment should have more information for consideration there is no need to wait until the end of useful life. We can change before the useful life ends if it could be proved that the new equipment has high capacity and low cost.

There are many reason, to change the equipment before the useful life is exhausted.

- The low quality of the old equipment. The increasing of demand is the main reason for changing the equipment because of the limitation of capacity. Therefore, two proposals that would suggest are

- Adding the same model of the old equipment to help each other.
- Replace with the high technology equipment.

- The Obsolete. Because of the high technology that caused the equipment to have high capacity and is comfortable. The comparison of the production between two pieces of equipment, the new one will spend lower cost than the old one. This reason could reduce the cost of production and decrease defective products and also save time.

- The declaration of the equipment. The old equipment has high expenses for maintenance and reparation. It means that this equipment will be exhausted of useful

life. We could compare the expenses year by year between the old equipment and the new equipment; which year of the old equipment has higher expenses than the new one? Therefore, we should change the equipment in that year.

- The possible for renting or leasing. In this way, the companies do not need to invest the initial cost for their own. The cost that will occur is only the renting or leasing cost, but no need to spend money for maintenance or fix the equipment such as Car leasing or Warehouse.

Replacement equipment can help companies that want to change their old and obsolete equipment. The calculation of replacement analysis should have enough input information for receiving the right output.

#### H. Input Information

The input data are as follows:

- i. Initial cost (First cost)
- ii. Revenue
- iii. Operating cost
- iv. Maintenance cost
- v. Market Value
- vi. Trade - In
- vii. Salvage value
- viii. Useful life
- ix. Interest rate

i. **Initial Cost (First Cost).** Initial cost or First cost is the value of a new equipment. This cost acts as a capital of a company because the equipment is made by the company running the business, so it is called capital budget. When you want to sell this equipment, you should not use the initial cost for counting in the calculation. The initial cost is not only the price of equipment but also the installation cost or other expenses that occurred while setting up this equipment. The sources that you can find out the information are regarding the initial cost; you could ask a seller, your friend who is close to the equipment that you prefer to buy and you can find from the old purchase order or the receipt that was kept in your finance department or accounts department. Another way that you can find is the professional person.

ii. **Revenue.** The general idea of the word **revenue** means that the value of selling is higher than the value of buying even if you sell the old equipment and the price of market value is higher than the book value. The excess value will be the revenue of that equipment. The company also pays tax for the excess value of that equipment.

Some equipment has no revenue such as the equipment used in the office or the equipment that was not used in the production line. This equipment does not make any revenue so the company should use the cost for calculating in the replacement analysis.

The source that you can receive the information is from your finance department or account department.

iii. **Operating Cost.** Any business that has transaction of buying and selling should have an operating expense. The operating expenses occurred during selling merchandises or services can be separated into different categories:

- **Selling Expenses:** The expenses occurred while we sold and then send the merchandises to our customers such as salary of salesperson, agency fee, transportation expenses, entertainment expenses, advertising expenses, etc.

- **Administrative Expenses:** The expenses occurred in the office such as salary of employees, office suppliers expenses, shareholders meeting expenses, etc. There are also the expenses that occurred in both selling expenses and administrative expenses such as Depreciation expenses of building, equipment, utilities fee. These expenses will be allocated in the proportion of 40% for selling expenses and 60% for administrative expenses.

- **Other Expenses:** It is the expenses which are not included in selling & administrative expenses such as loan interest expenses, net loss expenses, etc.

- **Extraordinary Items:** It means that the revenue and expenses have these characteristics:

- It does not occur from the normal practice of the business.
- The expenses can not be expected to happen often or not.

- **Net Profit (Net Income) or Net Loss.**

Net Profit = Revenue - Expenses ; (revenue > expenses)

Net Loss = Revenue - Expenses ; (revenue < expenses)

iv. **Maintenance Cost.** Maintenance Cost is an expense that is reserved for preventing the damage, the deterioration of the equipment and also keep it has a good capacity through the useful life.

Examples of the maintenance Costs:

- Fill lubrication in machine.
- Change the accessories part.
- Labor cost.

v. **Market Value.** The market value is the value of equipment in the market during selling and buying whether the period of time. The price should be reasonable and no pressure on the price and it should be accepted by both parties. Some sellers can sell his or her equipment at higher or lower price than market value but it should be accepted by the buyer too.

vi. **Trade – In.** This price is quite similar with market value. This value is in case that the owner of old equipment wants to change to a new one and contact the seller. The seller want to buy the old one and sell the new one with a condition that the seller will buy the old equipment with a price and the remaining is to be paid by the buyer. If the buyer accepts that price which is called trade-in, then he or she can release the old one and get the new without the expenses of keeping the old equipment.

vii. **Salvage Value.** Salvage Value is the expected trade-in or market value at the end of the useful life of the asset. The salvage amount may be expressed as a percentage of the first cost and it may be positive, zero, or negative if dismantling costs or carry-away costs is anticipated. Current depreciation methods approved for tax purposes usually assume a salvage value of zero, even though the actual salvage value may be positive. This may force the payment of extra income taxes when an asset is sold with a net realized value greater than the current book value.

viii. **Useful Life.** Useful Life is the period of lifetime for equipment. Some equipment has 5 years, 10 years or no useful life; it depends on the types of equipment.

ix. **Interest Rate.** Interest is the manifestation of the time value of money. It is a measure of the increase between the original sum borrowed or invested and the final amount owed or accrued. If you invest money at some time in the past, the interest would be

$$\text{Interest} = \text{total amount accumulated} - \text{original investment}$$

On the other hand, if you borrow money at some time in the past, the interest would be

$$\text{Interest} = \text{present amount owed} - \text{original loan}$$

In either case, there is an increase in the amount of money that was originally invested or borrowed, and the increase over the original amount is the interest. When interest is expressed as a percentage of the original amount per unit time, which is called interest rate.

$$\text{Percentage interest rate} = \frac{\text{interest accrued per unit time}}{\text{Original amount}} = 100\%$$

These input information is useful for the users who want to replace their own equipment. They could use these information to put in the calculation equation, which are as follows:



Table 2.1. Standard Notations

To find	Given	Equation	Formula
Present Value	Future Value	$P = F(P/F, i\%, n)$	$P = F[1/(1+i)^n]$
Future Value	Present Value	$F = P(F/P, i\%, n)$	$F = P(1+i)^n$
Present Value	Present Value	$P = A(P/A, i\%, n)$	$P = A[(1+i)^n - 1 / i(1+i)^n]$
Annual Value	Present Value	$A = P(A/P, i\%, n)$	$A = P[i(1+i)^n / (1+i)^n - 1]$
Annual Value	Future Value	$A = F(A/F, i\%, n)$	$A = F[i / (1+i)^n - 1]$
Future Value	Annual Value	$F = A(F/A, i\%, n)$	$F = A[(1+i)^n - 1 / i]$

These formulae or equations are for you to calculate the timing of the cost but the best way and easier way that you can choose is Annual equation or formula. It is because that replacement analysis should be analysis for each year that we can know which year we should replace our equipment. Therefore, Annual calculation is the usual way used in the calculation of replacement analysis.

### III. THE APPRAISAL OF A MACHINE

An appraiser should have knowledge about the physical and running of the machine and they can consolidate accurate information.

#### A. Objectives of the Appraisal

The appraisal must have objectives; what do an appraiser want for the appraisal value. There are many objectives but depends on the assets or machine.

We categorize the objectives as follows:

- **Loan.** The business owner wants to buy a machine or any asset but has not enough money. Therefore, the bank is the way for him or her to get money to buy a machine or asset. Before a banker is going to give him or her a loan, he must appraise that asset or machine. The banker should analyse the benefits that the borrower could give back to the bank.
- **Insurance.** Insurance businesses also appraises an asset or machine because they must know the value of the assets or machine that they are going to insure for a limited amount of insurance.
- **Joint-Venture.** When one company joins business with another company it's called a Joint-Venture business. So, assets in both companies should show value and show to each company. The appraisal companies are the third party to appraise their assets and they can be trusted.

- Separated business or selling a business. A company which wants to separate or sell the business should know the value of each asset belonging to the business. The company should find the expert institution to settle the price. Appraisal institution is the answer for them to help settle the price of their assets.
- Buying and Selling. Normally, a buyer wants to buy at the lowest price but a seller wants to sell at the highest price. Therefore, the appraisal business was chosen to settle the value of the asset and both parties trust them.

These are the objectives that an appraiser should know which objective that he or she is going to appraise.

#### B. Steps of the Appraisal

The steps of the appraisal are as follows:

- i. Defining the appraisal problems.
- ii. Basics analyse and prepare the appraisal.
- iii. Integrate and analyse the data.
- iv. Analyse the best and usable of the appraisal.
- v. Appraise the value of assets.
- vi. Finding the relationship between value and
- vii. Report.

These are the steps of the appraisal for general purpose but we will specify on the machine. Therefore, the steps of the appraisal will be as follows:

i. Check a machine. Nowadays, the technology has developed and used for designing machines. Therefore, the old machines will quickly become out of date and the new machines have high capacity. This is a problem for the appraisers, they must develop their skill in checking each machine because of unused to the machines.

ii. Describe a machine. The appraiser could describe the machine for other users to know what is the character of this machine.

The methods of how to describe the machine are:

- Name of the machine.
- Name of the factory of the machine
- Type of the machine.
- Character of the machine, such as size and/or the capacity of the machine.
- No. of the machine.
- The character of the driving motor in the machine.
- The implement and equipment.
- The equipment of controlling, wiring and pipe system.

Besides of these methods, there are other methods that the appraiser should know the price of the new machine, the appraisal price, also the initial price, the useful life, the date of manufacturing. This information is useful in the calculation of taxation, accounting, insurance because these are important for the manufacturing.

The description of the machine can change the concepts that depend on the type of a machine.

iii. The appraisal. The machine has 3 methods of how to appraise.

- Compare with the marketing price.

- Compare with the cost.
- Compare with the revenue.

These methods help the appraiser to find out the result of the last value. Usually, the appraisers will not use all methods, but they will use only one method that is the cost method. This method could find the result that is not different from other methods. The appraiser uses only the cost method because it is easy to find the information if they can find other methods, they could use the other methods.

The price of the old machine is the first thing that the appraisers should find. One thing that they should know is that machine is often developed by new technology, so the owner of the business may or may not find out the same type of the old machine. The appraisers have to find out the price of the old type or find the price of the machine that has the similar character or instead of the exact machine. The price of the old machine should include the installation cost, insurance, and taxation. Therefore, the appraisers should have more experience to appraise the old machine and they should remember that the type of the old machine might not be produced. They should find out the similar type instead of making the appraisal complete.

iv. Depreciation. They find the price of the old machine after that they should calculate the market price of it. They should have the information of the machine before they appraise the machine. The information of appraising is:

- How is the machine maintenance?
- How did the machine work?
- How many hours did the machine run?
- Have the machine changed the engine for more efficiency?

The appraisers should know that the declination of the running machine will have the high depreciation more than the new machine and the stop-running machine will have more depreciation than the running machine. This step of depreciation is an important for the appraisal and effect to the market price.

The declination of the machine is separated in 2 ways.

- The declination cause of the running machine. Every machine has its useful life that made the machine decline following time.
- The declination cause of the economy. This is the outside factor that made the machine to decline such as the changing of the technology, policy of the government, changing the policy of the industry and enterprise.

The depreciation 4 methods such as Straight-line methods, Units-of-Production Method, Declining-Balance Method, and Sum-of-the-Years-Digits Method. If the machine is used until the useful life it will not have the book value but it may has the salvage value. Therefore, the appraisers should concentrate on the calculation.

v. The valuation. To set the valuation of the machine, the appraisers should understand the whole factors before setting the price. They should know where a buyer will use this machine and that should consist of the cost of installation, set the wire and/or pipes system. The appraiser will use these factors to adjust the price of the old machine to the buyer.

### C. Methods of the Appraisal

In the reality, appraisers do not need to know and understand the whole things about the appraisal that is the same as other occupations. The appraisers should not

know everything but have to be careful in the details that they do not know. The more information, the more efficient appraisal in a job. After they got enough information, they will conclude the report and send it back to the customer. The customer should match the report with their company policy for more appropriation.

They should find out the information for their appraisal.

- Source of the information. This step is more important because the detail of a machine for the appraisal is quite unavailable as compared to land or building. Other immovable property are concerned with 2 or 3 items but the machine is concerned with a hundred items for appraisal. Some items may have small value but it is important to have enough information otherwise they will work hard and issue an unusable report. The best source of the information is the owner of the machine. After they received the information, they should adjust and check again before formal use. Other sources come from Bank and friends who can provide the information to them.

- The market price. This is another factor that the appraiser should be concerned whether the machine has two market prices at the same time; the are the price to submit for tender and the price asked from sellers. The moving market provided 2 base prices for the representative to buy and sell and the second is buy. The appraisers should be concerned about the price from them because almost all the representative of buy and sell of the machine will mark up to be the high price for the popular machine. The machine, that is difficult to sell, was bought if it has very low cost or may be not be bought or they will sell before they buy the machine at reduced cost.

- The declining value of the unusable machine. The second-hand machine are of 2 types. First is the machine that is still running and second is a stopped machine.

The running will have the normal depreciation that becomes the normal market price but the stopped machine will have more depreciation and make the price reduced.

Example : The price of the machine is 120,000 baht but this price includes the transportation cost and other costs are required. So, the real price will be only  $\frac{2}{3}$  of the total price,  $120,000 \times \frac{2}{3} = 80,000$  baht. If we want to sell the existing machine the price will be reduced to half of the price that is  $80,000 \times \frac{1}{2} = 40,000$  baht. This price should depend on the old machine and whether the market already have a new type or not, if it has the price of the machine will become only half of the remaining price. Now the price became 20,000 baht. The concept of a buyer is that if they buy this machine and they will have the cost for maintaining it. He or she will reduce the price to become only  $\frac{1}{3}$  of the price that is  $20,000 \times \frac{1}{3} = 7,000$  baht.

The appraisers should be concerned for 2 values of the machine that is the offering price and the checking price. Therefore, they should clearly check the price before they do the appraisal.

- The usability of the machine. The first thing that is important in the appraisal is to check the capacity of the machine how much revenue it got. Not only these questions but also the questions of how long this machine could operate because a machine that could not produce and make the revenue is useless. This method is called Revenue Calculation but this method is not suitable because of the lack of information. So, they should find out the other methods. The popular method in the appraisal is Cost Calculation.

- Return on the investment. The appraisers should have some informations of how many years that buyer will have the return on investment. This step attracts the



buyer to buy the machine but the year that they calculate can be changed depends on the other factors that can happen in the future.

- Cost calculation. is method is better way to appraise the machine because more information is available. They could find the price of the new machine that is of the same type or a new type of the machine and also the transportation cost, installation cost. They use this information to adjust the information for find out other information such as the physical condition of the machine, and the useful life. These information made them know the remaining life of the machine and use for the insurance company.

Fare Value of the machine

$$= \frac{\text{Remaining life} \times \text{The price of machine replacement}}{\text{Useful life}}$$

There is no exact information in the appraisal. So, they should adjust the existing information to suit with the machine. They can find out the other information for comparing the machine from the market because they should have the completely information.

- The value of the old machine.

There are 3 types of the value of the old machine:

- i. Fair market value. This price set by appraisers who had adjusted the price. They considered not only the machine itself but also the cost of the settlement, the useful life that is also compared with other similar machines and the capacity that is compared with other similar machines.
- ii. The fare value. This price considered by insurance company is that the price will be higher than the fair market value. In case the machine had lost many

parts of it and should be replaced, so the insurance company have to pay the price (Fair Market Value) that includes a fine too.

iii. The mortgage value. This price will be lower than the Fair Market price because the seller knew that the machine that he or she wants to sell is not in the market demands. It is only that the buyer wants to buy to keep and expect that it will make a profit in the future. Therefore, the buyer give the lower price to the seller that will depend on the negotiation between them.

- The criteria of correction. The appraisers should be honest in their duties. The important duties that they should consider are:

- Analyse the transactions of the machine.
- Enter every transactions for use in the appraisal.
- Categorise the machine in responsibility.
- Consolidate the information for adjusting the price.

In the appraisal market it still wants an appraiser who have experience in the part of adjusting the price.

The appraisers meet the problems that will delay the appraisal:

- The difficulty in categorising the machine.
- Lack of information.
- Two values at the same time (the offering price and the checking price).
- Other problems.

The value of the machine will decline which follows the useful life of the

machine. Therefore, appraisers should be cautious to find the information, especially, the imitated machine that was spread in the market. They should check that the machine is registered at the registration office. So, the appraisal is an important business in the business world and they act as the middle party to help the business.



## IV. THE DECISION SUPPORT SYSTEMS

This chapter is considering the generic of Decision Support System and a reader could know the overview of the Decision Support System.

### A. Decision Support Systems

Decision Support Systems is supporting the decision processes of managers with flexible access to models and relevant information. This approach emphasises analysis of key decisions with the aim of improving both the effectiveness and the efficiency of decision making and also represents a point of view on the role of the computer in the management decision making process. Decision support implies the use of computers to:

- Assist managers in their decision making processes in semistructured tasks.
- Support, rather than replace, managerial judgement.
- Improve the effectiveness of decision making rather than its efficiency.

These aims have been made increasingly practicable by rapid changes in computer technology that now permits low-cost access to models, systems, and data bases. As these facilities become cheaper, more flexible, and more powerful, they open up new opportunities for managers to draw on computer support in making key decisions.

We now have the potential to develop altogether new ways of supporting decision processes.

First, there has been considerable technological progress. The evolution of remote access to computer power with short turnaround time opens a new set of possibilities in the area of information and decision systems. This evolution has resulted in a variety of specific computer systems, with direct and flexible use access as the common theme. In addition, low-cost typewriter and graphical display terminals have been developed through which users are linked to the resources of the computer system.

The second development in the last few years has been a conceptual one. An understanding of the inherent structure of information systems within organisations is emerging. Also, we adding to our knowledge of the ways in which human beings solve problems and of ways in which we can build models that capture aspects of their decision-making processes. These insights provide us with some important concepts for systems design.

The progress in these areas has been dramatic, and our planning and entirely new kinds of systems that dynamically involve the manager's judgement and support him with analysis, models, and flexible access to relevant information. In order to realise this potential, however, we must have an appropriate framework within which to view management decision making and systems support.

The concept of Decision Support Systems overlaps with other commentators' views on Management Information Systems (MIS) and on the broad field of Operations Research/ Management Science (OR/MS). We merely assert that the DSS approach merits a distinctive label and that it differs from MIS and OR/MS in terms of its area of impact on and payoff to the organisation and its relevance for managers.

The different of Management Information Systems, Operations Research / Management Science and Decision Support System are:

- Management Information Systems:
  - i. The main impact has been on structured tasks where standard operating procedures, decision rules, and information flows can be reliably predefined.
  - ii. The main payoff has been in improving efficiency by reducing costs, turnaround time, and so on, and by replacing clerical personnel.
  - iii. The relevance for managers' decision making has mainly been indirect.
- Operations Research / Management Science:
  - i. The impact has mostly been on structured problems (rather than tasks) where the objective that data and constraints can be prespecified.
  - ii. The payoff has been in generating better solutions for given types of problems.
  - iii. The relevance for managers has been the provision of detailed recommendations and new methodologies for handling complex problems.

- Decision Support Systems (these are claims as much as accomplishments):
  - i. The impact is on decisions in which there is sufficient structure for computer and analytic aids to be of value but where managers' judgement is essential.
  - ii. The payoff is in extending the range and capability of managers' decision processes to help them improve their effectiveness.
  - iii. The relevance for managers is the creation of a supportive tool, under their own control, which does not attempt to automate the decision process, predefine objectives, or impose solutions.

#### B. Framework of Decision Support Systems

The characteristics of the information necessary to support decision making in each of these three areas are so different that quite different information systems are appropriate in each of them. It should be clear that the information requirements of the operational control area are very different from those of the strategic planning area. This difference is not simply a matter of aggregation, but can be found in the fundamental character of the information needed by managers in these areas. In operational control the information tends to be from internal sources, quite detailed, historical in nature, often with a requirement of being current and accurate. Strategic planning information tends to be largely external, aggregate information dealing with the future and there is no particular need to be either current or accurate.

Keen and Scott-Morton (1978) pointed that Decision Support System covers the function of works that are following:

- Decision Support System was used for the specific analysis job and not do the job repeat.
- Decision Support System can answer the questions in sense of “What will it happen, if .....”.
- Decision Support System is not program to design the decision making for a manager or users but just for integrate the information and result of the analysis is just the advice for manager only.

Steven L. Alter who surveyed on Decision Support System's characteristics is divided it into a 7-category taxonomy:

- i. File drawer systems
- ii. Data analysis systems
- iii. Analysis information systems
- iv. Accounting models
- v. Representational models
- vi. Optimization models
- vii. Suggestion models

These 7 categories are also grouped into 2 groups: data-oriented systems (the first three) and model-oriented systems (the last four). Descriptions of these 7 categories are:



- i. File drawer system. It is basically the automated version of a simple file cabinet. The major difference between these systems and file cabinet-type systems is improved accuracy and speed.
- ii. Data analysis system. The examples of data analysis system are on-line budgeting systems, perform simple data analysis. The present results of operations can be compared with the past or with a target budget, and variation can be reported.
- iii. Analysis information system. The examples of analysis information system are regional analysis and sales force analysis, utilize a series of decision-oriented databases and small models in order to provide management information. These systems can analyze the present situation by using internal data. They can also generate a forecast for the next period based on the past performance.
- iv. Accounting models. They use definitional relationships and formulas in order to calculate the consequences of a particular action. Any “What-if” analysis type of model can be classified within this group. Sources and uses of funds are one example; break-even analysis is another.
- v. Representational models. They include simulation models that do not use definitional relationships available in accounting models, such as Monte Carlo simulation models. The outcome of this type of system is usually the estimation of consequences of a particular action over the entire system. For example, using Monte Carlo simulation one can see the effects of varying the number of operators assigned to a service station.
- vi. Optimization models. The most commonly used models, are designed either to maximize the profit or to minimize the cost. Any type of allocation model, including linear programming techniques, can be classified within this group.

vii. Suggestion models. They are structured than optimization models. The output of a suggestion model is the answer to a problem. A good example is a manufacturing control system. Based on a series of constraints and the existing situation, the system will calculate the production mix. This type of system can utilize any kind of model or formula in order to come up with the solution.

The major distinction between data-oriented systems and model-oriented systems is that the first group uses pure data analysis and the second group uses modeling analysis.

This report considers the Decision Support System for equipment replacement analysis. Therefore, we should know how Decision Support Systems help and solve a problem of the equipment replacement analysis. The next chapter will consider the relation of these two functions and how to input the data in to the major components of Decision Support Systems.

## **V. A DECISION SUPPORT SYSTEM FOR EQUIPMENT**

### **REPLACEMENT ANALYSIS**

Engineering analysis, especially in machinery and equipment replacement analysis are the major problems and difficulties in degrees of calculation and data gathering.

These difficulties and problems are solved by:

- Constructing the data gathering system that can record in the future. It is more convenient and faster than inputting new data every time. This system can adjust and compile data easily.
- Constructing package program in entire step of calculation and analysis. It decreases errors and the boring of frequently calculation. This program must be easily used, measured and also clearly analyzed until it finished.

The trend, which supports the decision support systems for equipment replacement analysis, can be divided into 5 categories: -

- **Data Management System**
  - External data.
  - Internal data.
- **Model Base Management System**

- Analysis Management System
- Dialogue Management System
  - Input data.
  - Recommendation
  - Data Adjustment
- Software Management System

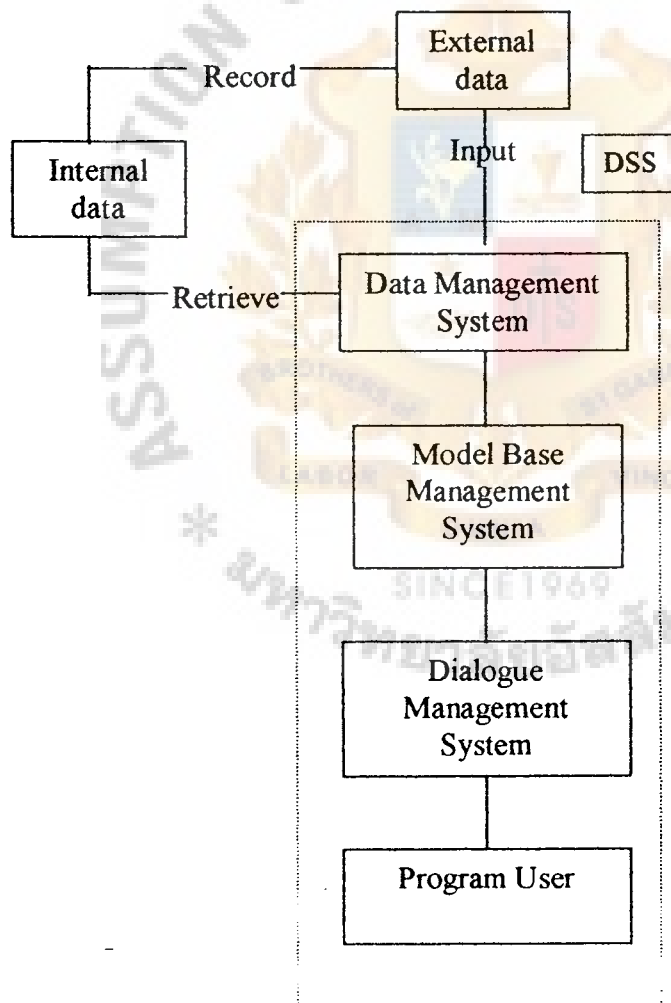


Figure 5.1. The Decision Support System for Equipment Replacement Analysis

#### A. Data Management System

This system is constructed in recording and gathering data faster and easily in next analysis. It can be divided into 2 categories:

- **External Data.** These are the temporary data and also were designed to support strategic planning in the company. The user wants to analyze it in each time without recording such as competition, labor markets, labor union activities, government activities, supplier, customers, technological breakthroughs, consumer behavior, tax structures, money market etc.
- **Internal Data.** These are generated and collected internally. They can involve transaction data, which are usually supported by an accounting subsystem in an organization, or other types of data collected internally from other subsystems such as marketing, manufacturing, or personnel. An accounting information system serves as the basis for any other information system in the organization by collecting and maintaining all the internal data. This may include payrolls, accounts receivable, accounts payable, purchasing and receiving, fixed or maintenance assets, and general ledgers.

Since the equipment replacement analysis can solve many methods and alternatives. The internal data must be gathered in the file in order to easily search and record.

These files can be categorized into:

- Defender file : Old equipment file

- Challenger file : New equipment file
- Lease file

The defender file is comprised of:

- Record data
- Equipment code
- Department
- ×• Name of equipment
  - Supplier
  - Salesperson
- ×• First Cost
- ×• Salvage value
- ×• Current annual operating cost
- ×• Current annual maintenance and other costs
- ×• Current annual savings
- ×• Estimated Life
- ×• Time put in service

The lease file is comprised of:

- Record data
- ×• Name of equipment
  - Supplier
  - Salesperson
- ×• Rental Cost

- ×• Current annual operating cost
- ×• Current annual maintenance cost

(Note) × = The variance needs for equipment replacement analysis.

Input data. The program will blank the space to fill each variance of data in order that the user can fill, adjust and record in the file. This is similar to input the temporary data for each analysis.

#### B. Model Base Management System

This system can calculate and analyze by the mathematics model and economic engineering with

- Time value of money
- Annual cost.
- Minimum annual cost
- Time value of money.

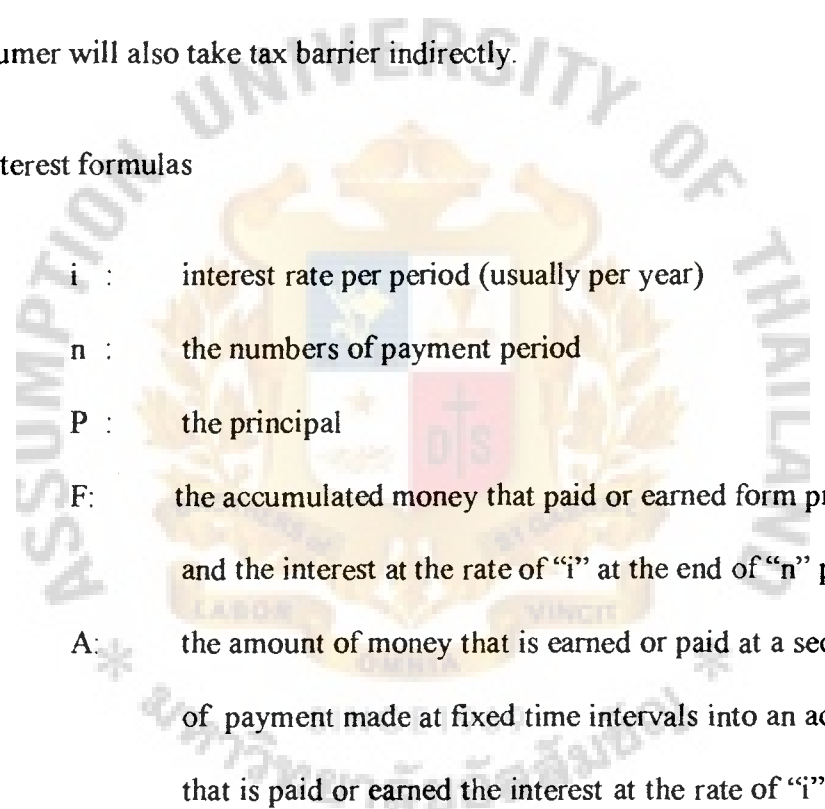
Annual cost as the major selective alternatives.

Money is the matter that humans defined to change goods or services. Everyone knows how to use money since he was young. When he grows up until he works in a job, he receives money in form of wages and salary depending on capability and knowledge. Money can be exchanged with goods and services as wanted. The sum of

money can be exchanged with the same quality of goods and services in decreasing quantities. It means that the value or price of goods increases. The economists said that the value of money can be changed at the decreasing of time period.

Lending normally has compensation or benefits that depends on the agreement between lender and borrower, that is directly involved interest. If the lender lends money to produce goods, the price of goods must include interest in cost of production. The consumer will also take tax barrier indirectly.

#### Interest formulas

- 
- A large, faint watermark of the Assumption University of Thailand is visible in the background of the text. It features a central shield with a cross and other heraldic elements, surrounded by the university's name in English and Thai script.
- i : interest rate per period (usually per year)
  - n : the numbers of payment period
  - P : the principal
  - F: the accumulated money that paid or earned form principal and the interest at the rate of “i” at the end of “n” period.
  - A: the amount of money that is earned or paid at a sequence of payment made at fixed time intervals into an account that is paid or earned the interest at the rate of “i” equally at “n” period.

- Annual Cost. The formulas of annual cost is:

Formulas (Blank and Tarquin, 1989)



$$\text{Annual Cost} = P(A/P, i, n) - S(A/F, i, n) + \text{current annual expense} \\ (\text{operating expense and maintenance expense})$$

P : First cost (initial cost)

S : Salvage value

- Current Annual Expense comprised of:
  - Current annual operating cost
  - Current annual maintenance and other costs
  - Current annual savings

$$\text{Current annual expenses} = a + b + c$$

i : interest rate per period (usually per year)

n : the numbers of payment period in tending agreement (per year)

$$A/P, i, n = \frac{i(1+i)^n}{i(1+i)^n - 1}$$

$$A/F, i, n = \frac{i}{(1+i)^n - 1}$$

- Minimum annual cost. When calculating annual cost, we have each alternative and comparing with the value of annual cost. The minimum annual cost will

be selected because it is suitable for using.

### C. Analysis Management System.

This system includes calculation and analysis. The user selects the structural analysis as desire:

- Calculating the suitable useful life of machinery and equipment.
- Equipment replacement analysis can be categorized into:
  - Expansion capacity analysis.
  - The comparison between defender and challenger.
  - The comparison of lease or purchase analysis.

These structures have different alternatives:

- The suitable useful life of equipment.

Alternative: should be substituted how many years of the remaining life.

- The equipment substitution can be divided into 3 categories:

- i. Expansion capacity analysis.

Alternatives: to select the challenger work with defender or to select the big challenger (new type of equipment) replace with defender.

- ii. Comparison between defender and challenger.

Alternatives: to select the challenger with defender in that condition or to select the challenger in that condition.

iii. Comparison between lease or purchase analysis.

Alternatives: to select the defender or to select the challenger or to lease in that condition.

#### D. Dialogue Management System

- **Input Data.** The user input data in to the program that is shown as the Excel sheet that is easy for input data and understands because the program has icon for easyness to choose the condition.
- **Recommendation.** This program will compare the result of the analysis and show the invited the best alternative by showing the annual cost for easy comparison.
- The user can delete the data by using the function “Delete” in the keyboard.

#### E. Software Management System

We use Microsoft Excel (97) to create the software program. It is because Excel' 97 is easy to use and users who know a little bit of knowledge of Excel can use this program. Excel'97 is also easy to write the command through the macro that is available in the Excel function. The structure program is also easy to understand and the manual of Excel is also available in the market or bookstores. In the future, this program that is created by using Microsoft Excel is easy to develop.

## VI. PROGRAM DEVELOPMENT

This report has developed a program to support the replacement analysis for more ease in calculation and help in decision-making.

This program is run on Excel'97 that is the latest application. This application is familiar with every user because Excel is an application for the purpose of calculating and is available in every computer, which has Microsoft Office. Excel also user interface and common use even who don't know Excel could easily learn and understand. Anyhow, Excel is only specific in general purposes that is not specific in details in what we exactly want. Therefore, we use Visual Basic to write the program for controlling and running the menu and specific task that we require. Visual Basic also made the program more accessible, user interface and match with the requirement.

The characteristics of Visual Basic Application:

- Easy to write the command.
- English Language as an intermediary.
- Any application like Excel, Access, Power point, etc. supported to Visual Basic.
- Easy to understand more than other language like C, COBOL, PASCAL, or FORTRAN.

This program is separated into six steps:

- i. Inquiry for Replacement Machines
- ii. Depreciation Calculation
- iii. Search Information
- iv. Calculation Payment
- v. Supporting Information
- vi. Maintain Information

Regarding the beginning, this program has to run on Excel'97. It means that users should have Excel'97 application to support the program. When opening this program, it will show the main menu which has message box to show the steps of works.

The methods of using this program are stated from the first step till the last step:

A. Inquiry for Replacement Machines

This sheet will help users to calculate about the replacement analysis. It has three parts in this sheet. The first one is replacement comparison between defender and challenger. The second one is comparison between buying and leasing. The last one is Loan that is in case that the company would like to borrow money from Finance Institution.

The users have to put on the data in to the black space following the transaction was given at the left-hand size. The steps of input the data following with the transaction:

- Initial Cost
  - Defender : Remaining amount of the machine or equipment
  - Challenger : The first cost (the price of the machine added with the set-up cost) of the machine or equipment
- Trade-in Value
  - Defender : -
  - Challenger : The price that challenger gives to the old machine
- Salvage Value. The approximate price of the machine that remaining in the market at the end period of life cycle.
- Annual Operating Cost and Annual Maintenance Cost. These are the cost that occurred during the period of working time. If the data of the users are not annual amount, the users should put in the total amount and press icon “Annual”. The total cost will change to be annual value (per year).
- Remaining Life / Useful Life
  - Defender : Remaining Life
  - Challenger : Useful Life
- Interest Rate. The interest rate in the period of time

After the users completely put on the data, then press icon “EUAW”, Equivalent

Uniform Annual Worth. The cost per year will show them and compare that with machine (challenger) should be chosen or should be continued for using the old machine. This calculation could help users compare among the machines that users want to replace with old machine.

The next steps that users can compare with are the leasing. If users want to know whether the machines should be bought or lease. They have to input the data of leasing in the black space under the block of leasing. After they put the whole information, replacement and leasing, then the conclusion will show the result which machine should be chosen and which methods should be chosen between buying or leasing.

After the users know the result then this program has other two services that can help them; which are Loan and The period that is appropriate for changing or replacing.

- Loan. The users have to press icon “Loan” then the message box will show the choice for choosing.
  - Find the Number of years. The user should put in the amount that you want to pay per month, then press “calculate” the number of year and month will show under the line of EUAW.
  - Find Annuity per month. The user should put in the number of period (per month), then press “calculate” the amount per period will show under the line of EUAW.
- The period that is appropriate for changing or replacing. The users can press icon “continue” then the sheet will show together that the information of the machine

was chosen. Then the users should input the salvage value of each year for making the cost per year more accurately. Then the users can look at the overview of the cost per year during the useful life of which year has the lowest cost then you can sell the machine on that year.

#### B. Depreciation Calculation

The users choose this choice then the message box will show as information for the users know that we have four types of depreciation for you to choose by using numeric 1,2,3,4 represented as Straight-line Method, Declining-Balance Method, Double-Declining Balance Method, Sum-of-the-year-digits Method. In this sheet, users should put in the data and also put the number of depreciation type. This is separated machine in each form and has menu “Print” and “Annual” for you to print and making the operation and maintenance cost to be annual (per year) one by one. After you finished putting in the data, then you press icon “Depreciation” for calculating the depreciation that will show under the form of information.

#### C. Search Information

This sheet will show the list of companies in each business type that can be related with to replacement analysis. The example is the business of Appraisal that helps the company to have more information or hire them-to appraise the old machine that you want to sell. Other services also have benefits to the company too. If you want to change and add the information you can go to another sheet, Maintain Information.



#### D. Calculation Payment

This sheet will support the user who would like to know the payment and the period that should be paid to Finance Institution. This sheet has two types of calculation:

- Calculation Payment
- Time Calculation.

The same concept of the sheet on that is the replacement analysis but this sheet can print the detail in each year until the lifetime.

The users can put the project name or machine name for specific detail then choose the type of payment. After that the message box will come out to put the data then press icon “Calculate”. There will be the message box to show the amount of payment or the period of payment. If you want to print you just press icon “Print” the detail will print out for you. If you want only to see the detail you press icon “Go to detail”, the detail will be shown on your monitor.

#### E. Supporting Information

This sheet will help the users to know about replacement analysis and depreciation shortly. When you choose the supporting information the message box will show two choices of Replacement Analysis and Depreciation Analysis.

Replacement Analysis will help the users to know the basic of calculation of Replacement Analysis. Depreciation Analysis will help them to know the calculation formula and types of depreciation.

#### F. Maintain Information

This sheet will support the sheet of Search Information because this sheet can change and add the information if the company requires. We protect this sheet with password to prevent the default and correct the data in the way of wrong purpose. The company has to set an employee that has authority to change and add the information. Any users would like to add or change have to give the information to the authorized person.

The module of this program will be shown in the Appendix A.

#### G. Picture of the Program

Only the explanation by literature is not clear. Therefore, I attached the picture to show the step of program from the first step till the last step. I will help a user to understand and clearly easily. The pictures will be shown in Appendix B.

## VII. SYSTEM EVALUATION AND TESTING

In this chapter, we will show the result of replacement analysis method in three cases. The data of these case studies will be analyzed with replacement analysis technique. We will use the manual calculation to analyze them. After that we will analyze with the replacement analysis program to developed and to be shown “source code” in the appendix A (the detail and specification of this program was discussed in previous chapter).

Next we will show the manual calculation and program calculation.

### A. Case Study 1 : Seamer-The Minimum-Cost Life

This case study use Seamer as an example for calculation in the concept of replacement analysis. The concept that will concentrate on the minimum-cost life is presently owned equipment.

This case study uses EUAW (Equivalent Uniform Annual Worth)

Seamer was chosen for this case study. The Seamer, SB-29, is old equipment in production department that is ordered from Taiwan. The details are as follows:

First Cost	1,000,000 THB
Salvage Value	0 THB

Estimate useful life	10	Years
Remaining life	3	Years
Market Price	100,000	THB
Operating and Maintenance Cost	50,000	THB

The operating and maintenance cost will increase every year about 15%.

The capacity of the equipment is 80 cans per minute.

Need to increase the capacity of production line. This case will concentrate on two alternatives of increasing the capacity. Two alternatives are as follow:

- i. Expand capacity by adding the same type of the equipment, SB-29 from Taiwan.
- ii. Sell the old equipment and buy the new one, Angelos from America, which has high speed and capacity.

Details of each alternative can be shown as follows:

Detail of the old equipment (Taiwan No. SB-29)

First Cost	1,000,000	THB
Salvage Value	0	THB
Estimate useful life	10	Years
Used for	7	Years

The capacity 80 cans per minute

Interest rate 14%

## Operation and Maintenance Cost:

- Operation Cost:

- Labor Cost Working time is about 26 days per month, each day works for 12 hours. Wages per day 140 THB / 8 hours (no overtime if more equipment).

Therefore, total expenses per year should be

$$= (140/8) * 26 * 12 * 12$$

$$= 65,520 \text{ THB}$$

- Electricity Cost Monthly cost = 1,200 THB

$$\text{Cost per year} = \underline{14,400 \text{ THB}}$$

$$\text{Total Operating Cost per year} = 65,520 + 14,400$$

$$= 79,920 \text{ THB}$$

- Maintenance Cost :

- Accessory and Repair Cost Monthly cost = 4,000 THB,

$$\text{Total cost} = 48,000 \text{ THB per year}$$

- Lubricant 1 gallon = 140 THB per week,

$$1 \text{ year} = 140 * 52 = 7,280 \text{ THB}$$

- Break down The break down for each equipment is 8% = 58

minute/day

$$\text{Lose per minute; labour cost} = 0.34 \text{ THB/minute}$$

$$; \text{ lost of opportunity for producing} = 0.50 \text{ THB/minute}$$

$$\text{Total lose per minute} = 0.34 + 0.50 = 0.84 \text{ THB/minute}$$

$$\text{per day} = 48.72 \text{ THB and estimate per year} = 15,200 \text{ THB}$$

Total Maintenance Cost per year = 70,480 THB

Details of the New Equipment (Taiwan No. SB-29)

First Cost 1,000,000 THB

Salvage Value 0 THB

Estimate useful life 10 Years

The capacity 100 cans per minute

Interest rate 14%

Operation and Maintenance Cost

- Operation Cost :

- Labor Cost Working time is about 26 days per month, each day works for 12 hours. Wages per day 140 THB / 8 hours (no overtime). Therefore,

Total expenses per year should be =  $(140/8) \times 26 \times 12 \times 12$

= 65,520 THB

- Electricity Cost Monthly cost = 1,200 THB

Cost per year = 14,400 THB

Total Operating Cost per year = 79,920 THB

- Maintenance Cost:

- Accessory and Repair Cost Monthly cost = 2,000 THB,

Total cost = 24,000 THB per year

- Lubricant 1 gallon = 140 THB per week,

1 year =  $140 \times 52 = \underline{7,280 \text{ THB}}$

– Break down. The break down for each equipment is 5%

= 36 minute/day

Lose per minute; labour cost = 0.34 THB/minute; lost of opportunity

for producing = 0.50 THB/minute

Total lose per minute =  $0.34 + 0.50$

= 0.84 THB/minute

per day = 30.24 THB and estimate per year = 9,450 THB

Total Maintenance Cost per year = 40,730 THB

#### Details of the New Equipment (America Type Angelor)

First Cost 3,000,000 THB

Salvage Value 0 THB

Estimate useful life 10 Years

The capacity 130 cans per minute (condition: - not buy the old equipment)

Interest rate 14%

#### Operation and Maintenance Cost

- Operation Cost:

– Labour Cost. The capacity of 2 equipment from Taiwan = 180

cans/minute 180 cans/minute spend 8 hours; 130 cans/minute spend  $(8 \times 180) / 130$

= 11.08 hours

Overtime 3 hours per day , labor cost 140 THB / day and overtime is 1.5 times

$$\text{Total overtime cost} = (140 \times 1.5) / 8 = 26.25 \text{ THB}$$

$$\text{Total labor cost per day} = 140 + (26.25 \times 3) = 219 \text{ THB}$$

$$\text{Total labor cost per year} = 219 \times 26 \times 12 = 68,328 \text{ THB}$$

$$\text{– Electricity Cost. Monthly cost} = 1,000 \text{ THB}$$

$$\text{Cost per year} = 12,000 \text{ THB}$$

$$\text{Total Operating Cost per year} = 80,328 \text{ THB}$$

- **Maintenance Cost:**

$$\text{– Accessory and Repair Cost Monthly cost} = 2,000 \text{ THB,}$$

$$\text{Total cost} = 24,000 \text{ THB per year}$$

$$\text{– Lubricant. 1 gallon} = 140 \text{ THB per week,}$$

$$1 \text{ year} = 140 \times 52 = 7,280 \text{ THB}$$

$$\text{– Break down. The break down for each equipment is 3\%}$$

$$= 22 \text{ minute/day, lose per minute; labour cost} = 0.34 \text{ THB/minute}$$

$$; \text{ lost of opportunity for producing} = 0.50 \text{ THB/minute}$$

$$\text{Total lose per minute} = 0.34 + 0.50 = 0.84 \text{ THB/minute}$$

$$\text{Lose per day} = 0.84 \times 22 = 18.48 \text{ THB}$$

$$\text{Lose per year} = 18.48 \times 12 = 5,800 \text{ THB}$$

$$\text{Total Maintenance Cost per year} = 37,080 \text{ THB}$$

If the company buy the new equipment, it can support the emergency production and also safety which is about 30,000 THB / year.

- **Manual Calculation with Replacement Analysis Method**

$$\text{– Expand capacity by adding the same type of the equipment, SB-29 from Taiwan}$$



The old equipment (Taiwan No. SB-29)

First Cost	1,000,000	THB
Salvage Value	0	THB
Market value (Cannot sell)	0	THB
Remaining life	3	Years
Operating Cost	79,920	THB
Maintenance Cost	70,480	THB
Capacity	80	Cans/minute
Interest Rate	14 %	

$$\begin{aligned}
 EUAW &= P (A/P, 14\%, 3) - S (A/F, 14\%, 3) + 79,920 + 70,480 \\
 &= 0 (A/P, 14\%, 3) - 0 (A/F, 14\%, 3) + 79,920 + 70,480 \\
 &= 150,400 \text{ THB}
 \end{aligned}$$

The same type of the old equipment for adding capacity (Taiwan No. SB-29)

First Cost	1,000,000	THB
Salvage Value	0	THB
Useful life	10	Years
Operating Cost	79,920	THB
Maintenance Cost	40,730	THB
Capacity	100	Cans/minute
Interest Rate	14 %	

$$\begin{aligned}
 EUAW &= 1,000,000 (A/P, 14\%, 10) - 0 + 79,920 + 40,730 \\
 &= 191,710 - 0 + 79,920 + 40,730 \\
 &= 312,360 \text{ THB}
 \end{aligned}$$

Total Cost for this alternative that included the old equipment cost and the new but same type

$$\begin{aligned}
 EUAW_1 &= 150,400 + 312,360 \\
 &= 462,760 \text{ THB}
 \end{aligned}$$

– Sell the old equipment and buy the new one, Angelos from America, which has high speed and capacity.

The new type of equipment for replacement (America No. Angelos)

First Cost	3,000,000 THB
Salvage Value	0 THB
Useful life	10 Years
Operating Cost	80,328 THB
Maintenance Cost	37,080 THB
Capacity	130 Cans/minute
Interest Rate	14 %

$$\begin{aligned}
EUAW_2 &= P(A/P, 14\%, 10) - 0 + 80,328 + 37,080 \\
&= 3,000,000(A/P, 14\%, 10) - 0 + 80,328 + 37,080 \\
&= 575,130 + 80,328 + 37,080 \\
&= 692,538 \text{ THB}
\end{aligned}$$

Conclusion for the cost of these 2 alternative that easy for manager to make the decision.

Total cost for alternative 1 = THB 462,760

Total cost for alternative 2 = THB 692,538

Therefore, we should choose the 1<sup>st</sup> alternative which cost about THB 462,760 for reduces the cost.

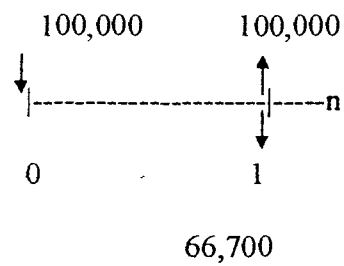
This result was compared with the company who gave the information, they also chose the 1<sup>st</sup> alternative because of the lowest cost.

\* Commend for old Machine\*

<u>Life Time</u>	Compare with	Operating and	
	<u>present period</u>	<u>Salvage Value</u>	<u>Maintenance Cost</u>
Present period	Year now	100,000 THB	50,000 THB
Year 8	Year 1	100,000 THB	66,700 THB
Year 9	Year 2	0 THB	66,700 THB
Year 10	Year 3	0 THB	66,700 THB

interest rate(MARR) = 14% per year

Year 1



$$P = 100,000$$

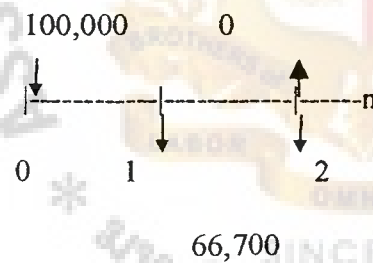
$$S = 100,000$$

$$\text{Annual O\&M} = 66,700$$

$$n = 1$$

$$i = 14\%$$

Year 2



$$P = 100,000$$

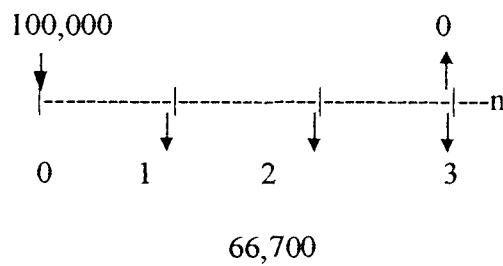
$$S = 0$$

$$\text{Annual O\&M} = 66,700$$

$$n = 2$$

$$i = 14\%$$

Year 3



$$P = 100,000$$

$$S = 0$$

$$\text{Annual O\&M} = 66,700$$

$$n = 3$$

$$i = 14\%$$

$$\begin{aligned} EUAW_1 &= P(A/P, i, n) + \text{Total Cost per month} - S(A/F, i, n) \\ &= 100,000 (A/P, 14\%, 1) + 66,700 (A/F, 14\%, 1) \\ &\quad - 100,000 (A/F, 14\%, 1) \\ &= 114,000 + 66,700 - 100,000 \\ &= 80,700.- \end{aligned}$$

$$\begin{aligned} EUAW_2 &= P (A/P, i, n) + \text{Total Cost per month} \\ &= 100,000 (A/P, 14\%, 2) + 66,700 \\ &= 60,729 + 66,700 \\ &= 127,429.- \end{aligned}$$

$$\begin{aligned}
 EUAW_3 &= P (A/P, i, n) + \text{Total Cost per month} \\
 &= 100,000 (A/P, 14\%, 3) + 66,700 \\
 &= 43,073 + 66,700 \\
 &= 109,773.-
 \end{aligned}$$

If no alternative, the old machine should be used for 1 year from now.

- Computerize Calculation with Replacement Analysis Method. The example will be shown in Appendix C.

#### B. Case Study 2 : The Equipment Replacement Considers with Buying or Renting

This case used Copy machine as a case study in the detail of should we buy or rent the copy machine? The new copyer and we shown the information of the old machine that which one has the lowest cost.

Need to buy or lease the new copy machine. In this case will concentrate on three alternatives:

- i. Use old copy machine continue, SHARP type SF- 7750.
- ii. Buy new copy machine, SHARP type SF- 8300, and sell old machine.
- iii. Lease copy machine, SHARP type SF- 8300, for using.

The details of each alternative can be shown as follows:

## Old Copy Machine Model SHARP type SF- 7750

SHARP type SF- 7750 is the type of the old Copy machine that could copy only A4 paper and B4 paper size. It could not make it small or wide. In case that the company wants to use other capacity he should go to SHARP's office and paid for time to time.

Cost SHARP SF- 7750	65,000	THB
Salvage Value	5,000	THB
Useful Life	5	Years
Used for	2	Years

- The Operating Cost:

- Estimate for copy the documents 10,000 papers / month and 120,000 papers / year,

Estimate the papers used size A4 70% = 84,000 papers / year

B4 20% = 24,000 papers / year

others size 10% = 12,000 papers / year

The cost of paper size A4 @reem 95 THB , one reem contain 425 papers

B4 @reem 130 THB, one reem contain 425 papers

Estimate the damage while copied per reem about 5%, each reem about 25 papers / reem. Therefore, the total cost of size A4 210 reems = 19,950 THB

B4 60 reems = 7,800 THB

Other size of paper went to SHARP's office cost 3.50 THB/ paper

Total Cost for others size  $12,000 \times 3.50 = 42,000$  THB

Total Cost of Papers 69,750 THB per year

- Electric City Cost about 15,000 papers / 400 THB = 3,200 THB
- Iron powder and ink powder that the seller changed for one time about

40,000 papers and the cost of the powders:-

Iron powder = 2,250 THB/each

Ink powder = 550 THB/each

These powder must changed together in average 3 times a year

Cost =  $(2,250 + 550) \times 3 = 8,400$  THB/year

- Ink powder that can buy not through the SHARP a bold can copy for 5,000 papers, one year used 24 bolds, each bold cost 550 baht =  $550 \times 24 = 13,200$  THB

- The Maintenance Cost:

- Drum each of them cost 3,000 THB and useful life is 1 year.
- Cleaning inside of the Copy machine every month, estimate cost per time 200 THB per year 2,400 THB

Total Operating Cost 94,550 THB

Total Maintenance Cost 6,000 THB

The copy machine model SHARP type SF- 8300 (Buying)

The company want to use the copy machine that has zoom and enlarge or other



Cost of SHARP SF-8300	158,000	THB
Salvage Value	10,000	THB
Useful Life	8	years

- The Operating Cost:
  - The estimate cost of copy's papers within a year
  - Other sizes of papers @reem 140 THB, each of one reem has 425

Other sizes for 30 reems = 4,200 THB

– Iron powder and Ink powder should be change by seller will change 60,000 paper as the estimated.

Ink powder 1 bottle = 900 THB

$$= 5,100 \text{ THB/year}$$

71

Total cost  $900 * 17 = 15,300$  THB/year

- The Maintenance Cost:

- Drum each of them cost 8,500 THB and useful life is 1 year.

- Cleaning inside of the Copy machine every month; estimate cost per time 200 THB per year 2,400 THB

Total Operating Cost      55,550      THB

Total Maintenance Cost      10,900      THB

The copy machine model SHARP type SF- 8300 (Leasing)

SHARP SF-8300 that is the type of the new copy machine. The details are as follows:

- The leasing Cost 1,000 THB per month, 12,000 THB per year
- Down Cost 8,000 THB at 1<sup>st</sup> year next year have the interest rate at 14%

the cost is  $8,000 * 14\% = 1,120$  THB.

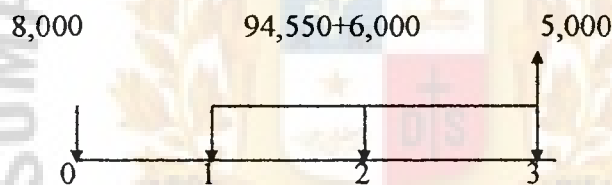
- The cost of papers are 28,200 THB per year
- Electric-City Expenses is 3,200 THB per year
- The cost for copying was charged by leaser, first of 3,000 papers cost at 1,500 THB. The next paper cost at 0.50 THB/paper, total cost per month is 5,000 THB then cost a year at 60,000 THB.

Total Cost for Leasing 12,000 THB

Total Expenses      92,520 THB

- Manual Calculation with Replacement Analysis Method
  - Use old copy machine continue, SHARP type SF- 7750

Cost of copy machine	65,000 THB
Salvage Value	5,000 THB
The remaining of useful life (5-2)	3 year
The Operating Cost	94,550 THB
The Maintenance Cost	6,000 THB
The old machine value that seller will buy	8,000 THB
The interest rate	14.00 %

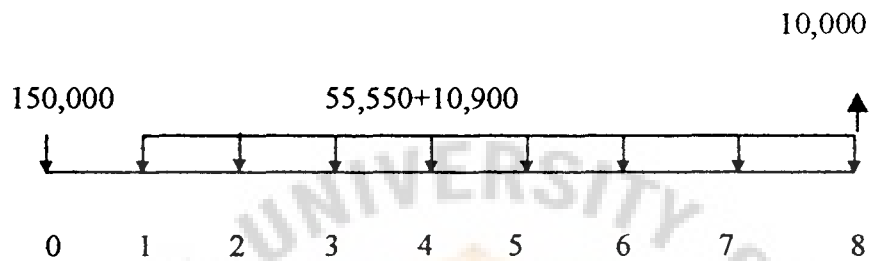


$$\begin{aligned}
 EUAW_1 &= 8,000 (A/P, 14\%, 3) - 5,000 (A/F, 14\%, 3) + 94,550 + 6,000 \\
 &= 1,992.19 + 94,550 + 6,000 \\
 &= 102,542.19 \text{ THB}
 \end{aligned}$$

- Buy new copy machine, SHARP type SF- 8300, and sell old machine

Cost of copy machine	158,000 THB
Salvage Value	10,000 THB
The Useful life	8 year

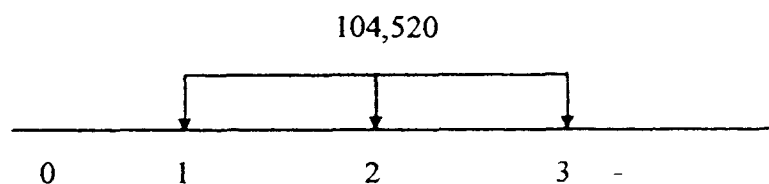
The Operating Cost	55,550 THB
The Maintenance Cost	10,900 THB
The Market Price for Old Machine	8,000 THB
The interest rate	14.00 %



$$\begin{aligned}
 EUAW_2 &= 150,000 (A/P, 14\%, 8) - 10,000 (A/F, 14\%, 8) + 55,550 + 10,900 \\
 &= 32,335.50 - 755.70 + 55,550 + 10,900 \\
 &= 98,029.80 \text{ THB}
 \end{aligned}$$

– Lease copy machine, SHARP type SF- 8300

The Lease Cost	12,000 THB
The Expenses Cost	92,520 THB
Total Cost per year	104,520 THB



$$EUAW_3 = 104,520 \text{ THB}$$

Conclusion for the cost of these 3 alternatives is easy for manager to make the decision.

Total cost for alternative 1 = THB 102,502.19

Total cost for alternative 2 = THB 98,029.80

Total cost for alternative 3 = THB 104,520

Therefore, the company should sell the old copy machine and buy the new type of SHARP SF-8300 that has the lowest cost among the old machine type and the leasing.

- Computerize Calculation with Replacement Analysis Method. The example will be shown in Appendix C.

### C. Case Study 3: The Equipment Replacement Analysis in Case of the Comparison of the Old Machine and the New Machine

This case concerns the cooling system that we will decide to change machine which will support the cooling system.

#### The Cooling System Technology

The cooling system is important to the production or direct to a machine. The machine or other equipment in the production line should have the cooling system to let off the heat during the time the machine works, such as Cooling machine, Air Conditioning, Air-Compressor, Punching machine, Plastic Injection, and so on.

The composition of the cooling system are as follow:

- Water pump made the water cycle in the cooling system.
- Machine and equipment that want to let off the heat.
- Cooling tower has the duty to let off the heat that water passed to the machine and equipment out off the machine.
- Air-Blower to let off the heat by the air that moves in the opposite direction with the water movement in the cooling tower.
- Water tank, Piping system, and Sediment strainer plate.

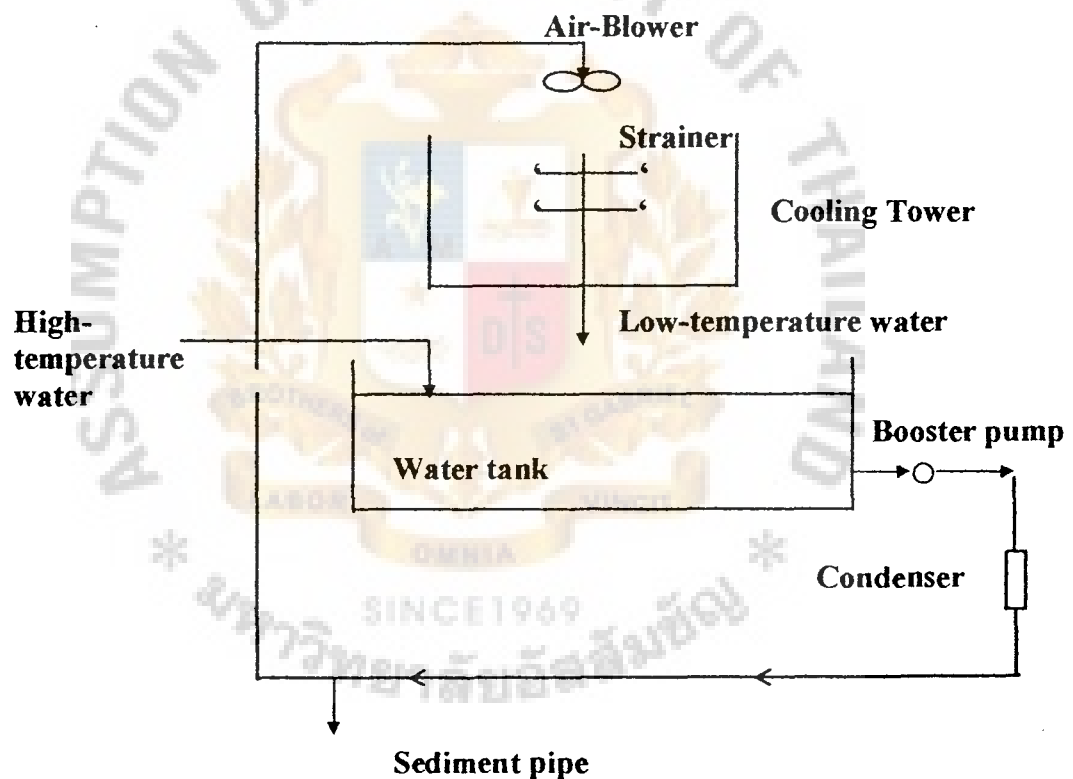


Figure 7.1. The System Working of Cooling System

The problems that occur in the cooling system

The cooling system that is used at this moment is the open system. The part of water will evaporate to let the remaining water have low temperature. The result to make the low temperature is getting high value of strong savant.

Separate the problems of the cooling system are as follows:

- The Scale of  $\text{CaCl}_2$ 
  - The cause      The strong of savant is getting high.
  - The effect      It reduced the capacity of the letting off the heat and to plug the pipe.
  - The solution: - We clean with chemical substances that consists of a catalyst such as  $\text{H}_2 \text{SO}_4$  conc.
    - To put the chemical substances to protect sidement such as Tachiles polylate, Selson.
    - To control the blow down.
- Growing of Lichen
  - The cause      The water in the cooling system get high temperature when it touches the sunshine. It makes the Fungi grow and also the Algae. These will consist of dust from air- blower, it will plug the pipe.
  - The effect      It reduced the capacity of the letting off the heat and to plug the pipe.
  - The solution      - It should be cleaned with the Neutralize solution.

- To fill the chemical to protect the Lichen such as Motorumin, Nichipat A3.

- The Dilute

- The cause The strong savant made the value of liquid became less alkaline(pH) and air-blower evacuate some light gas like sulpherdyodcycle ( $\text{SO}_2$ ) this gas is an acid.

- The effect This acid made the pipe equipment decayed and leaked.

- The solution - It should be cleaned with the chemical such as Stain SS, Stain CL

- To fill in the chemical to protect the sediment such as Polylate, Tachiles.

- To fill in the chemical like  $\text{CrO}_4$  compound.

Need to change the new system. In this case we will concentrate on two alternatives.

- i. Use old cooling system continue (Gas chlorinator – JESCO-C-2002 from German).

- ii. Replace by the new cooling system (Ozone generator - OZONAIR type RXO-15 from America).

The details of each alternative can be shown as follows:



### Details of the Old System (Gas Chlorinator - JESCO- C-2002 from Germany)

Gas chlorinator, the capacity of Gas could kill an infection and water plant that can solve the problem of the cooling system. On the other hand, the Gas chlorinator also has a capacity to decay a pipe. Therefore, if we use Gas chlorinator, we should use the chemical to protect the capacity of decaying.

The component of the injector machine for Gas chlorinator:

- Gas chlorinator
- Gas chlorine tank
- Safety valve
- Gas detector
- Injector
- Booster pump

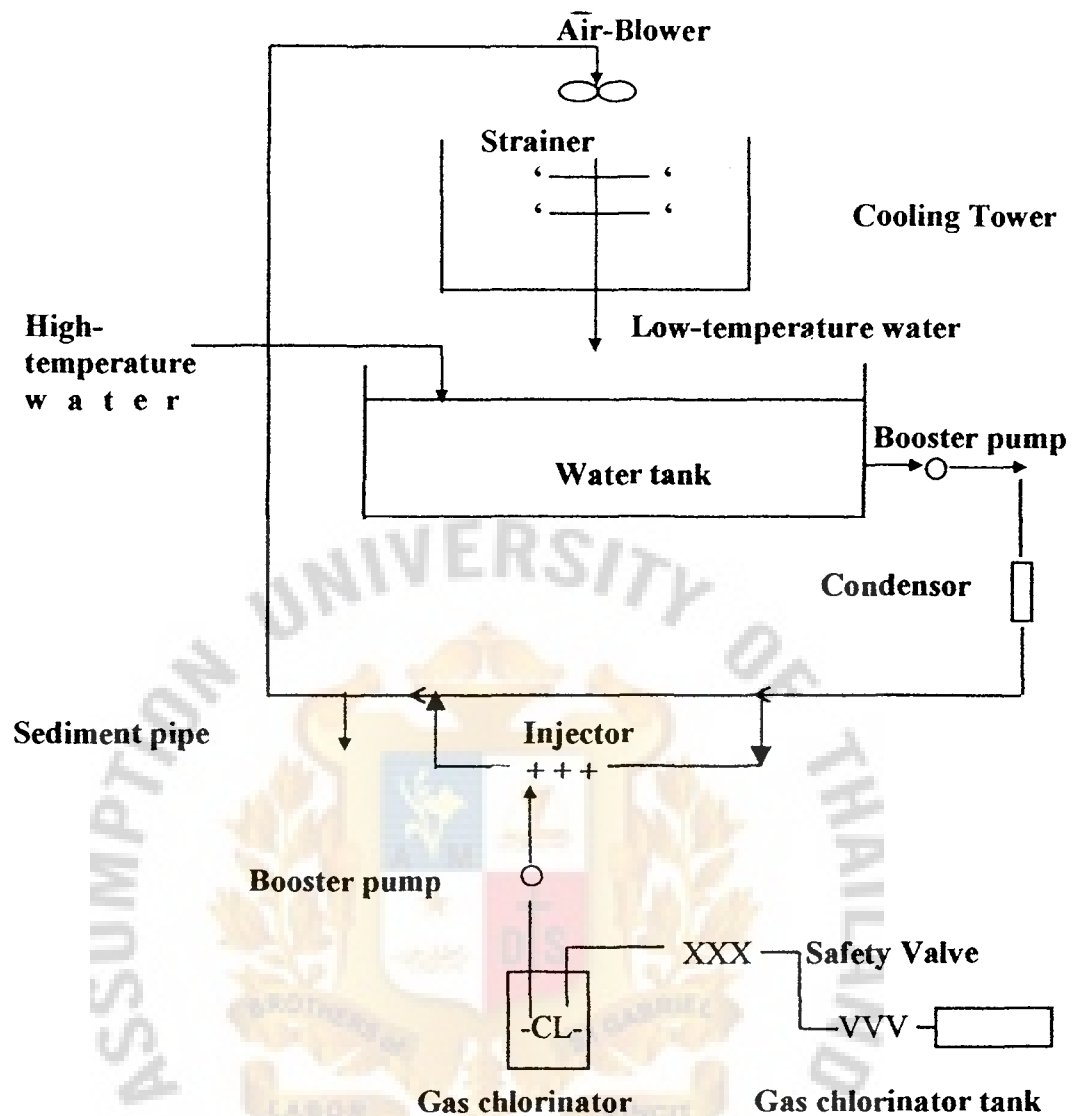


Figure 7.2. The Plan of Setting the Gas Chlorinator in the Cooling System

The details of the cooling system:

- The estimate of working time, start at 7.00 A.M.-21.00 P.M., total 14 hours 6 days per week, total for 1 year use 312 days or 4,368 hours.
- The flow rate of water - the estimate is 5 cm<sup>3</sup> per hour.

- The Expenditure Data:

- The quantity of Gas chlorinator at the estimate at 3,000 : 1,000,000 (ppm)
 
$$= 3,000 * (5 \text{ million cm}^3 \text{ per hour})$$

$$= 15,000 \text{ cm}^3 \text{ per hour}$$
 or
 
$$= 15,000 * 4,368 = 65,520,000 \text{ cm}^3$$

$$= 65,520 \text{ litre / year}$$

$\text{Density} = \text{Mass} / \text{Volume}$
--

The density of Gas chlorinator is 3.214 gram/litre

Therefore, Mass = Density \* Volume

$$= 3.214 * 65,520 = 210,581 \text{ grams}$$

$$= 210.58 \text{ Kg.}$$

The price for Gas chlorinator per 1 Kg. is  $210.58 * 32 = 6,740 \text{ Baht}$

- Anti-corrosion and Scale inhibition

10 litre per one week, one year is  $10 * 52 = 520 \text{ litre}$

Price per litre is 120 baht;  $520 * 120 = 62,400 \text{ Baht}$

- Back wash for Cooling Tower. It should be washed once a year that cost about 15,000 baht.
- The system of sending Gas Chlorinator should be used with the big booster pump. The price of the booster pump is 17,000 baht per 2 years. The manufacturing should be changed every 2 years because of the decadence.
- Labour Cost (operator) per 1 person, 120 baht per day,

per year is  $120 \times 312 = 37,440$  baht.

- The price of the checking tool for leaking gas chlorinator is about 12,000 baht, it has 4 years of useful life.

- The cost of the electricity for the whole system is about 1,200 watt/hour = 1.2 kilowatt/hour.

Therefore, the whole year will use  $1.2 \times 4,368 = 5,241.6$  kilowatt-hour/ hour.

The cost per kilowatt-hour/hour is 6 baht, the total expenses for the whole year is  $5,241.6 \times 6 = 31,450$  baht.

**The total cost for the old system is 164,530 baht**

#### Detail of the New System (Ozone Generator, OZONAIR Type RXO-15 from America)

This system uses ozone gas for killing an infection and water plant which is very well to solve the problem of cooling system. The decadenced problems of gas chlorinator are not problems in ozone gas system. Ozone gas is a light acid that could becomes oxygen and will not decay the pipe.

The component of the injector machine for Ozone Gas:

- Ozone generator
- Oxygen generator
- In-line contactor
- Water pump

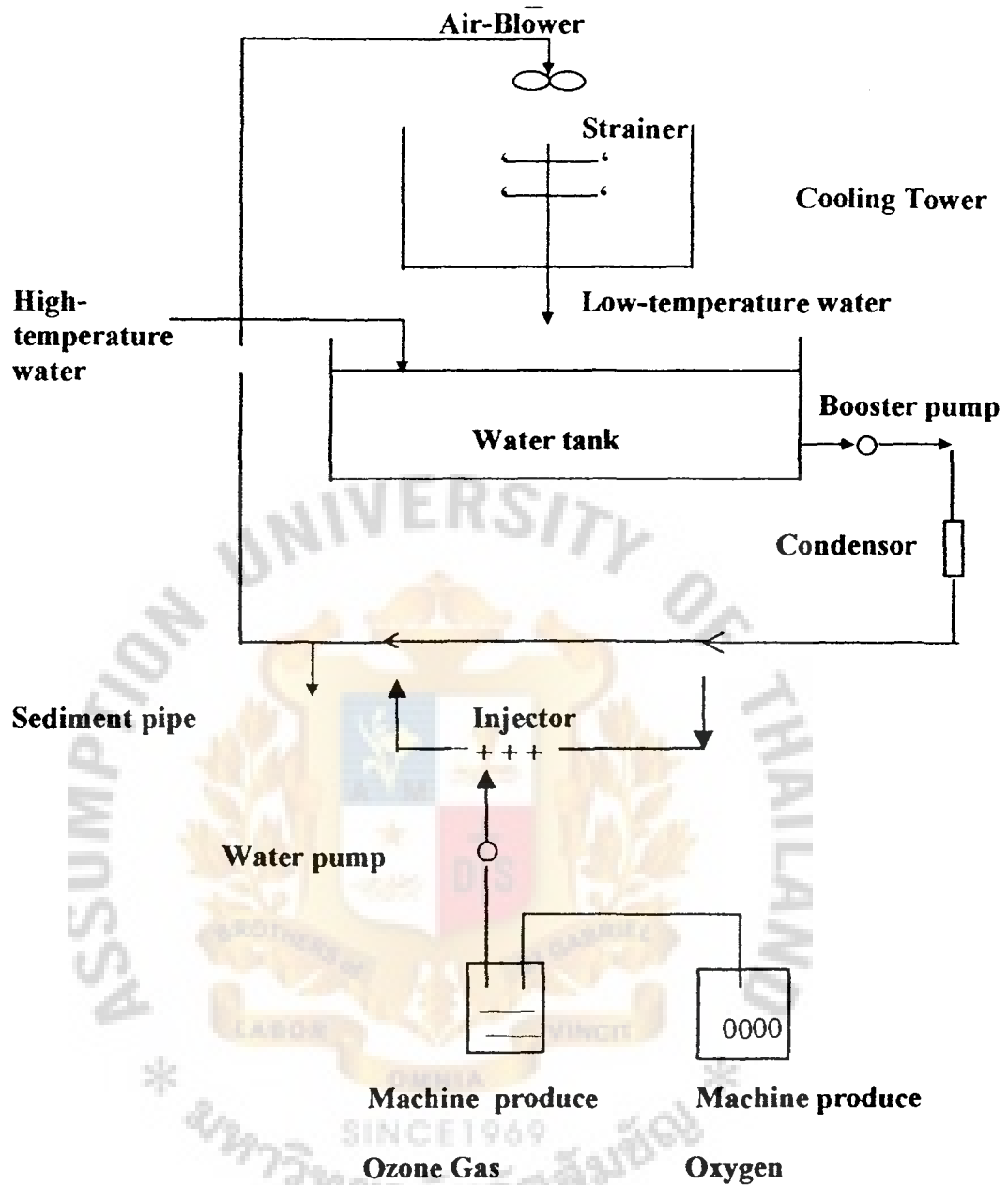


Figure 7.3. The Plan of Setting the Ozone Gas in the Cooling System

- The Expenditure Data:
  - Back wash will do it once a year and the cost is not too high because gas ozone has high capacity to immediately kill the infection and water plant and

no problems remained after wash.

- This system can use only a water pump because the system used the low water pressure. Therefore, the price of the piping is about 10,000 baht. The useful life is estimated about 4 years.

- Labour Cost (operator) for 1 person per day is about 120 baht, the cost per year is about  $120 \times 312 = 37,440$  baht.

- The cost of the electricity for the whole system is about 700 watt/hour = 0.7 kilowatt/hour.

Therefore, the whole year will use  $0.7 \times 4,368 = 3,058$  kilowatt-hour/ hour.

The cost per kilowatt-hour/hour is 6 baht, the total expenses for the whole year is  $3,058 \times 6 = 18,350$  baht.

**Total Cost for the new system is 68,290 baht**

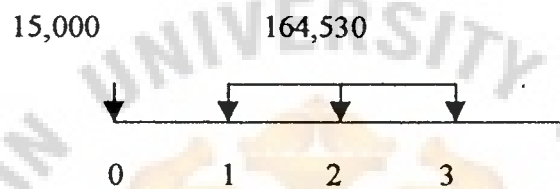
The benefit occurred using gas ozone system. This system that gas ozone could change to be an oxygen could be less maintenance cost because less decadence, wet and leak protection, reduced the safety life budget for workers. It saves the manufacturing about 2,000 baht per year.

- Manual Calculation with Replacement Analysis Method

- The calculation of the old system (Gas chlorinator - JESCO- C-2002 from German)

The Initial Cost	38,000	baht
Salvage value	0	year

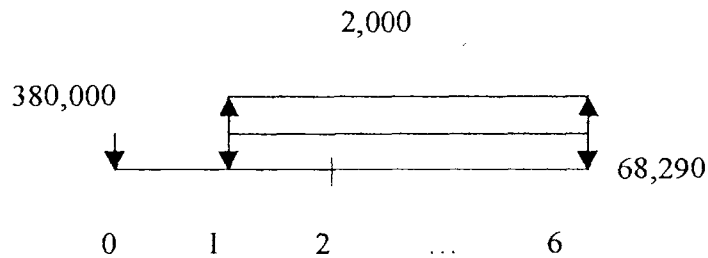
Useful Life	4	year
Used life	1	year
Market Price	15,000	baht
Total Cost (per year)	164,530	baht
Benefit (during a year)	0	baht
Interest Rate	14%	



$$\begin{aligned}
 EUAW_1 &= P(A/P, i\%, n) - S(A/F, i\%, n) + \text{Total Cost per year} \\
 &= 15,000 (A/P, 14\%, 3) - 0(A/F, 14\%, 3) + 164,530 \\
 &= 170,990 \text{ Baht}
 \end{aligned}$$

The new system (Ozone generator, OZONAIR type RXO-15 from America)

The Initial Cost	380,000	baht
Salvage value	0	year
Useful Life	6	year
Total Cost (per year)	68,290	baht
Benefit (during a year)	2,000	baht
Interest Rate	14%	



$$\begin{aligned}
 EUAW_2 &= P(A/P, i, n) - S(A/F, i, n) + \text{Total Cost per year} - \text{Benefit} \\
 &= 380,000 (A/P, 14\%, 6) - 0 (A/F, 14\%, 6) + 68,290 \\
 &\quad - 2,000 \\
 &= 97,720.80 - 0 + 68,290 - 2,000 \\
 &= 164,010.80 \text{ baht}
 \end{aligned}$$

Conclusion the cost of these 2 alternatives is easy for manager to make the decision.

Total cost for alternative 1 = THB 170,990

Total cost for alternative 2 = THB 164,010.80

Therefore, the company should choose the new system, Ozone Generator, because of the lowest cost.

- Computerize Calculation with Replacement Analysis Method. The example will be shown in Appendix C.



## VIII. CONCLUSION AND RECOMMENDATION

This Report analyses Replacement Analysis by using Decision Support System and develops a program to support the replacement calculation. The program can help a user to receive the effective calculation in the replacement analysis. The case study of the calculation came from the companies which kindly provided the information.

### A. Conclusions

- The Decision Support System can help the user delete the non-useful data and maintain the important information in the calculation. It will help to increase the speed in the analysis.
- The user who has no knowledge of Replacement Analysis can use this program and calculate by himself or herself. The program helps him or her to know what the data should be in the calculation and also reduce the risk of wrong decision making.
- The Decision Support System concept can advise the appropriate alternative and make the accurate figure for forecasting in the analysis. The final decision making will depend on the user or a manager that may be under the policy of their company.
- Other benefits from the program
  - To provide the knowledge of engineering economy by emphasis of replacement analysis and also is useful in the class of this subject
  - To help the user understand the concept of the analysis and to make

accurate calculation.

- To apply the Decision Support System with Replacement Analysis to help the user and the manager in which the best decision-making.
- To create the program to use easier, safe-time, use often, and help in the classroom.

## B. Recommendations

After using the program, we will know that we should improve the program by:

- The program should have the inspection of the accurate calculation or use the statistical technique to estimate the data in the future and record enough information. The program can use sensitivity study in using with the other factors and know the important factors that are involved. This method can make the user have more caution in finding the information.
- We should create the dynamic database that provides the users to set the factor by themselves following each machine and equipment in any situation. That will cover the whole factors that are required.
- There should be a program that can forecast the figure that can calculate the figure more accurately. Any other machines that remain enough useful life should not be analyzed in replacing with a new one.
- This program can use only the specific task. It uses the analysis of

replacement of machine or equipment. It cannot be used in other analyses in other fields.

### C. Future Study

- The program should have the taxation in the replacement analysis of machine and equipment. It can make the program to be harmonious with the real situation of the company.
- We should use the sensitivity study with the factors. It made the user be more cautious in the finding of the informations.
- We should test this program with other cases to find the weakness of this program. The weakness can be used as data to implement this program in the future.



## **APPENDIX A**

### **A MODULE PROGRAM**

```

****-----***
****-----***
PART 1
WRITE MODULE FOR CREATING APPLICATION FOR ANALYSIS MACHINE
****-----***
****-----***

```

```

Sub Run_Search()
    Application.ScreenUpdating = False
    Call clear_search
    Call Sort_data
    Sheets("inf_data").Range("a1").Value = "1"
    Sheets("Dialog_Search").Select
    DialogSheets("Dialog_Search").Show
End Sub

Sub Sort_data()
    Sheets("inf_data").Select
    Application.ScreenUpdating = False
    Range("B3:G100").Select
    Selection.Sort Key1:=Range("B3"), Order1:=xlAscending, header:=xlNo, _
        OrderCustom:=1, MatchCase:=False, Orientation:=xlTopToBottom
    Range("A1").Select
End Sub

Sub Maintain_data()
    Dim insertdata
    Dim editdata
    Dim msg
    If Sheets("maintain").Range("b3").Value = "" Or Sheets("maintain").Range("b5").Value = "" Or Sheets("maintain").Range("b6").Value = "" Or Sheets("maintain").Range("b7").Value = "" Or Sheets("maintain").Range("b8").Value = "" Or Sheets("maintain").Range("b9").Value = "" Then
        msg = MsgBox("Maintain data is not corect , please try agian or call system admin" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical, "Maintain Database")
        Sheets("maintain").Range("b3").Value = ""
        Sheets("maintain").Range("b5").Value = ""
        Sheets("maintain").Range("b6").Value = ""
        Sheets("maintain").Range("b7").Value = ""
        Sheets("maintain").Range("b8").Value = ""
        Sheets("maintain").Range("b9").Value = ""
    Else
        If (Sheets("inf_data").Range("aa3").Value) Like "NEW RECORD" Then
            insertdata = Sheets("inf_data").Range("b2000").Value
            Sheets("inf_data").Range("b" & insertdata).Value = Sheets("maintain").Range("b3").Value
            Sheets("inf_data").Range("c" & insertdata).Value = Sheets("maintain").Range("b5").Value
            Sheets("inf_data").Range("d" & insertdata).Value = Sheets("maintain").Range("b6").Value

```

```

        Sheets("inf_data").Range("e" & insertdata).Value = Sheets("maintain").Range
("b7").Value
        Sheets("inf_data").Range("f" & insertdata).Value = Sheets("maintain").Range
("b8").Value
        Sheets("inf_data").Range("g" & insertdata).Value = Sheets("maintain").Range
("b9").Value
        msg = MsgBox(Sheets("maintain").Range("b3").Value & " Company can append to
database " & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbInformation,
"Maintain Database")
        Sheets("maintain").Range("b3").Value = ""
        Sheets("maintain").Range("b5").Value = ""
        Sheets("maintain").Range("b6").Value = ""
        Sheets("maintain").Range("b7").Value = ""
        Sheets("maintain").Range("b8").Value = ""
        Sheets("maintain").Range("b9").Value = ""
    Else
        editdata = Sheets("inf_data").Range("ah3").Value
        Sheets("inf_data").Range("b" & editdata).Value = Sheets("maintain").Range
("b3").Value
        Sheets("inf_data").Range("c" & editdata).Value = Sheets("maintain").Range
("b5").Value
        Sheets("inf_data").Range("d" & editdata).Value = Sheets("maintain").Range
("b6").Value
        Sheets("inf_data").Range("e" & editdata).Value = Sheets("maintain").Range
("b7").Value
        Sheets("inf_data").Range("f" & editdata).Value = Sheets("maintain").Range
("b8").Value
        Sheets("inf_data").Range("g" & editdata).Value = Sheets("maintain").Range
("b9").Value
        msg = MsgBox(Sheets("maintain").Range("b3").Value & " Company can edit to
database " & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbInformation,
"Maintain Database")
        Sheets("maintain").Range("b3").Value = ""
        Sheets("maintain").Range("b5").Value = ""
        Sheets("maintain").Range("b6").Value = ""
        Sheets("maintain").Range("b7").Value = ""
        Sheets("maintain").Range("b8").Value = ""
        Sheets("maintain").Range("b9").Value = ""
    End If
End If
Sheets("maintain").Range("a1").Select
End Sub

Sub auto_open()
'Open Main Menu
On Error Resume Next
Sheets("mainmenu").Select
With ActiveWindow
    .DisplayGridlines = False
    .DisplayWorkbookTabs = False

```

```

        .DisplayHeadings = False
    End With
    Application.CommandBars("Formatting").Visible = False
    Application.CommandBars("Standard").Visible = False
    Application.DisplayFullScreen = True
    Call combine_menu
    Call dialog_menu_show
End Sub

Sub dialog_menu_show()
    Sheets("mainmenu").Select
    Range("c5").Select
    DialogSheets("Dialog_menu").Show
End Sub

Sub Check_mainmenu()
    Select Case Sheets("Inf_Data").Range("l6").Value
        Case 1
            Sheets("compare").Select
            Range("a1").Select
        Case 2
            Sheets("Input_form").Select
            Range("A1").Select
            Call inf_show
        Case 3
            Sheets("search").Select
            Range("a1").Select
        Case 4
            Sheets("main_menu").Select
            Range("a1").Select
        Case 5
            Call sup_inf_show
        Case 6
            DialogSheets("PASSWD").Show
    End Select
End Sub

Sub Option_dialog_show()
    DialogSheets("option_menu").Show
End Sub

Sub Option_dialog_CHECK()
    Application.ScreenUpdating = False
    Select Case Sheets("CAL_DEPRE").Range("A8").Value
        Case 1
            Sheets("compare").Select
            Range("a1").Select
        Case 2
            Sheets("compare_tax").Select
            Range("a1").Select
    End Select
End Sub

```

```

Sub Check_Search()
Dim endline As Integer
endline = Sheets("Inf_Data").Range("g1").Value
If Sheets("Inf_Data").Range("I1").Value = True Then
    Sheets("Inf_Data").Select
    Range("B2:g" & endline).Select
    Selection.Copy
    Sheets("Search").Select
    Range("A3").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone, SkipBlanks:= _
    False, Transpose:=False
    Range("a4").Select
Else
    Sheets("Inf_Data").Select
    Range("b1:f1").Select
    Selection.Copy
    Sheets("Search").Select
    Range("A4").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone, SkipBlanks:= _
    False, Transpose:=False
    Sheets("Inf_Data").Select
    Range("h3").Select
    Selection.Copy
    Sheets("Search").Select
    Range("f4").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone, SkipBlanks:= _
    False, Transpose:=False
    Sheets("search").Select
    Range("a4").Select
End If
End Sub
Sub clear_search()
    Sheets("Search").Range("A4:F100").Select
    Selection.ClearContents
    Range("A4").Select
End Sub
Sub Make_Annual0()
Dim msg
Sheets("Input_form").Select
For the old machine
If Range("c15").Value > 0 Then
    Range("c7").Value = Range("c7").Value / Range("c15").Value
    Range("c8").Value = Range("c8").Value / Range("c15").Value
    Range("c9").Value = Range("c9").Value / Range("c15").Value
    Range("c11").Value = Range("c11").Value / Range("c15").Value
ElseIf Range("c7").Value = 0 And Range("c8").Value = 0 And Range("c9").Value = 0 And
Range("c11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Old Machine " & (Chr(13) & Chr(10)

```



```

& "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual1()
Sheets("Input_form").Select
'For the machine 1
If Range("i15").Value > 0 Then
    Range("i7").Value = Range("i7").Value / Range("i15").Value
    Range("i8").Value = Range("i8").Value / Range("i15").Value
    Range("i9").Value = Range("i9").Value / Range("i15").Value
    Range("i11").Value = Range("i11").Value / Range("i15").Value
ElseIf Range("i7").Value = 0 And Range("i8").Value = 0 And Range("i9").Value = 0 And
Range("i11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Machine #1 " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual2()
Dim msg
Sheets("Input_form").Select
'For the machine 2
If Range("o15").Value > 0 Then
    Range("o7").Value = Range("o7").Value / Range("o15").Value
    Range("o8").Value = Range("o8").Value / Range("o15").Value
    Range("o9").Value = Range("o9").Value / Range("o15").Value
    Range("o11").Value = Range("o11").Value / Range("o15").Value
ElseIf Range("o7").Value = 0 And Range("o8").Value = 0 And Range("o9").Value = 0 And
Range("o11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Machine #2 " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual3()
Dim msg
Sheets("Input_form").Select
'For the machine 3
If Range("u15").Value > 0 Then
    Range("u7").Value = Range("u7").Value / Range("u15").Value
    Range("u8").Value = Range("u8").Value / Range("u15").Value
    Range("u9").Value = Range("u9").Value / Range("u15").Value
    Range("u11").Value = Range("u11").Value / Range("u15").Value
ElseIf Range("u7").Value = 0 And Range("u8").Value = 0 And Range("u9").Value = 0 And
Range("u11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Machine #3 " & (Chr(13) & Chr(10) &

```

```

"Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual4()
Dim msg
Sheets("Input_form").Select
'For the machine 4
If Range("aa15").Value > 0 Then
    Range("aa7").Value = Range("aa7").Value / Range("aa15").Value
    Range("aa8").Value = Range("aa8").Value / Range("aa15").Value
    Range("aa9").Value = Range("aa9").Value / Range("aa15").Value
    Range("aa11").Value = Range("aa11").Value / Range("aa15").Value
ElseIf Range("aa7").Value = 0 And Range("aa8").Value = 0 And Range("aa9").Value = 0
And Range("aa11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Machine #4 " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual5()
Dim msg
Sheets("Input_form").Select
'For the machine 5
If Range("ag15").Value > 0 Then
    Range("ag7").Value = Range("ag7").Value / Range("ag15").Value
    Range("ag8").Value = Range("ag8").Value / Range("ag15").Value
    Range("ag9").Value = Range("ag9").Value / Range("ag15").Value
    Range("ag11").Value = Range("ag11").Value / Range("ag15").Value
ElseIf Range("ag7").Value = 0 And Range("ag8").Value = 0 And Range("ag9").Value = 0
And Range("ag11").Value Then
    'Do nothing
Else
    msg = MsgBox("Please, Check Useful life of Machine #5 " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub Make_Annual6()
Dim msg
Sheets("Input_form").Select
'For the machine 6
If Range("am15").Value > 0 Then
    Range("am7").Value = Range("am7").Value / Range("am15").Value
    Range("am8").Value = Range("am8").Value / Range("am15").Value
    Range("am9").Value = Range("am9").Value / Range("am15").Value
    Range("am11").Value = Range("am11").Value / Range("am15").Value
ElseIf Range("am7").Value = 0 And Range("am8").Value = 0 And Range("am9").Value = 0
And Range("am11").Value Then
    'Do nothing
Else

```

```
msg = MsgBox("Please, Check Useful life of Machine #6 " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "CALCULATING DEPRECIATION")
```

```
End If
```

```
End Sub
```

```
Sub Make_Annual()
```

```
Call Make_Annual0
```

```
Call Make_Annual1
```

```
Call Make_Annual2
```

```
Call Make_Annual3
```

```
Call Make_Annual4
```

```
Call Make_Annual5
```

```
Call Make_Annual6
```

```
Range("a1").Select
```

```
End Sub
```

```
Sub Depreciation()
```

```
Application.ScreenUpdating = False
```

```
Dim method As Integer
```

```
Dim depre As Variant
```

```
Dim useful As Variant
```

```
Dim cost As Variant
```

```
Dim row_line
```

```
'For the old machine
```

```
'Clear old data
```

```
Sheets("Input_form").Select
```

```
Range("a20:ao1000").Select
```

```
Selection.ClearContents
```

```
Sheets("Cal_depre").Range("b20").Value = Range("c6").Value
```

```
Sheets("Cal_depre").Range("b21").Value = Range("c12").Value
```

```
Sheets("Cal_depre").Range("b22").Value = Range("c15").Value
```

```
cost = Range("c6").Value
```

```
method = Range("c19").Value
```

```
useful = Range("c15").Value
```

```
Sheets("Cal_depre").Select
```

```
If method > 0 And useful > 0 And cost > 0 Then
```

```
Select Case method
```

```
Case 1
```

```
'Straight Line Method
```

```
Range("c2").Select
```

```
Selection.Copy
```

```
Sheets("input_form").Select
```

```
Range("c21").Select
```

```
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
```

```
SkipBlanks:= _
```

```
False, Transpose:=False
```

```
Range("A20").Value = "Depreciation Expense Using Straight Line
```

```
Method of " & Range("c4").Value
```

```
Range("e21").Value = "Baht/year"
```

```
Case 2
```

```
'Declining Method
```

```
useful = useful + 1
```

```

Range("i2" & ":" & "i" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("c21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("b21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("A20").Value = "Depreciation Expense Using Declining Method
of " & Range("c4").Value
Range("e21").Value = "Baht/year"
Case 3
useful = useful + 1
Range("n2" & ":" & "n" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("c21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("b21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("A20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("c4").Value
Range("e21").Value = "Baht/year"
Case 4
useful = useful + 1
Range("s2" & ":" & "s" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("c21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select

```

```

Range("b21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("A20").Value = "Depreciation Expense Using Sum of Year
Digit Method of " & Range("c4").Value
Range("e21").Value = "Baht/year"
Case Else
Beep
msg = MsgBox("Select Deprecitation Method not correct of Old
Machine " & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
Sheets("input_form").Select
End Select
Else
msg = MsgBox("Key data is not correct of Old Machine, please check data again!"
& (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical, "CALCULATING
DEPRECIATION")
Sheets("input_form").Select
Range("c19").Select
End If
For the 1 new machine
Sheets("Cal_depre").Range("b20").Value = Range("i6").Value
Sheets("Cal_depre").Range("b21").Value = Range("i12").Value
Sheets("Cal_depre").Range("b22").Value = Range("i15").Value
cost = Range("i6").Value
method = Range("i19").Value
useful = Range("i15").Value
Sheets("Cal_depre").Select
If method > 0 And useful > 0 And cost > 0 Then
Select Case method
Case 1
'Straight Line Method
Range("c2").Select
Selection.copy
Sheets("input_form").Select
Range("i21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("g20").Value = "Depreciation Expense Using Straight Line
Method of " & Range("i4").Value
Range("k21").Value = "Baht/year"
Case 2
'Declining Method
useful = useful + 1
Range("i2" & ":" & "i" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("i21").Select

```

```

Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("h21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("g20").Value = "Depreciation Expense Using Declining Method
of " & Range("i4").Value
Range("k21").Value = "Baht/year"
Case 3
useful = useful + 1
Range("n2" & ":" & "n" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("i21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("h21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("g20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("i4").Value
Range("k21").Value = "Baht/year"
Case 4
useful = useful + 1
Range("s2" & ":" & "s" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("i21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("h21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _

```

```

        False, Transpose:=False
        Range("g20").Value = "Depreciation Expense Using Sum of Year Digit
Method of " & Range("i4").Value
        Range("k21").Value = "Baht/year"
    Case Else
        Beep
        msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 1" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
        Sheets("input_form").Select
    End Select

Else
    msg = MsgBox("Key data is not correct New Machine # 1, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
    Sheets("input_form").Select
    Range("i19").Select
End If

'For the 2 new machine
Sheets("Cal_depre").Range("b20").Value = Range("o6").Value
Sheets("Cal_depre").Range("b21").Value = Range("o12").Value
Sheets("Cal_depre").Range("b22").Value = Range("o15").Value
cost = Range("o6").Value
method = Range("o19").Value
useful = Range("o15").Value
Sheets("Cal_depre").Select
    If method > 0 And useful > 0 And cost > 0 Then
        Select Case method
            Case 1
                'Straight Line Method
                Range("c2").Select
                Selection.Copy
                Sheets("input_form").Select
                Range("o21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Range("m20").Value = "Depreciation Expense Using Straight Line
Method of " & Range("o4").Value
                Range("q21").Value = "Baht/year"
            Case 2
                'Declining Method
                useful = useful + 1
                Range("i2" & ":" & "i" & useful).Select
                Selection.Copy
                Sheets("input_form").Select
                Range("o21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Sheets("Cal_depre").Select

```



```

Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("n21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("m20").Value = "Depreciation Expense Using Declining Method
of " & Range("o4").Value
Range("q21").Value = "Baht/year"
Case 3
useful = useful + 1
Range("n2" & ":" & "n" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("o21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("n21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("m20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("o4").Value
Range("q21").Value = "Baht/year"
Case 4
useful = useful + 1
Range("s2" & ":" & "s" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("o21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("n21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("m20").Value = "Depreciation Expense Using Sum of Year
Digit Method of " & Range("o4").Value
Range("q21").Value = "Baht/year"

```



```

        Case Else
            Beep
            msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 2 " & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
            Sheets("input_form").Select
        End Select
    Else
        msg = MsgBox("Key data is not correct of New Machine # 2, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
        Sheets("input_form").Select
        Range("o19").Select
    End If
'For the 3 new machine
    Sheets("Cal_depre").Range("b20").Value = Range("u6").Value
    Sheets("Cal_depre").Range("b21").Value = Range("u12").Value
    Sheets("Cal_depre").Range("b22").Value = Range("u15").Value
    cost = Range("u6").Value
    method = Range("u19").Value
    useful = Range("u15").Value
    Sheets("Cal_depre").Select
    If method > 0 And useful > 0 And cost > 0 Then
        Select Case method
            Case 1
                'Straight Line Method
                Range("c2").Select
                Selection.copy
                Sheets("input_form").Select
                Range("u21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                    False, Transpose:=False
                Range("s20").Value = "Depreciation Expense Using Straight Line
Method of " & Range("u4").Value
                Range("w21").Value = "Baht/year"
            Case 2
                'Declining Method
                useful = useful + 1
                Range("i2" & ":" & "i" & useful).Select
                Selection.copy
                Sheets("input_form").Select
                Range("u21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                    False, Transpose:=False
                Sheets("Cal_depre").Select
                Range("j2" & ":" & "j" & useful).Select
                Selection.copy
                Sheets("input_form").Select
                Range("t21").Select

```

```

        Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
        False, Transpose:=False
        Range("s20").Value = "Depreciation Expense Using Declining Method
of " & Range("u4").Value
        Range("w21").Value = "Baht/year"
        Case 3
            useful = useful + 1
            Range("n2" & ":" & "n" & useful).Select
            Selection.copy
            Sheets("input_form").Select
            Range("u21").Select
            Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
            False, Transpose:=False
            Sheets("Cal_depre").Select
            Range("j2" & ":" & "j" & useful).Select
            Selection.copy
            Sheets("input_form").Select
            Range("t21").Select
            Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
            False, Transpose:=False
            Range("s20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("u4").Value
            Range("w21").Value = "Baht/year"
            Case 4
                useful = useful + 1
                Range("s2" & ":" & "s" & useful).Select
                Selection.copy
                Sheets("input_form").Select
                Range("u21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Sheets("Cal_depre").Select
                Range("j2" & ":" & "j" & useful).Select
                Selection.copy
                Sheets("input_form").Select
                Range("t21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Range("s20").Value = "Depreciation Expense Using Sum of Year Digit
Method of " & Range("u4").Value
                Range("w21").Value = "Baht/year"
            Case Else
                Beep
                msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 3 " & Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")

```

```

        Sheets("input_form").Select
    End Select
Else
    msg = MsgBox("Key data is not correct of New Machine # 3, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
    Sheets("input_form").Select
    Range("u19").Select
End If

'For the 4 new machine
Sheets("Cal_depre").Range("b20").Value = Range("aa6").Value
Sheets("Cal_depre").Range("b21").Value = Range("aa12").Value
Sheets("Cal_depre").Range("b22").Value = Range("aa15").Value
cost = Range("aa6").Value
method = Range("aa19").Value
useful = Range("aa15").Value
Sheets("Cal_depre").Select
    If method > 0 And useful > 0 And cost > 0 Then
        Select Case method
            Case 1
                'Straight Line Method
                Range("c2").Select
                Selection.Copy
                Sheets("input_form").Select
                Range("aa21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Range("y20").Value = "Depreciation Expense Using Straight Line
Method of" & Range("aa4").Value
                Range("ac21").Value = "Baht/year"
            Case 2
                'Declining Method
                useful = useful + 1
                Range("i2" & ":" & "i" & useful).Select
                Selection.Copy
                Sheets("input_form").Select
                Range("aa21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
                Sheets("Cal_depre").Select
                Range("j2" & ":" & "j" & useful).Select
                Selection.Copy
                Sheets("input_form").Select
                Range("z21").Select
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False

```

```

Range("y20").Value = "Depreciation Expense Using Declining Method of
" & Range("aa4").Value
Range("ac21").Value = "Baht/year"
Case 3
    useful = useful + 1
    Range("n2" & ":" & "n" & useful).Select
    Selection.Copy
    Sheets("input_form").Select
    Range("aa21").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
    Sheets("Cal_depre").Select
    Range("j2" & ":" & "j" & useful).Select
    Selection.Copy
    Sheets("input_form").Select
    Range("z21").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
    Range("y20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("aa4").Value
    Range("ac21").Value = "Baht/year"
Case 4
    useful = useful + 1
    Range("s2" & ":" & "s" & useful).Select
    Selection.Copy
    Sheets("input_form").Select
    Range("aa21").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
    Sheets("Cal_depre").Select
    Range("j2" & ":" & "j" & useful).Select
    Selection.Copy
    Sheets("input_form").Select
    Range("z21").Select
    Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
    Range("y20").Value = "Depreciation Expense Using Sum of Year Digit
Method of " & Range("aa4").Value
    Range("ac21").Value = "Baht/year"
Case Else
    Beep
    msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 4 " & Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
    Sheets("input_form").Select
    End Select
Else

```

```

msg = MsgBox("Key data is not correct of New Machine # 4, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")

```

```

    Sheets("input_form").Select
    Range("aa19").Select

```

```
End If
```

```
'For the 5 new machine
```

```

    Sheets("Cal_depre").Range("b20").Value = Range("ag6").Value
    Sheets("Cal_depre").Range("b21").Value = Range("ag12").Value
    Sheets("Cal_depre").Range("b22").Value = Range("ag15").Value
    cost = Range("ag6").Value
    method = Range("ag19").Value
    useful = Range("ag15").Value
    Sheets("Cal_depre").Select

```

```
    If method > 0 And useful > 0 And cost > 0 Then
```

```
        Select Case method
```

```
            Case 1
```

```
                'Straight Line Method
```

```
                Range("c2").Select
```

```
                Selection.Copy
```

```
                Sheets("input_form").Select
```

```
                Range("ag21").Select
```

```
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
```

```
SkipBlanks:= _
```

```
                False, Transpose:=False
```

```
                Range("ae20").Value = "Depreciation Expense Using Straight Line
```

```
Method of " & Range("ag4").Value
```

```
                Range("ai21").Value = "Baht/year"
```

```
            Case 2
```

```
                'Declining Method
```

```
                useful = useful + 1
```

```
                Range("i2" & ":" & "i" & useful).Select
```

```
                Selection.Copy
```

```
                Sheets("input_form").Select
```

```
                Range("ag21").Select
```

```
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
```

```
SkipBlanks:= _
```

```
                False, Transpose:=False
```

```
                Sheets("Cal_depre").Select
```

```
                Range("j2" & ":" & "j" & useful).Select
```

```
                Selection.Copy
```

```
                Sheets("input_form").Select
```

```
                Range("af21").Select
```

```
                Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
```

```
SkipBlanks:= _
```

```
                False, Transpose:=False
```

```
                Range("ae20").Value = "Depreciation Expense Using Declining
```

```
Method of " & Range("ag4").Value
```

```
                Range("ai21").Value = "Baht/year"
```

```
            Case 3
```

```
                useful = useful + 1
```

```

Range("n2" & ":" & "n" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("ag21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("af21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
Range("ae20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("ag4").Value
Range("ai21").Value = "Baht/year"
Case 4
    useful = useful + 1
Range("s2" & ":" & "s" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("ag21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("af21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
    False, Transpose:=False
Range("ae20").Value = "Depreciation Expense Using Sum of Year
Digit Method of " & Range("ag4").Value
Range("ai21").Value = "Baht/year"
Case Else
    Beep
    msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 5" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
    Sheets("input_form").Select
End Select
Else
    msg = MsgBox("Key data is not correct of New Machine # 5, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
    Sheets("input_form").Select

```

```

Range("ag19").Select
End If
For the 6 new machine
  Sheets("Cal_depre").Range("b20").Value = Range("am6").Value
  Sheets("Cal_depre").Range("b21").Value = Range("am12").Value
  Sheets("Cal_depre").Range("b22").Value = Range("am15").Value
  cost = Range("am6").Value
  method = Range("am19").Value
  useful = Range("am15").Value
  Sheets("Cal_depre").Select
    If method > 0 And useful > 0 And cost > 0 Then
      Select Case method
        Case 1
          'Straight Line Method
          Range("c2").Select
          Selection.copy
          Sheets("input_form").Select
          Range("am21").Select
          Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
          False, Transpose:=False
          Range("ak20").Value = "Depreciation Expense Using Straight Line
Method of " & Range("am4").Value
          Range("ao21").Value = "Baht/year"
        Case 2
          'Declining Method
          useful = useful + 1
          Range("i2" & ":" & "i" & useful).Select
          Selection.copy
          Sheets("input_form").Select
          Range("am21").Select
          Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
          False, Transpose:=False
          Sheets("Cal_depre").Select
          Range("j2" & ":" & "j" & useful).Select
          Selection.copy
          Sheets("input_form").Select
          Range("al21").Select
          Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
          False, Transpose:=False
          Range("ak20").Value = "Depreciation Expense Using Declining
Method of " & Range("am4").Value
          Range("ao21").Value = "Baht/year"
        Case 3
          useful = useful + 1
          Range("n2" & ":" & "n" & useful).Select
          Selection.copy
          Sheets("input_form").Select
          Range("am21").Select

```



```

Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("a121").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("ak20").Value = "Depreciation Expense Using Double Declining
Method of " & Range("am4").Value
Range("ao21").Value = "Baht/year"
Case 4
useful = useful + 1
Range("s2" & ":" & "s" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("am21").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Sheets("Cal_depre").Select
Range("j2" & ":" & "j" & useful).Select
Selection.copy
Sheets("input_form").Select
Range("a121").Select
Selection.PasteSpecial Paste:=xlValues, Operation:=xlNone,
SkipBlanks:= _
False, Transpose:=False
Range("ak20").Value = "Depreciation Expense Using Sum of Year
Digit Method of " & Range("am4").Value
Range("ao21").Value = "Baht/year"
Case Else
Beep
msg = MsgBox("Select Deprecitation Method not correct of New
Machine # 6 " & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
Sheets("input_form").Select
End Select
Else
msg = MsgBox("Key data is not correct of New Machine # 6, please check data
again!" & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical,
"CALCULATING DEPRECIATION")
Sheets("input_form").Select
Range("ao19").Select
End If

```



```

End Sub
Sub Quit_application()
Dim msg
    Beep
    msg = MsgBox("Thank you for using our services " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbInformation, "Donna Consultant Co., Ltd")
    Call reset_allmenu
With Application
    .DisplayFormulaBar = True
    .DisplayStatusBar = True
    .DisplayNoteIndicator = True
    .DisplayFullScreen = False
End With
With ActiveWindow
    .DisplayHorizontalScrollBar = True
    .DisplayVerticalScrollBar = True
    .DisplayWorkbookTabs = True
End With
Sheets("mainmenu").Select
Application.CommandBars("Formatting").Visible = True
Application.CommandBars("Standard").Visible = True
'ActiveWindow.Close saveChanges:=True
Application.Quit
End Sub
Sub Find_EAUW()
Dim answer
Dim msg
Dim row
Dim useful
    row = 1400
    Application.ScreenUpdating = False
    Sheets("compare").Range("a1400:a1405").Select
    Selection.ClearContents
    Sheets("compare").Range("a16:h16").Select
    Selection.ClearContents
    Sheets("compare").Range("a18").Select
    Selection.ClearContents

If Sheets("compare").Range("b12").Value <> 0 And Sheets("compare").Range
("c12").Value = 0 And Sheets("compare").Range("d12").Value = 0 And Sheets
("compare").Range("e12").Value = 0 And Sheets("compare").Range("f12").Value = 0 And
Sheets("compare").Range("g12").Value = 0 And Sheets("compare").Range("h12").Value =
0 Then
    answer = "We suggest to replace the old machine "
    Range("a18").Value = answer
    Sheets("op_year").Range("b4").Value = Sheets("compare").Range("b6").Value
    Sheets("op_year").Range("b6").Value = Sheets("compare").Range("b9").Value
    Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("b10").Value
    Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("b12").Value

```

```

        Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
        useful = Sheets("compare").Range("b12").Value
        Sheets("op_year").Select
        Range("b11:b110").Select
        Selection.ClearContents
        Range("a12:c110").Select
        Selection.ClearContents
        Range("a10:c110").Select
        Selection.Borders(xlEdgeBottom).LineStyle = xlNone
        Selection.Borders(xlInsideHorizontal).LineStyle = xlNone
        Range("a11:c11").Select
        Selection.Copy
        useful = useful + 11 - 1
        If useful > 11 Then
            Sheets("op_year").Range("a12" & ":" & "c" & useful).Select
            Selection.PasteSpecial Paste:=xlFormulas, Operation:=xlNone,
SkipBlanks:= _
                False, Transpose:=False
            Range("a" & useful & ":" & "c" & useful).Select
            With Selection.Borders(xlEdgeBottom)
                .LineStyle = xlContinuous
                .Weight = xlMedium
                .ColorIndex = xlAutomatic
            End With
        Else
            Range("a11:c11").Select
            With Selection.Borders(xlEdgeBottom)
                .LineStyle = xlContinuous
                .Weight = xlMedium
                .ColorIndex = xlAutomatic
            End With
        End If
        Sheets("compare").Select
        Range("a1").Select
        Application.ScreenUpdating = True
        Range("a18").Select

```

Else

answer = "We suggest to replace the old machine with "

```

        Sheets("Cal_Eauw").Select
        - If Range("i8").Value = Range("c8").Value Then
            answer = answer & " Machine " & Range("c3").Value
            If Abs(Sheets("compare").Range("c15").Value) <= Sheets("compare").Range
("c26").Value And Abs(Sheets("compare").Range("c15").Value) > 0 And Sheets
("compare").Range("c26").Value > 0 Then
                answer = answer & " By Purchasing Machine"

```

```

ElseIf Abs(Sheets("compare").Range("c15").Value) > Sheets("compare").Range
("c26") And Abs(Sheets("compare").Range("c15").Value) > 0 And Sheets
("compare").Range("c26").Value > 0 Then
    answer = answer & " By Leasing Machine"
End If
Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("c5").Value
row = row + 1
End If
If Range("i8").Value = Range("d8").Value Then
    answer = answer & ", "
    answer = answer & " Machine " & Range("d3").Value
    If Abs(Sheets("compare").Range("d15").Value) <= Sheets("compare").Range
("d26").Value And Abs(Sheets("compare").Range("d15").Value) > 0 And Sheets
("compare").Range("d26").Value > 0 Then
        answer = answer & " By Purchasing Machine"
    ElseIf Abs(Sheets("compare").Range("d15").Value) > Sheets("compare").Range
("d26") And Abs(Sheets("compare").Range("d15").Value) > 0 And Sheets
("compare").Range("d26").Value > 0 Then
        answer = answer & " By Leasing Machine"
    End If
    Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("d5").Value
    row = row + 1
End If
If Range("i8").Value = Range("e8").Value Then
    answer = answer & ", "
    answer = answer & " Machine " & Range("e3").Value
    If Abs(Sheets("compare").Range("e15").Value) <= Sheets("compare").Range
("e26").Value And Abs(Sheets("compare").Range("e15").Value) > 0 And Sheets
("compare").Range("e26").Value > 0 Then
        answer = answer & " By Purchasing Machine"
    ElseIf Abs(Sheets("compare").Range("e15").Value) > Sheets("compare").Range
("e26") And Abs(Sheets("compare").Range("e15").Value) > 0 And Sheets
("compare").Range("e26").Value > 0 Then
        answer = answer & " By Leasing Machine"
    End If
    Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("e5").Value
    row = row + 1
End If
If Range("i8").Value = Range("f8").Value Then
    answer = answer & ", "
    answer = answer & " Machine " & Range("f3").Value
    If Abs(Sheets("compare").Range("f15").Value) <= Sheets("compare").Range
("f26").Value And Abs(Sheets("compare").Range("f15").Value) > 0 And Sheets
("compare").Range("f26").Value > 0 Then
        answer = answer & " By Purchasing Machine"
    ElseIf Abs(Sheets("compare").Range("f15").Value) > Sheets("compare").Range
("f26") And Abs(Sheets("compare").Range("f15").Value) > 0 And
Sheets("compare").Range("f26").Value > 0 Then

```

```

        answer = answer & " By Leasing Machine"
    End If
    Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("f5").Value
    row = row + 1
End If
If Range("i8").Value = Range("g8").Value Then
    answer = answer & ", "
    answer = answer & " Machine " & Range("g3").Value
    If Abs(Sheets("compare").Range("g15").Value) <= Sheets("compare").Range
("g26").Value And Abs(Sheets("compare").Range("g15").Value) > 0 And Sheets
("compare").Range("g26").Value > 0 Then
        answer = answer & " By Purchasing Machine"
    ElseIf Abs(Sheets("compare").Range("g15").Value) > Sheets("compare").Range
("g26") And Abs(Sheets("compare").Range("g15").Value) > 0 And Sheets
("compare").Range("g26").Value > 0 Then
        answer = answer & " By Leasing Machine"
    End If
    Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("g5").Value
    row = row + 1
End If
If Range("i8").Value = Range("h8").Value Then
    answer = answer & ", "
    answer = answer & " Machine " & Range("h3").Value
    If Abs(Sheets("compare").Range("h15").Value) <= Sheets("compare").Range
("h26").Value And Abs(Sheets("compare").Range("h15").Value) > 0 And Sheets
("compare").Range("h26").Value > 0 Then
        answer = answer & " By Purchasing Machine"
    ElseIf Abs(Sheets("compare").Range("h15").Value) > Sheets("compare").Range
("h26") And Abs(Sheets("compare").Range("h15").Value) > 0 And Sheets
("compare").Range("h26").Value > 0 Then
        answer = answer & " By Leasing Machine"
    End If
    Sheets("Compare").Range("a" & row).Value = Sheets("Compare").Range
("h5").Value
    row = row + 1
End If
Sheets("Compare").Select
msg = MsgBox(answer & (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly +
vbInformation, "REPLACEMENT MACHINE")
Range("b15").Value = Sheets("Cal_Eauw").Range("b8").Value
Range("c15").Value = Sheets("Cal_Eauw").Range("c8").Value
Range("d15").Value = Sheets("Cal_Eauw").Range("d8").Value
Range("e15").Value = Sheets("Cal_Eauw").Range("e8").Value
Range("f15").Value = Sheets("Cal_Eauw").Range("f8").Value
Range("g15").Value = Sheets("Cal_Eauw").Range("g8").Value
Range("h15").Value = Sheets("Cal_Eauw").Range("h8").Value

Range("a18").Value = answer

```

```

Application.ScreenUpdating = True
Range("a18").Select
End If
End Sub
Sub replace_annual()
Dim msg
On Error Resume Next
Sheets("Compare").Select
    For Old machine
        If Range("b12").Value >= 0 Then
            Range("b9").Value = Range("b9").Value / Range("b12").Value
            Range("b10").Value = Range("b10").Value / Range("b12").Value
        Else
            msg = MsgBox("Please, Check Useful life of Defender " & (Chr(13) & Chr(10)
& "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
        End If
        For machine #1
            If Range("c12").Value > 0 Then
                Range("c9").Value = Range("c9").Value / Range("c12").Value
                Range("c10").Value = Range("c10").Value / Range("c12").Value
            Else
                msg = MsgBox("Please, Check Useful life of Defender#1 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
            End If
            For machine #2
                If Range("d12").Value > 0 Then
                    Range("d9").Value = Range("d9").Value / Range("d12").Value
                    Range("d10").Value = Range("d10").Value / Range("d12").Value
                Else
                    msg = MsgBox("Please, Check Useful life of Defender#2 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
                End If
                For machine #3
                    If Range("e12").Value > 0 Then
                        Range("e9").Value = Range("e9").Value / Range("e12").Value
                        Range("e10").Value = Range("e10").Value / Range("e12").Value
                    Else
                        msg = MsgBox("Please, Check Useful life of Defender#3 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
                    End If
                    For machine #4
                        If Range("f12").Value > 0 Then
                            Range("f9").Value = Range("f9").Value / Range("f12").Value
                            Range("f10").Value = Range("f10").Value / Range("f12").Value
                        Else
                            msg = MsgBox("Please, Check Useful life of Defender#4 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
                        End If
                        For machine #5
                            If Range("g12").Value > 0 Then

```

```

Range("g9").Value = Range("g9").Value / Range("g12").Value
Range("g10").Value = Range("g10").Value / Range("g12").Value
Else
    msg = MsgBox("Please, Check Useful life of Defender#5 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
'For machine #6
If Range("h12").Value > 0 Then
    Range("h9").Value = Range("h9").Value / Range("h12").Value
    Range("h10").Value = Range("h10").Value / Range("h12").Value
Else
    msg = MsgBox("Please, Check Useful life of Defender#6 " & (Chr(13) & Chr
(10) & "Donna Company"), vbOKOnly + vbCritical, "ANNAULLY CALCULATION")
End If
End Sub
Sub compare_machine()

End Sub
Sub print_replacement()
    Application.ScreenUpdating = False
    Sheets("compare").Range("A1:H26").Select
    Selection.PrintOut Copies:=1
    Range("a1").Select
End Sub
Sub print_search()
Dim row
Dim page
Dim count As Integer
Dim record
count = 1
    Application.ScreenUpdating = False
    Sheets("search").Select
    page = Range("A1403").Value
    Do Until count = page + 1
        record = (34 * count) + 3
        Range("A" & record & ":" & "F" & record).Select
        Selection.Borders(xlDiagonalDown).LineStyle = xlNone
        Selection.Borders(xlDiagonalUp).LineStyle = xlNone
        Selection.Borders(xlEdgeLeft).LineStyle = xlNone
        Selection.Borders(xlEdgeTop).LineStyle = xlNone
        With Selection.Borders(xlEdgeBottom)
            .LineStyle = xlContinuous
            .Weight = xlMedium
            .ColorIndex = xlAutomatic
        End With
        count = count + 1
    Loop
    row = Range("a1400").Value
    Range("A4" & ":" & "F" & row).Select
    Selection.PrintOut Copies:=1

```



```

count = 1
Do Until count = page + 1
    record = (34 * count) + 3
    Range("A" & record & ":" & "F" & record).Select
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
    Selection.Borders(xlInsideVertical).LineStyle = xlNone
    Selection.Borders(xlDiagonalDown).LineStyle = xlNone
    Selection.Borders(xlDiagonalUp).LineStyle = xlNone
    Selection.Borders(xlEdgeLeft).LineStyle = xlNone
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    Selection.Borders(xlEdgeBottom).LineStyle = xlNone
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
    Selection.Borders(xlInsideVertical).LineStyle = xlNone
    count = count + 1
Loop
Range("a1").Select
End Sub
Sub print_depre_old()
Dim startpage
Dim endpage
    Application.ScreenUpdating = False
    Sheets("input_form").Select
    Range("A1:E19").Select
    Selection.PrintOut Copies:=1
    startpage = Range("c1301").Value
    endpage = Range("c1302").Value
    Range("A" & startpage & ":" & "E" & endpage).Select
    Selection.PrintOut Copies:=1
    Range("A1").Select
End Sub
Sub print_depre_new1()
Dim startpage
Dim endpage
    Application.ScreenUpdating = False
    Sheets("input_form").Select
    Range("g1:k19").Select
    Selection.PrintOut Copies:=1
    startpage = Range("i1301").Value
    endpage = Range("i1302").Value
    Range("g" & startpage & ":" & "k" & endpage).Select
    Selection.PrintOut Copies:=1
    Range("g1").Select
End Sub
Sub print_depre_new2()
Dim startpage
Dim endpage
    Application.ScreenUpdating = False
    Sheets("input_form").Select
    Range("m1:q19").Select
    Selection.PrintOut Copies:=1

```

```

startpage = Range("o1301").Value
endpage = Range("o1302").Value
Range("m" & startpage & ":" & "q" & endpage).Select
Selection.PrintOut Copies:=1
Range("m1").Select
End Sub
Sub print_depre_new3()
Dim startpage
Dim endpage
Application.ScreenUpdating = False
Sheets("input_form").Select
Range("S1:W19").Select
Selection.PrintOut Copies:=1
startpage = Range("U1301").Value
endpage = Range("U1302").Value
Range("S" & startpage & ":" & "W" & endpage).Select
Selection.PrintOut Copies:=1
Range("S1").Select
End Sub
Sub print_depre_new4()
Dim startpage
Dim endpage
Application.ScreenUpdating = False
Sheets("input_form").Select
Range("Y1:AC19").Select
Selection.PrintOut Copies:=1
startpage = Range("AA1301").Value
endpage = Range("AA1302").Value
Range("Y" & startpage & ":" & "AC" & endpage).Select
Selection.PrintOut Copies:=1
Range("Y1").Select
End Sub
Sub print_depre_NEW5()
Dim startpage
Dim endpage
Application.ScreenUpdating = False
Sheets("input_form").Select
Range("AE1:AI19").Select
Selection.PrintOut Copies:=1
startpage = Range("AG1301").Value
endpage = Range("AG1302").Value
Range("AE" & startpage & ":" & "AI" & endpage).Select
Selection.PrintOut Copies:=1
Range("AE1").Select
End Sub
Sub print_depre_NEW6()
Dim startpage
Dim endpage
Application.ScreenUpdating = False
Sheets("input_form").Select
Range("AK1:AO19").Select

```



```

Selection.PrintOut Copies:=1
startpage = Range("AM1301").Value
endpage = Range("AM1302").Value
Range("AK" & startpage & ":" & "AO" & endpage).Select
Selection.PrintOut Copies:=1
Range("AK1").Select
End Sub
Sub Op_year()
Dim row
Dim useful
If Sheets("compare").Range("a1406").Value >= Sheets("compare").Range
("c1400").Value Then
row = Sheets("compare").Range("c1400").Value + 1399
Select Case Sheets("compare").Range("a" & row).Value
Case Sheets("compare").Range("c5").Value
Sheets("op_year").Range("b4").Value = Sheets("compare").Range("c6").Value
Sheets("op_year").Range("b5").Value = Sheets("compare").Range("c7").Value
Sheets("op_year").Range("b6").Value = Sheets("compare").Range("c9").Value
Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("c10").Value
Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("c12").Value
Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
useful = Sheets("compare").Range("c12").Value
Case Sheets("compare").Range("d5").Value
Sheets("op_year").Range("b4").Value = Sheets("compare").Range("d6").Value
Sheets("op_year").Range("b5").Value = Sheets("compare").Range("d7").Value
Sheets("op_year").Range("b6").Value = Sheets("compare").Range("d9").Value
Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("d10").Value
Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("d12").Value
Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
useful = Sheets("compare").Range("d12").Value
Case Sheets("compare").Range("e5").Value
Sheets("op_year").Range("b4").Value = Sheets("compare").Range("e6").Value
Sheets("op_year").Range("b5").Value = Sheets("compare").Range("e7").Value
Sheets("op_year").Range("b6").Value = Sheets("compare").Range("e9").Value
Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("e10").Value
Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("e12").Value
Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
useful = Sheets("compare").Range("e12").Value
Case Sheets("compare").Range("f5").Value
Sheets("op_year").Range("b4").Value = Sheets("compare").Range("f6").Value
Sheets("op_year").Range("b5").Value = Sheets("compare").Range("f7").Value
Sheets("op_year").Range("b6").Value = Sheets("compare").Range("f9").Value

```

```

        Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("f10").Value
        Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("f12").Value
        Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
        useful = Sheets("compare").Range("f12").Value
        Case Sheets("compare").Range("g5").Value
            Sheets("op_year").Range("b4").Value = Sheets("compare").Range("g6").Value
            Sheets("op_year").Range("b5").Value = Sheets("compare").Range("g7").Value
            Sheets("op_year").Range("b6").Value = Sheets("compare").Range("g9").Value
            Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("g10").Value
            Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("g12").Value
            Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
            useful = Sheets("compare").Range("g12").Value
        Case Sheets("compare").Range("h5").Value
            Sheets("op_year").Range("b4").Value = Sheets("compare").Range("h6").Value
            Sheets("op_year").Range("b5").Value = Sheets("compare").Range("h7").Value
            Sheets("op_year").Range("b6").Value = Sheets("compare").Range("h9").Value
            Sheets("op_year").Range("b7").Value = Sheets("compare").Range
("h10").Value
            Sheets("op_year").Range("b8").Value = Sheets("compare").Range
("h12").Value
            Sheets("op_year").Range("b9").Value = Sheets("compare").Range
("b13").Value
            useful = Sheets("compare").Range("h12").Value
        End Select
        Call CLEAR_OP_YEAR
        Range("a11:c11").Select
        Selection.Copy
        useful = useful + 11 - 1
        Sheets("op_year").Range("a12" & ":" & "c" & useful).Select
        Selection.PasteSpecial Paste:=xlFormulas, Operation:=xlNone, SkipBlanks:= _
False, Transpose:=False

Else
    Sheets("op_year").Range("b4").Value = 0
    Sheets("op_year").Range("b5").Value = 0
    Sheets("op_year").Range("b6").Value = 0
    Sheets("op_year").Range("b7").Value = 0
    Sheets("op_year").Range("b8").Value = 0
    Sheets("op_year").Range("b9").Value = 0
    Sheets("op_year").Range("b11:b110").Select
    Selection.ClearContents

End If

Range("a10:c110").Select
Selection.Borders(xlEdgeBottom).LineStyle = xlNone
Selection.Borders(xlInsideHorizontal).LineStyle = xlNone
Sheets("op_year").Select

```

```

        Range("a1").Select
    End
End Sub

Sub CLEAR_OP_YEAR()
    Range("A12:C110").Select
    Selection.ClearContents
    Range("A11").Select
End Sub

Sub print_OPYEAR()
    Dim row
    Dim page
    Dim count As Integer
    Dim record
    count = 1
    Application.ScreenUpdating = False
    Sheets("OP_YEAR").Select
    page = Range("A1404").Value
    Range("A1" & ":" & "C" & page).Select
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    With Selection.Borders(xlEdgeBottom)
        .LineStyle = xlContinuous
        .Weight = xlMedium
        .ColorIndex = xlAutomatic
    End With
    Do Until count = page + 1
        record = (30 * count) + 2
        Range("A" & record & ":" & "C" & record).Select
        Selection.Borders(xlDiagonalDown).LineStyle = xlNone
        Selection.Borders(xlDiagonalUp).LineStyle = xlNone
        Selection.Borders(xlEdgeLeft).LineStyle = xlNone
        Selection.Borders(xlEdgeTop).LineStyle = xlNone
        With Selection.Borders(xlEdgeBottom)
            .LineStyle = xlContinuous
            .Weight = xlMedium
            .ColorIndex = xlAutomatic
        End With
        count = count + 1
    Loop
    row = page
    Range("A1" & ":" & "C" & row).Select
    Selection.PrintOut Copies:=1
    count = 1
    Do Until count = page + 1
        record = (30 * count) + 2
        Range("A" & record & ":" & "C" & record).Select
        Selection.Borders(xlDiagonalDown).LineStyle = xlNone
        Selection.Borders(xlEdgeBottom).LineStyle = xlNone
        count = count + 1
    Loop
    Sheets("op_year").Select

```

```

Range("a1").Select

End Sub
Sub continue()
    Sheets("op_year").Select
    Range("a1").Select
End Sub
Sub goto_compare_tax_sheet()
    Sheets("compare_tax").Select
    Range("a1").Select
End Sub
Sub goto_compare_sheet()
    Sheets("compare").Select
    Range("a1").Select
End Sub
Sub goto_depre_sheet()
    Sheets("input_form").Select
    Range("a1").Select
    Call inf_show
End Sub
Sub goto_main_menu_sheet()
    Sheets("main_menu").Select
    Range("a1").Select
End Sub

Sub goto_menu1_sheet()
    DialogSheets("menu1").Show
End Sub
Sub goto_menu2_sheet()
    DialogSheets("menu2").Show
End Sub
Sub goto_search_sheet()
    Sheets("search").Select
    Range("a1").Select
End Sub
Sub goto_information_sheet()
    Sheets("information").Select
    Range("a1").Select
End Sub
Sub print_addition()
    Application.ScreenUpdating = False
    Sheets("information").Select
    Range("A1:j44").Select
    Selection.PrintOut Copies:=1, Collate:=True
    Range("a1").Select
End Sub
Sub goto_maintain_sheet()
    With DialogSheets("PASSWD")
        .DrawingObjects("Edit Box 4").Text = ""
        .DrawingObjects("Edit Box 8").Text = ""
    End With
    DialogSheets("PASSWD").Show

```

```

End Sub
Sub check_authority()
Dim msg
    With DialogSheets("PASSWD")
        Sheets("PASSWD_inf").Range("e3").Value = .DrawingObjects("Edit Box 4").Text
        Sheets("PASSWD_inf").Range("f3").Value = .DrawingObjects("Edit Box 8").Text
    End With
    If DialogSheets("PASSWD").DrawingObjects("Edit Box 4").Text = "" Or DialogSheets
("PASSWD").DrawingObjects("Edit Box 8").Text = "" Then
        msg = MsgBox("Sorry, Login and password is not blank " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly + vbCritical, "Check Authorize")
    Else
        If (Sheets("PASSWD_inf").Range("E5").Value) Like "PASSWORD CORRECT" Then
            Sheets("MAINTAIN").Select
            Range("a1").Select
            DialogSheets("passwd").hide
        End If
    End If
End Sub
Sub re_password()
Dim msg
Dim row1
    With DialogSheets("RE_PASSWD")
        Sheets("PASSWD_inf").Range("e3").Value = .DrawingObjects("Edit Box 9").Text
        Sheets("PASSWD_inf").Range("f3").Value = .DrawingObjects("Edit Box
10").Text
    End With
    If DialogSheets("RE_PASSWD").DrawingObjects("Edit Box 9").Text = "" Or
DialogSheets("RE_PASSWD").DrawingObjects("Edit Box 10").Text = "" Or DialogSheets
("RE_PASSWD").DrawingObjects("Edit Box 11").Text = "" Then
        msg = MsgBox("Sorry, Login and Old password and New password are not blank "
& (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical, "Check Authorize")
    Else
        If (Sheets("PASSWD_inf").Range("E5").Value) Like "PASSWORD CORRECT" Then
            row1 = Sheets("PASSWD_inf").Range("g4").Value
            Sheets("PASSWD_inf").Range("c" & row1).Value = DialogSheets
("RE_PASSWD").DrawingObjects("Edit Box 11").Text
            msg = MsgBox("Password has already change " & (Chr(13) & Chr(10) & "Donna
Company"), vbOKOnly + vbInformation, "Check Authorize")
        Else
            msg = MsgBox("Sorry you can not change password ,Old passowd is not correct "
& (Chr(13) & Chr(10) & "Donna Company"), vbOKOnly + vbCritical, "Check Authorize")
        End If
    End If
End Sub
Sub re_password_show()

```

```

DialogSheets("passwd").hide
With DialogSheets("RE_PASSWD")
    .DrawingObjects("Edit Box 9").Text = ""
    .DrawingObjects("Edit Box 10").Text = ""
    .DrawingObjects("Edit Box 11").Text = ""
End With
DialogSheets("re_passwd").Show
End Sub
Sub goto_chage_password()
    With DialogSheets("RE_PASSWD")
        .DrawingObjects("Edit Box 9").Text = ""
        .DrawingObjects("Edit Box 10").Text = ""
        .DrawingObjects("Edit Box 11").Text = ""
    End With
    DialogSheets("re_passwd").Show
End Sub
Sub goto_information_depre_sheet()
    Sheets("information_depre").Select
End Sub
Sub print_addition_depre()
    Application.ScreenUpdating = False
    Sheets("information_depre").Select
    Range("A1:j60").Select
    Selection.PrintOut Copies:=1, Collate:=True
    Range("a1").Select
End Sub
Sub inf_show()
    DialogSheets("inf").Show
End Sub
Sub sup_inf_show()
    DialogSheets("sup_inf").Show
End Sub
Sub Check_Sup_inf()
    With DialogSheets("Sup_inf")
        If (.DrawingObjects("option button 4").Value) = 1 Then
            Sheets("information").Select
            Range("a1").Select
        ElseIf (.DrawingObjects("option button 5").Value) = 1 Then
            Sheets("information_depre").Select
            Range("a1").Select
        End If
    End With
End Sub
Sub loan_show()
    Sheets("compare").Range("a16:h16").Select
    Selection.ClearContents
    Range("a1").Select
    DialogSheets("loan").Show
    With DialogSheets("Loan")
        .DrawingObjects("option button 4").Value = 1
        .DrawingObjects("label 11").Visible = True
    End With
End Sub

```



```

.DrawingObjects("label 12").Visible = True
.DrawingObjects("label 13").Visible = False
.DrawingObjects("label 15").Visible = False
.DrawingObjects("edit box 10").Visible = True
.DrawingObjects("edit box 14").Visible = False
.DrawingObjects("button 2").Visible = True
.DrawingObjects("button 20").Visible = False
.DrawingObjects("group box 16").Visible = True
.DrawingObjects("group box 17").Visible = False
End With
End Sub
Sub CHECK_LOAN1()
    With DialogSheets("Loan")
        If (.DrawingObjects("option button 4").Value) = 1 Then
            .DrawingObjects("label 11").Visible = True
            .DrawingObjects("label 12").Visible = True
            .DrawingObjects("edit box 10").Visible = True
            .DrawingObjects("button 2").Visible = True
            .DrawingObjects("group box 16").Visible = True
            .DrawingObjects("label 13").Visible = False
            .DrawingObjects("label 15").Visible = False
            .DrawingObjects("edit box 14").Visible = False
            .DrawingObjects("button 20").Visible = False
            .DrawingObjects("group box 17").Visible = False
            Sheets("CAL_LOAN").Range("B15").Value = 0
            Sheets("CAL_LOAN").Range("B14").Value = 0
        End If
        If (.DrawingObjects("option button 7").Value) = 1 Then
            .DrawingObjects("label 11").Visible = False
            .DrawingObjects("label 12").Visible = False
            .DrawingObjects("edit box 10").Visible = False
            .DrawingObjects("button 2").Visible = False
            .DrawingObjects("group box 16").Visible = False
            .DrawingObjects("label 13").Visible = True
            .DrawingObjects("label 15").Visible = True
            .DrawingObjects("edit box 14").Visible = True
            .DrawingObjects("button 20").Visible = True
            .DrawingObjects("group box 17").Visible = True
            Sheets("CAL_LOAN").Range("B15").Value = 0
            Sheets("CAL_LOAN").Range("B14").Value = 0
        End If
    End With
End Sub
Sub calculate_loan()
    With DialogSheets("Loan")
        If (.DrawingObjects("option button 7").Value) = 1 Then
            Sheets("CAL_LOAN").Range("B15").Value = 0
            Sheets("CAL_LOAN").Range("B14").Value = .DrawingObjects("Edit
Box 14").Text

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```

        Sheets("COMPARE").Range("C16").Value = Sheets
("CAL_LOAN").Range("C14").Value
        Sheets("COMPARE").Range("D16").Value = Sheets
("CAL_LOAN").Range("D14").Value
        Sheets("COMPARE").Range("E16").Value = Sheets
("CAL_LOAN").Range("E14").Value
        Sheets("COMPARE").Range("F16").Value = Sheets
("CAL_LOAN").Range("F14").Value
        Sheets("COMPARE").Range("G16").Value = Sheets
("CAL_LOAN").Range("G14").Value
        Sheets("COMPARE").Range("H16").Value = Sheets
("CAL_LOAN").Range("H14").Value
        Sheets("COMPARE").Range("A16").Value = "Annuanity of Loan per
month"

    End If
    If (.DrawingObjects("option button 4").Value) = 1 Then
        Sheets("CAL_LOAN").Range("B14").Value = 0
        Sheets("CAL_LOAN").Range("B15").Value = .DrawingObjects("Edit
Box 10").Text
        .DrawingObjects("Edit Box 10").Text = Format(.DrawingObjects("Edit
Box 10").Text, "#,##0.00")
        Sheets("COMPARE").Range("A16").Value = "Time of Loan payment
"
        Sheets("COMPARE").Range("C16").Value = Sheets
("CAL_LOAN").Range("C19").Value & " yr " & Sheets("CAL_LOAN").Range
("C20").Value & " mth"
        Sheets("COMPARE").Range("d16").Value = Sheets
("CAL_LOAN").Range("d19").Value & " yr " & Sheets("CAL_LOAN").Range
("d20").Value & " mth"
        Sheets("COMPARE").Range("e16").Value = Sheets
("CAL_LOAN").Range("e19").Value & " yr " & Sheets("CAL_LOAN").Range
("e20").Value & " mth"
        Sheets("COMPARE").Range("f16").Value = Sheets
("CAL_LOAN").Range("f19").Value & " yr " & Sheets("CAL_LOAN").Range
("f20").Value & " mth"
        Sheets("COMPARE").Range("g16").Value = Sheets
("CAL_LOAN").Range("g19").Value & " yr " & Sheets("CAL_LOAN").Range
("g20").Value & " mth"
        Sheets("COMPARE").Range("h16").Value = Sheets
("CAL_LOAN").Range("h19").Value & " yr " & Sheets("CAL_LOAN").Range
("h20").Value & " mth"
    End If
End With
DialogSheets("loan").hide
End Sub
Sub Greeting()
Dim msg
    msg = MsgBox("Welcome to using Our application " & (Chr(13) & Chr(10) &
"Donna Company"), vbOKOnly, "Geeting You")
End Sub
Sub Notify()

```



```

Dim msg
    msg = MsgBox("Please, read our information " & (Chr(13) & Chr(10) & "Donna
Company"), vbOKOnly, "Inform You")
End Sub

```

```

***-----***
***-----***
PART 2
WRITE MODULE FOR CREATING MENU BAR
***-----***
***-----***

```

```

Sub reset_allmenu()
    MenuBars(xlWorksheet).Reset
    MenuBars(xlModule).Reset
End Sub

Sub createglmenu_xlworksheet()
    MenuBars(xlWorksheet).Menus.Add Caption:="Main_Menu"
    Set mainmenu = MenuBars(xlWorksheet).Menus("Main_Menu").MenuItems.Add
    (Caption:="Show Main Menu", OnAction:="dialog_menu_show")
    MenuBars(xlWorksheet).Menus.Add Caption:="Replacement"
    Set Replace1 = MenuBars(xlWorksheet).Menus("Replacement").MenuItems.Add
    (Caption:="Replacement", OnAction:="goto_compare_sheet")
    MenuBars(xlWorksheet).Menus.Add Caption:="Depreciation"
    Set Depre1 = MenuBars(xlWorksheet).Menus("Depreciation").MenuItems.Add
    (Caption:="Depreciation Calculation", OnAction:="goto_depre_sheet")
    MenuBars(xlWorksheet).Menus.Add Caption:="Payment"
    Set Payment1 = MenuBars(xlWorksheet).Menus("Payment").MenuItems.Add
    (Caption:="Show Payment Menu", OnAction:="goto_main_menu_sheet")
    Set Payment1 = MenuBars(xlWorksheet).Menus("Payment").MenuItems.Add
    (Caption:="Find the Annually Payment", OnAction:="goto_menu1_sheet")
    Set Payment1 = MenuBars(xlWorksheet).Menus("Payment").MenuItems.Add
    (Caption:="Find the time Payment", OnAction:="goto_menu2_sheet")
    MenuBars(xlWorksheet).Menus.Add Caption:="Search-Update_Information"
    Set Search1 = MenuBars(xlWorksheet).Menus("Search-
Update_Information").MenuItems.Add(Caption:="Search Inf",
OnAction:="goto_search_sheet")
    Set Search1 = MenuBars(xlWorksheet).Menus("Search-
Update_Information").MenuItems.Add(Caption:="Maintain Inf",
OnAction:="goto_maintain_sheet")
    Set Search1 = MenuBars(xlWorksheet).Menus("Search-
Update_Information").MenuItems.Add(Caption:="Change Password",
OnAction:="goto_chage_password")
    MenuBars(xlWorksheet).Menus.Add Caption:="Addition_Information"
    Set Support1 = MenuBars(xlWorksheet).Menus("Addition_Information").MenuItems.Add
    (Caption:="Replace Analysis", OnAction:="goto_information_sheet")
    Set Support1 = MenuBars(xlWorksheet).Menus("Addition_Information").MenuItems.Add
    (Caption:="Depreciation Analysis", OnAction:="goto_information_depre_sheet")
    MenuBars(xlWorksheet).Menus.Add Caption:="Save_Program"
    Set Quit1 = MenuBars(xlWorksheet).Menus("Save_program").MenuItems.Add
    (Caption:="Save Program", OnAction:="Save_application")
    MenuBars(xlWorksheet).Menus.Add Caption:="Quit_Program"

```

```

Set Quit1 = MenuBars(xlWorksheet).Menus("Quit_program").MenuItems.Add
(Caption:="Quit Program", OnAction:="Quit_application")
End Sub
Sub Save_application()
    ActiveWindow.ScrollWorkbookTabs.Position:=xlFirst
    Sheets("Mainmenu").Select
    ActiveWorkbook.Save
    Beep
    msg = MsgBox("Program has already Save " & (Chr(13) & Chr(10) & "Donna
Company"), vbOKOnly + vbInformation, "Donna Consultant Co., Ltd")
End Sub
Sub CHECK_MENU_THAI_ENGLISH()
    Select Case MenuBars(xlWorksheet).Menus(1).Caption
        Case "□&□□ "
            Call delete_menu
        Case "&File"
            Call delete_menu_ENGLISH
    End Select
End Sub
Sub combine_menu()
    MenuBars(xlWorksheet).Reset
    Call CHECK_MENU_THAI_ENGLISH
    Call createglmenu_xlworksheet
End Sub
Sub delete_menu() 'For Thai Menu
On Error Resume Next
    MenuBars(xlWorksheet).Menus("&□□□ ").Delete
    MenuBars(xlWorksheet).Menus("&□□ □ □□").Delete
    MenuBars(xlWorksheet).Menus("&□□□□").Delete
    MenuBars(xlWorksheet).Menus("&□□ □ □□").Delete
    MenuBars(xlWorksheet).Menus("&□□ □□ ").Delete
    MenuBars(xlWorksheet).Menus("&□□□ □").Delete
    MenuBars(xlWorksheet).Menus("&□□□□ □ □□ ").Delete
    MenuBars(xlWorksheet).Menus("&□□□ □□ ).Delete
    MenuBars(xlWorksheet).Menus("&□□□ □□ □").Delete
    'MenuBars(xlChart).Menus("&□□□ ").Delete
    'MenuBars(xlChart).Menus("&□□ □ □□").Delete
    'MenuBars(xlChart).Menus("&□□□□").Delete
    'MenuBars(xlChart).Menus("&□□ □ □□").Delete
    'MenuBars(xlChart).Menus("&□□□ □ ").Delete
    'MenuBars(xlChart).Menus("&□□□□ □ □□ ").Delete
    'MenuBars(xlChart).Menus("&□□□ □□ ).Delete
    'MenuBars(xlChart).Menus("&□□ □ □□□").Delete
End Sub
Sub delete_menu_ENGLISH() 'For English Menu
    MenuBars(xlWorksheet).Menus("&File").Delete
    MenuBars(xlWorksheet).Menus("&Edit").Delete
    MenuBars(xlWorksheet).Menus("&View").Delete
    MenuBars(xlWorksheet).Menus("&Insert").Delete
    MenuBars(xlWorksheet).Menus("&Format").Delete
    MenuBars(xlWorksheet).Menus("&Tools").Delete
    MenuBars(xlWorksheet).Menus("&data").Delete

```

```

MenuBar(xlWorksheet).Menus("&Window").Delete
MenuBar(xlWorksheet).Menus("&Help").Delete
'MenuBars(xlChart).Menus("&File").Delete
'MenuBars(xlChart).Menus("&Edit").Delete
'MenuBars(xlChart).Menus("&View").Delete
'MenuBars(xlChart).Menus("&Insert").Delete
'MenuBars(xlChart).Menus("&Format").Delete
'MenuBars(xlChart).Menus("&Tools").Delete
'MenuBars(xlChart).Menus("&Window").Delete
'MenuBars(xlChart).Menus("&Help").Delete
End Sub

```

```

***-----***
***-----***
PART 3
WRITE MODULE FOR CREATING APPLICATION FOR PAYMENT CALCULATION
***-----***
***-----***

```

```

Sub Put_value_for_Cal()
    With DialogSheets("menu1")
        Sheets("AMT").Range("C1").Value = .DrawingObjects("Edit Box 2").Text
        .DrawingObjects("Edit Box 2").Text = Format(.DrawingObjects("Edit Box
2").Text, "#,##0.00")
        Sheets("AMT").Range("C2").Value = .DrawingObjects("Edit Box 3").Text
        .DrawingObjects("Edit Box 3").Text = Format(.DrawingObjects("Edit Box
3").Text, "#,##0.00")
        Sheets("AMT").Range("C3").Value = .DrawingObjects("Edit Box 4").Text
        Sheets("AMT").Range("e4").Value = .DrawingObjects("Edit Box 5").Text
        Sheets("AMT").Range("g4").Value = .DrawingObjects("Edit Box 6").Text
        Call AMT_Cal
    End With
End Sub

Sub Put_value_for_Cal_year()
    With DialogSheets("menu2")
        Sheets("YEAR").Range("C1").Value = .DrawingObjects("Edit Box 2").Text
        .DrawingObjects("Edit Box 2").Text = Format(.DrawingObjects("Edit Box
2").Text, "#,##0.00")
        Sheets("YEAR").Range("C2").Value = .DrawingObjects("Edit Box 3").Text
        .DrawingObjects("Edit Box 3").Text = Format(.DrawingObjects("Edit Box
3").Text, "#,##0.00")
        Sheets("YEAR").Range("C3").Value = .DrawingObjects("Edit Box 4").Text
        Sheets("YEAR").Range("C5").Value = .DrawingObjects("Edit Box 5").Text
        .DrawingObjects("Edit Box 5").Text = Format(.DrawingObjects("Edit Box
5").Text, "#,##0.00")
        Call AMT_Cal_YEAR
    End With
End Sub

Sub AMT_Cal_YEAR()
    On Error Resume Next
    Dim YEAR As Integer
    Dim MONTH As Integer

```

```

Dim msg As Variant
Dim style As Variant
Dim tittle As String
    Beep
    YEAR = Format(Sheets("YEAR").Range("C9").Value, "#,##0.00")
    MONTH = Format(Sheets("YEAR").Range("E9").Value, "#,##0.00")
    If YEAR = 0 And MONTH = 0 Then
        answer = "Cannot Calculate the time payment because it is the impossible situation"
        style = vbOKOnly + vbCritical
    Else
        answer = "Period of time for payment = " & YEAR & " year " & MONTH & "
month "
        style = vbOKOnly + vbInformation
    End If
    tittle = "Payment Calculation"
    msg = MsgBox(answer, style, tittle)
End Sub

```

```

Sub AMT_Cal()
On Error Resume Next
Dim answer As Variant
Dim msg As Variant
Dim style As Variant
Dim tittle As String

    answer = Format(Sheets("AMT").Range("C8").Value, "#,##0.00")
    If answer = 0 Then
        answer = "Cannot Calculate the annual payment because it is the impossible
situation"
        style = vbOKOnly + vbCritical
    Else
        answer = "Annual Payment = " & answer & " baht"
        style = vbOKOnly + vbInformation
    End If
    tittle = "Payment Calculation"
    msg = MsgBox(answer, style, tittle)

```

```

End Sub
Sub Clear_value_for_Cal()
    With DialogSheets("menu1")
        .DrawingObjects("Edit Box 2").Text = ""
        .DrawingObjects("Edit Box 3").Text = ""
        .DrawingObjects("Edit Box 4").Text = ""
        .DrawingObjects("Edit Box 5").Text = ""
        .DrawingObjects("Edit Box 6").Text = ""
    End With
    DialogSheets("menu1").hide

```

```

End Sub
Sub Clear_value_for_Cal_year()
    With DialogSheets("menu2")
        .DrawingObjects("Edit Box 2").Text = ""
        .DrawingObjects("Edit Box 3").Text = ""
    End With

```

```

        .DrawingObjects("Edit Box 4").Text = ""
        .DrawingObjects("Edit Box 5").Text = ""
    End With
    DialogSheets("menu2").hide
End Sub
Sub show_menu11()
On Error Resume Next
Call Close_dialog
Call Clear_value_for_Cal_year
DialogSheets("menu1").Show

End Sub
Sub show_menu2()
On Error Resume Next
Call Close_dialog
Call Clear_value_for_Cal
DialogSheets("menu2").Show
End Sub
Sub Close_dialog()
On Error Resume Next
DialogSheets("menu1").hide
DialogSheets("menu2").hide
End Sub
Sub go_to_report1()
Sheets("report1").Select
Range("a1").Select
End Sub
Sub go_to_report2()
Sheets("report2").Select
Range("a1").Select
End Sub

Sub print_report1() *
Application.ScreenUpdating = False
Dim endrow
Dim page
Dim countpage
Dim pagerow
Dim countloop
Dim pageloop
Dim headline
Dim endline
endrow = Sheets("amt").Range("c10").Value
page = Sheets("amt").Range("c11").Value
Sheets("report1").Select
'Rows(endrow).Select
'Call line_format
countloop = 1
pageloop = 1
Do Until pageloop > page
    pagerow = (countloop * 30) + 7
    Range("a1" & "." & "h" & pagerow).Select

```

```

Selection.PrintOut Copies:=1
headline = (countloop * 7) + 1
endline = pagerow
Rows(headline & ":" & endline).Select
Selection.EntireRow.Hidden = True
countloop = countloop + 1
pageloop = pageloop + 1
Loop
'Rows(endrow).Select
'Call line_unformat
Rows(1 & ":" & endline).Select
Selection.EntireRow.Hidden = False
Range("a1").Select
End Sub
Sub print_report2()
Application.ScreenUpdating = False
Dim endrow
Dim page
Dim countpage
Dim pagerow
Dim countloop
Dim pageloop
Dim headline
Dim endline
endrow = Sheets("year").Range("c10").Value
page = Sheets("year").Range("c13").Value
Sheets("report2").Select
countloop = 1
pageloop = 1
Do Until pageloop > page
    pagerow = (countloop * 30) + 7
    Range("a1" & ":" & "h" & pagerow).Select
    Selection.PrintOut Copies:=1
    headline = (countloop * 7) + 1
    endline = pagerow
    Rows(headline & ":" & endline).Select
    Selection.EntireRow.Hidden = True
    countloop = countloop + 1
    pageloop = pageloop + 1
Loop
Rows(1 & ":" & endline).Select
Selection.EntireRow.Hidden = False
Range("a1").Select

End Sub

Sub line_format()
Selection.Borders(xlDiagonalDown).LineStyle = xlNone
Selection.Borders(xlDiagonalUp).LineStyle = xlNone
With Selection.Borders(xlEdgeLeft)
    .LineStyle = xlContinuous
    .Weight = xlMedium

```

```

        .ColorIndex = xlAutomatic
    End With
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    With Selection.Borders(xlEdgeBottom)
        .LineStyle = xlContinuous
        .Weight = xlMedium
        .ColorIndex = xlAutomatic
    End With
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
End Sub
Sub line_unformat()
    Selection.Borders(xlDiagonalDown).LineStyle = xlNone
    Selection.Borders(xlDiagonalUp).LineStyle = xlNone
    With Selection.Borders(xlEdgeLeft)
        .LineStyle = xlContinuous
        .Weight = xlMedium
        .ColorIndex = xlAutomatic
    End With
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    Selection.Borders(xlEdgeBottom).LineStyle = xlNone
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
End Sub

```





## **APPENDIX B**

### **PICTURES OF THE PROGRAM**





A1 <input checked="" type="checkbox"/> <b>REPLACEMENT</b> <input type="checkbox"/> <b>DEPRECIATION</b> <input type="checkbox"/> <b>PAIDMENT</b> <input type="checkbox"/> <b>SEARCH</b> <input type="checkbox"/> <b>OTHER INFORMATION</b> <input type="checkbox"/> <b>ADDRESS INFORMATION</b> <input type="checkbox"/> <b>SALES</b> <input type="checkbox"/> <b>COMPANY</b> <input type="checkbox"/> <b>OUT</b> <input type="checkbox"/> <b>PROGRAM</b>									
DONNA COMPANY									
DONNA COMPANY									
Conclusion of the Replacement Worksheet Report									
Name of Business Initial Cost Trade-In Value Salvage Value Annual Operating Cost Annual Maintenance Cost Remaining Life/Asset Life Interest Rate	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation Depreciation
Leasing Cost Expense Cost Annual Cost Total Cost Per Year	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	Depreciation Depreciation Depreciation Depreciation	

### DONNA COMPANY

#### Conclusion of the Replacement Machines Report


Name of Machine	Defender	Challenger	A	B	C	D	E	F
Initial Cost								
Trade-In Value								
Savings Value								
Annual Operating Cost								
Annual Maintenance Cost								
Remaining Useful Life								
Interest Rate								

☐ Find the Number of years

☐ Find Annually per month

Ready



<input type="checkbox"/> Main Menu <input type="checkbox"/> Replacement <input type="checkbox"/> Depreciation <input type="checkbox"/> Payment <input type="checkbox"/> Search <input type="checkbox"/> Update Information <input type="checkbox"/> Addition Information <input type="checkbox"/> Save Program <input type="checkbox"/> Quit Program		
A1 DONNA COMPANY (Purchasing Machine)		
DONNA COMPANY (Purchasing Machine)		
Optimum for using	Machine	<input type="button" value="Back"/> <input type="button" value="Print"/> <input type="button" value="Menu"/>
Selected Machine		EAUW
Initial Cost		
Trade-In Value		
Annual Operating Cost		
Annual Maintenance Cost		
Remaining Life/Useful Life		
Interest Rate		
KEY SALVAGE VALUE	AMOUNT	EAUW
Salvage Value Year 1		
Ready		



Main_Menu Replacement Depreciation Payment Search-Update Information Addition Information Save Program Quit Program		
A1 DONNA COMPANY		
Depreciation Calculation		
<div> <div> <div>Annual</div> <div>Depreciation</div> <div>Main Menu</div> </div> </div>		
<div> <div> <div>Name of Old Machine</div> <div>A</div> </div> </div>		
<div> <div>Cost:</div> <div> <div>Initial Cost:</div> <div>Baht</div> </div> <div> <div>Annual Operating Cost</div> <div>Baht</div> </div> <div> <div>Annual Maintenance Cost</div> <div>Baht</div> </div> <div> <div>Annual Leasing Cost</div> <div>Baht</div> </div> </div>		
<div> <div>Revenue:</div> <div> <div>Annual Revenue</div> <div>Baht</div> </div> </div>		
<div> <div>Salvage Value</div> <div>Baht</div> </div>		
<div> <div>Market Value</div> <div>Baht</div> </div>		
<div> <div>Trade-In Value</div> <div>Baht</div> </div>		
<div> <div>Useful Life</div> <div>Years</div> </div>		
<div> <div>Remaining Life</div> <div>Years</div> </div>		
<div> <div>Interate Rate</div> <div>%</div> </div>		
<div> <div>Depreciation Method</div> </div>		
<div> <div> <div>Name of Machine</div> </div> </div>		
<div> <div>Cost:</div> <div> <div>Initial Cost:</div> <div>Baht</div> </div> <div> <div>Annual Operating Cost</div> <div>Baht</div> </div> <div> <div>Annual Maintenance Cost</div> <div>Baht</div> </div> <div> <div>Annual Leasing Cost</div> <div>Baht</div> </div> </div>		
<div> <div>Revenue:</div> <div> <div>Annual Revenue</div> <div>Baht</div> </div> </div>		
<div> <div>Salvage Value</div> <div>Baht</div> </div>		
<div> <div>Market Value</div> <div>Baht</div> </div>		
<div> <div>Trade-In Value</div> <div>Baht</div> </div>		
<div> <div>Useful Life</div> <div>Years</div> </div>		
<div> <div>Remaining Life</div> <div>Years</div> </div>		
<div> <div>Interate Rate</div> <div>%</div> </div>		
<div> <div>Depreciation Method</div> </div>		



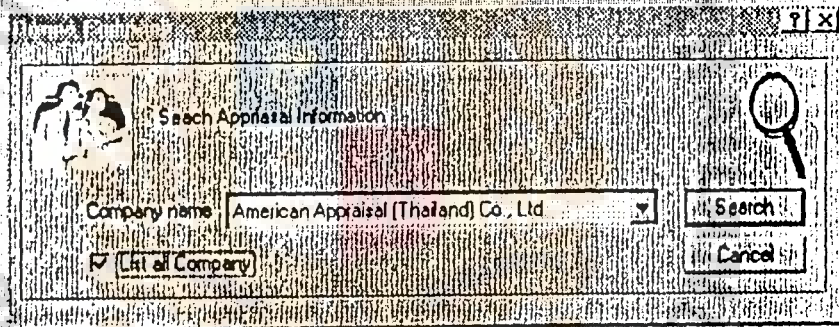
Main Menu Replacement Depreciation Payment Search Update Information Addition Information Save Program Quit Program

A1 DONNA COMPANY

DONNA COMPANY

List of source company

Co Name	Address	Province	Tel.	Name	Business type
America Appraisal	101/19 AIA Tower, 12 Fl., Srisa Bangkok		675-6403-15	Yongyuth	Machinery



Search Appraisal Information

Company name: American Appraisal (Thailand) Co., Ltd.

☒ List all Company

Search Cancel

Ready NUM

HS

# DONNA COMPANY

Calculation  
 Payment



0.00  
 Payment

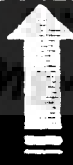
0.00  
 Payment

Machine / Project name



0.00  
 Payment

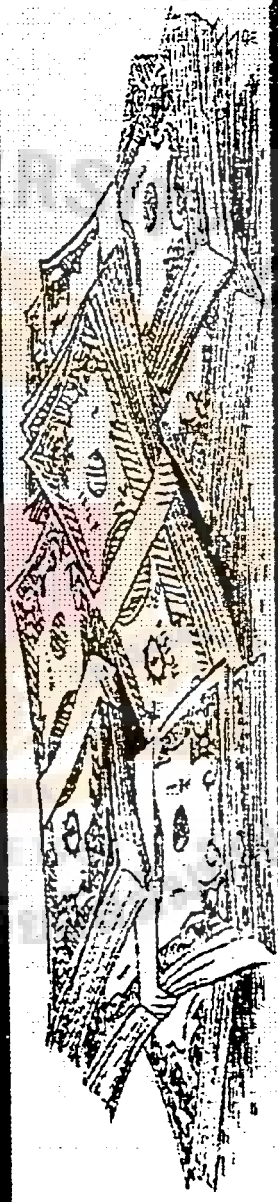
Time  
 Calculation



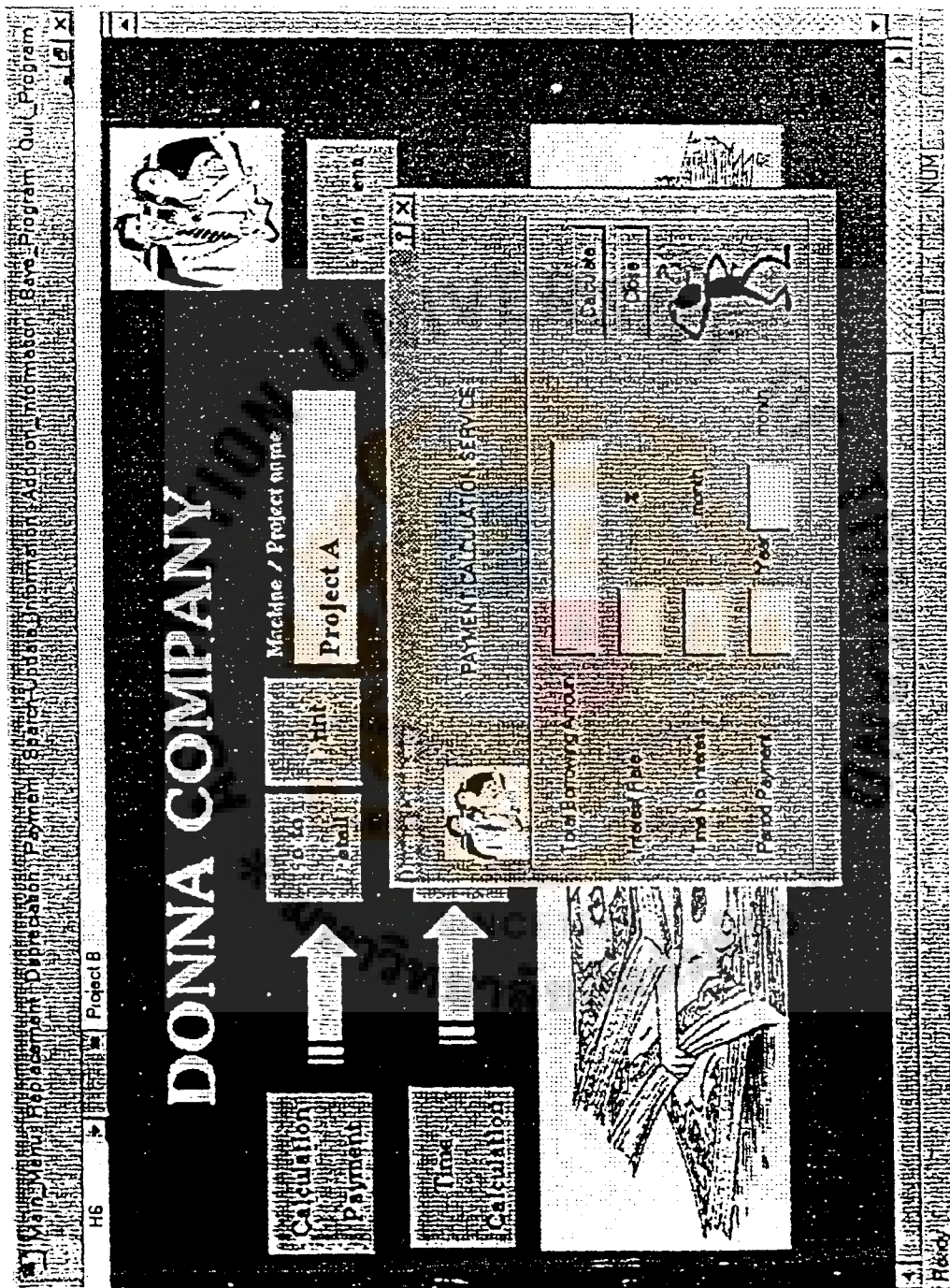
0.00  
 Payment

0.00  
 Payment

Machine / Project name







Principle Amount  
Annual Payment  
Time for no interest

2,000,000 Baht  
38,791.83 Baht  
3 Month

Donna Company



Project A Annual Payment 38,791.83 Baht Interest 14.00 % Time 7 year 3 month

C:\DATA\DONNA\Bure 1\at\Bure 1

Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
31	1,605,412.42	18,729.81	18,729.81		18,729.81	20,062.02	1,585,350.40
32	1,585,350.40	18,495.75	18,495.75		18,495.75	20,296.08	1,565,054.32
33	1,565,054.32	18,258.97	18,258.97		18,258.97	20,532.86	1,544,521.46
34	1,544,521.46	18,018.42	18,018.42		18,018.42	20,772.41	1,523,749.05
35	1,523,749.05	17,777.07	17,777.07		17,777.07	21,014.76	1,502,734.29
36	1,502,734.29	17,531.90	17,531.90		17,531.90	21,259.93	1,481,474.36
37	1,481,474.36	17,283.87	17,283.87		17,283.87	21,507.96	1,459,966.40
38	1,459,966.40	17,032.94	17,032.94		17,032.94	21,758.89	1,438,207.51
39	1,438,207.51	16,779.09	16,779.09		16,779.09	22,012.74	1,416,194.76
40	1,416,194.76	16,522.27	16,522.27		16,522.27	22,268.56	1,393,925.21
41	1,393,925.21	16,262.40	16,262.40		16,262.40	22,526.37	1,371,395.84
42	1,371,395.84	15,999.62	15,999.62		15,999.62	22,787.21	1,348,603.63
43	1,348,603.63	15,733.71	15,733.71		15,733.71	23,050.12	1,325,545.50
44	1,325,545.50	15,464.70	15,464.70		15,464.70	23,327.13	1,302,218.37
45	1,302,218.37	15,192.55	15,192.55		15,192.55	23,599.28	1,278,619.09
46	1,278,619.09	14,917.22	14,917.22		14,917.22	23,874.61	1,254,744.48
47	1,254,744.48	14,638.69	14,638.69		14,638.69	24,153.14	1,230,591.34
48	1,230,591.34	14,356.90	14,356.90		14,356.90	24,434.93	1,206,156.41
49	1,206,156.41	14,071.82	14,071.82		14,071.82	24,720.01	1,181,436.40
50	1,181,436.40	13,783.42	13,783.42		13,783.42	25,008.41	1,156,428.00
51	1,156,428.00	13,491.66	13,491.66		13,491.66	25,300.17	1,131,127.83
52	1,131,127.83	13,196.49	13,196.49		13,196.49	25,595.34	1,105,532.49
53	1,105,532.49	12,897.88	12,897.88		12,897.88	25,893.95	1,079,636.54
54	1,079,636.54	12,595.76	12,595.76		12,595.76	26,196.05	1,053,442.49
55	1,053,442.49	12,290.16	12,290.16		12,290.16	26,501.67	1,026,940.82
56	1,026,940.82	11,980.98	11,980.98		11,980.98	26,810.85	1,000,129.97
57	1,000,129.97	11,668.18	11,668.18		11,668.18	27,123.95	973,006.32
58	973,006.32	11,351.74	11,351.74		11,351.74	27,440.09	945,566.23
59	945,566.23	11,031.61	11,031.61		11,031.61	27,760.22	917,806.01
60	917,806.01	10,707.74	10,707.74		10,707.74	28,084.09	889,721.92

Principle Amount 2,000,000 Baht  
Annual Payment 38,791.83 Baht  
Time for no interest 3 Month

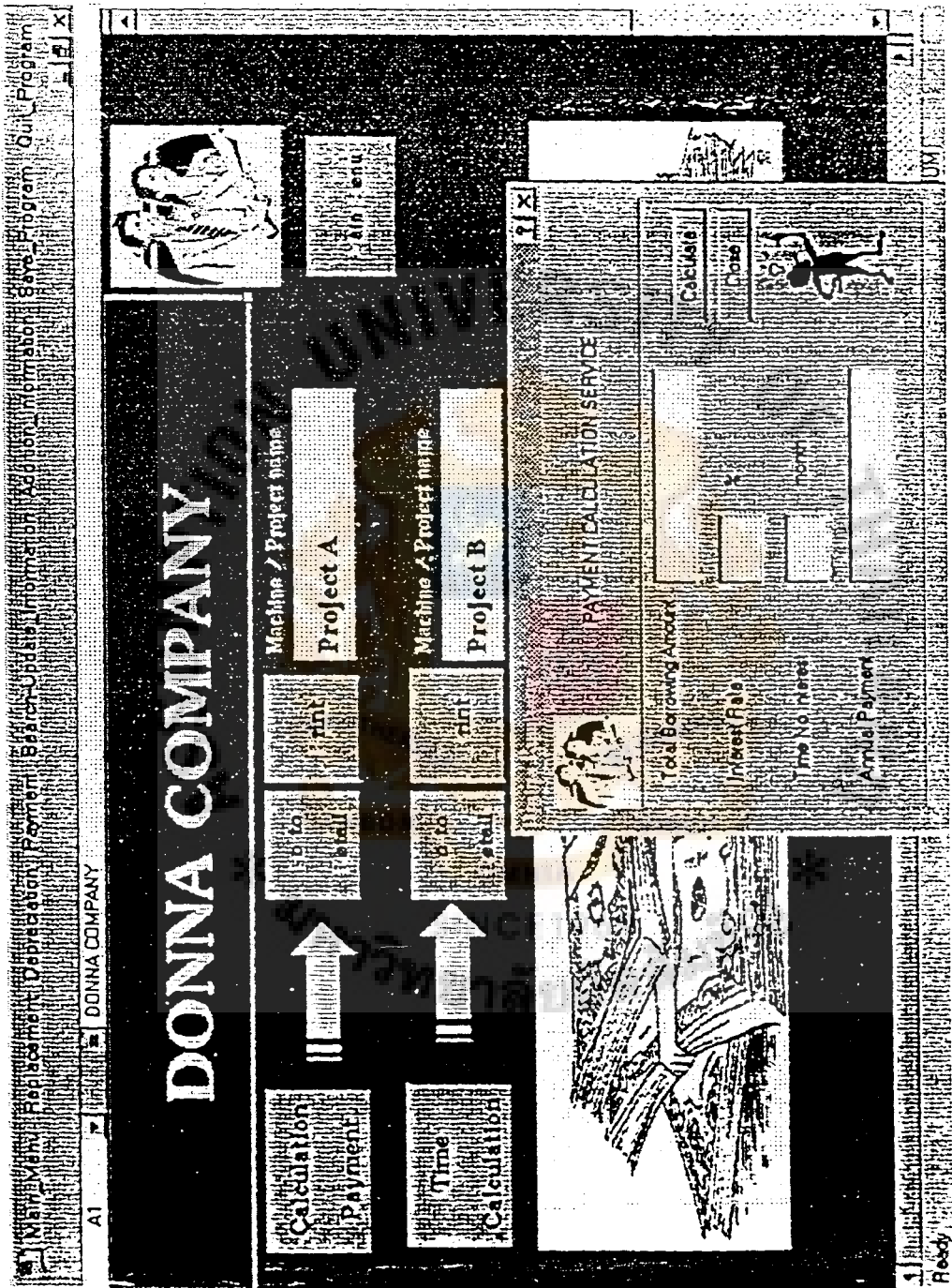
Donna Company



Project A Annual Payment 38,791.83 Baht Interest 14.00 % Time 7 year 3 month

Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
1	2,000,000.00	23,333.33	23,333.33	23,333.33			2,000,000.00
2	2,000,000.00	23,333.33	46,666.67	46,666.67			2,000,000.00
3	2,000,000.00	23,333.33	70,000.00	70,000.00			2,000,000.00
4	2,000,000.00	23,333.33	93,333.33	93,333.33	38,791.83		2,000,000.00
5	2,000,000.00	23,333.33	116,666.67	116,666.67	38,791.83		2,000,000.00
6	2,000,000.00	23,333.33	140,000.00	140,000.00	38,791.83		2,000,000.00
7	2,000,000.00	23,333.33	163,333.33	163,333.33	38,791.83		2,000,000.00
8	2,000,000.00	23,333.33	186,666.67	186,666.67	31,499.35	7,292.48	1,992,707.52
9	1,992,707.52	23,244.25	210,000.00	210,000.00	23,244.25	15,543.58	1,977,163.94
10	1,977,163.94	23,066.91	233,333.33	233,333.33	23,066.91	15,724.92	1,961,439.02
11	1,961,439.02	22,883.46	256,666.67	256,666.67	22,883.46	15,904.37	1,945,530.65
12	1,945,530.65	22,697.86	280,000.00	280,000.00	22,697.86	16,083.87	1,929,436.64
13	1,929,436.64	22,510.09	303,333.33	303,333.33	22,510.09	16,261.74	1,913,154.94
14	1,913,154.94	22,320.14	326,666.67	326,666.67	22,320.14	16,471.06	1,896,683.25
15	1,896,683.25	22,127.97	350,000.00	350,000.00	22,127.97	16,663.86	1,880,019.39
16	1,880,019.39	21,933.56	373,333.33	373,333.33	21,933.56	16,858.27	1,863,161.12
17	1,863,161.12	21,736.88	396,666.67	396,666.67	21,736.88	17,054.95	1,846,106.17
18	1,846,106.17	21,537.91	420,000.00	420,000.00	21,537.91	17,253.02	1,828,852.25
19	1,828,852.25	21,336.61	443,333.33	443,333.33	21,336.61	17,455.22	1,811,397.03
20	1,811,397.03	21,132.87	466,666.67	466,666.67	21,132.87	17,658.46	1,793,738.16
21	1,793,738.16	20,926.95	490,000.00	490,000.00	20,926.95	17,864.88	1,775,873.28
22	1,775,873.28	20,718.52	513,333.33	513,333.33	20,718.52	18,073.31	1,757,799.97
23	1,757,799.97	20,507.67	536,666.67	536,666.67	20,507.67	18,284.16	1,739,515.81
24	1,739,515.81	20,294.35	560,000.00	560,000.00	20,294.35	18,497.44	1,721,016.33
25	1,721,016.33	20,078.55	583,333.33	583,333.33	20,078.55	18,713.28	1,702,305.04
26	1,702,305.04	19,860.23	606,666.67	606,666.67	19,860.23	18,931.60	1,683,373.44
27	1,683,373.44	19,639.36	630,000.00	630,000.00	19,639.36	19,152.47	1,664,220.97
28	1,664,220.97	19,415.91	653,333.33	653,333.33	19,415.91	19,375.92	1,644,845.05
29	1,644,845.05	19,189.86	676,666.67	676,666.67	19,189.86	19,601.87	1,625,243.08
30	1,625,243.08	18,961.17	700,000.00	700,000.00	18,961.17	19,830.66	1,605,412.42







Principle Amount 2,000,000.00 Baht  
 Annual Payment 30,000.00 Baht  
 Time for no interest Month

Domine Company



Project B Annual Payment 30,000.00 1/12 Interest Rate 14.00 % Time 10 year 10 month

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Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
1	2,000,000.00	23,333.33	23,333.33		23,333.33	6,666.67	1,993,333.33
2	1,993,333.33	23,255.56	23,255.56		23,255.56	6,744.44	1,986,588.89
3	1,986,588.89	23,178.87	23,178.87		23,178.87	6,823.13	1,979,765.76
4	1,979,765.76	23,097.27	23,097.27		23,097.27	6,902.73	1,972,863.03
5	1,972,863.03	23,016.74	23,016.74		23,016.74	6,983.26	1,965,879.76
6	1,965,879.76	22,935.26	22,935.26		22,935.26	7,064.74	1,958,815.03
7	1,958,815.03	22,852.84	22,852.84		22,852.84	7,147.16	1,951,667.67
8	1,951,667.67	22,769.46	22,769.46		22,769.46	7,230.54	1,944,437.33
9	1,944,437.33	22,685.10	22,685.10		22,685.10	7,314.90	1,937,122.43
10	1,937,122.43	22,599.76	22,599.76		22,599.76	7,400.24	1,929,722.19
11	1,929,722.19	22,513.43	22,513.43		22,513.43	7,486.57	1,922,235.62
12	1,922,235.62	22,426.08	22,426.08		22,426.08	7,573.92	1,914,661.70
13	1,914,661.70	22,337.72	22,337.72		22,337.72	7,662.29	1,906,999.42
14	1,906,999.42	22,248.33	22,248.33		22,248.33	7,751.67	1,899,247.74
15	1,899,247.74	22,157.89	22,157.89		22,157.89	7,842.11	1,891,405.63
16	1,891,405.63	22,066.40	22,066.40		22,066.40	7,933.60	1,883,472.03
17	1,883,472.03	21,973.84	21,973.84		21,973.84	8,026.16	1,875,445.87
18	1,875,445.87	21,880.20	21,880.20		21,880.20	8,119.80	1,867,326.08
19	1,867,326.08	21,785.47	21,785.47		21,785.47	8,214.53	1,859,111.55
20	1,859,111.55	21,689.63	21,689.63		21,689.63	8,310.37	1,850,801.18
21	1,850,801.18	21,592.68	21,592.68		21,592.68	8,407.32	1,842,393.86
22	1,842,393.86	21,494.60	21,494.60		21,494.60	8,505.40	1,833,888.46
23	1,833,888.46	21,395.37	21,395.37		21,395.37	8,604.63	1,825,283.82
24	1,825,283.82	21,294.98	21,294.98		21,294.98	8,705.02	1,816,578.80
25	1,816,578.80	21,193.42	21,193.42		21,193.42	8,806.58	1,807,772.22
26	1,807,772.22	21,090.68	21,090.68		21,090.68	8,909.32	1,798,862.90
27	1,798,862.90	20,986.73	20,986.73		20,986.73	9,013.27	1,789,849.63
28	1,789,849.63	20,881.58	20,881.58		20,881.58	9,118.42	1,780,731.21
29	1,780,731.21	20,775.20	20,775.20		20,775.20	9,224.80	1,771,506.41
30	1,771,506.41	20,667.57	20,667.57		20,667.57	9,332.43	1,762,173.98

Principle Amount 2,000,000.00 Baht  
 Annual Payment 30,000.00 Baht  
 Time for no interest Month

Danna Company



Project B Annual Payment 30,000.00 17M Interest Rate 14.00 % Time 10 year 10 month

CHARTERED ACCOUNTANTS

Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
31	1,782,173.88	20,558.70	20,558.70		20,558.70	9,441.30	1,752,732.68
32	1,752,732.68	20,448.55	20,448.55		20,448.55	9,551.45	1,743,181.22
33	1,743,181.22	20,337.11	20,337.11		20,337.11	9,662.89	1,733,518.34
34	1,733,518.34	20,224.38	20,224.38		20,224.38	9,775.62	1,723,742.72
35	1,723,742.72	20,110.33	20,110.33		20,110.33	9,889.67	1,713,853.05
36	1,713,853.05	19,994.95	19,994.95		19,994.95	10,005.05	1,703,848.00
37	1,703,848.00	19,878.23	19,878.23		19,878.23	10,121.77	1,693,726.23
38	1,693,726.23	19,760.14	19,760.14		19,760.14	10,239.86	1,683,486.37
39	1,683,486.37	19,640.67	19,640.67		19,640.67	10,359.33	1,673,127.04
40	1,673,127.04	19,519.82	19,519.82		19,519.82	10,480.18	1,662,646.86
41	1,662,646.86	19,397.55	19,397.55		19,397.55	10,602.45	1,652,044.41
42	1,652,044.41	19,273.85	19,273.85		19,273.85	10,726.15	1,641,318.26
43	1,641,318.26	19,148.71	19,148.71		19,148.71	10,851.29	1,630,466.97
44	1,630,466.97	19,022.11	19,022.11		19,022.11	10,977.89	1,619,489.08
45	1,619,489.08	18,894.04	18,894.04		18,894.04	11,105.96	1,608,383.12
46	1,608,383.12	18,764.47	18,764.47		18,764.47	11,235.53	1,597,147.59
47	1,597,147.59	18,633.38	18,633.38		18,633.38	11,366.91	1,585,780.68
48	1,585,780.68	18,500.78	18,500.78		18,500.78	11,499.22	1,574,281.76
49	1,574,281.76	18,366.62	18,366.62		18,366.62	11,633.38	1,562,648.38
50	1,562,648.38	18,230.90	18,230.90		18,230.90	11,769.10	1,550,879.23
51	1,550,879.23	18,093.59	18,093.59		18,093.59	11,906.41	1,538,972.67
52	1,538,972.67	17,954.68	17,954.68		17,954.68	12,045.32	1,526,927.55
53	1,526,927.55	17,814.15	17,814.15		17,814.15	12,185.85	1,514,741.71
54	1,514,741.71	17,671.99	17,671.99		17,671.99	12,328.01	1,502,413.70
55	1,502,413.70	17,528.16	17,528.16		17,528.16	12,471.84	1,489,941.86
56	1,489,941.86	17,382.65	17,382.65		17,382.65	12,617.35	1,477,324.51
57	1,477,324.51	17,235.45	17,235.45		17,235.45	12,764.55	1,464,559.96
58	1,464,559.96	17,086.53	17,086.53		17,086.53	12,913.47	1,451,646.50
59	1,451,646.50	16,935.88	16,935.88		16,935.88	13,064.12	1,438,582.37
60	1,438,582.37	16,783.46	16,783.46		16,783.46	13,216.54	1,425,365.83

Principle Amount 2,000,000.00 Baht  
 Annual Payment 30,000.00 Baht  
 Term for no interest Month

Donna Company



Project B Annual Payment 30,000.00 10% Interest Rate 14.00 % Time 10 year 10 month

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Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
61	1,475,365.83	16,629.27	16,629.27		16,629.27	13,370.73	1,411,995.10
62	1,411,995.10	16,473.28	16,473.28		16,473.28	13,526.72	1,398,468.38
63	1,398,468.38	16,315.46	16,315.46		16,315.46	13,684.54	1,384,783.84
64	1,384,783.84	16,155.81	16,155.81		16,155.81	13,844.19	1,370,939.65
65	1,370,939.65	15,994.30	15,994.30		15,994.30	14,005.70	1,356,933.95
66	1,356,933.95	15,830.90	15,830.90		15,830.90	14,169.10	1,342,764.84
67	1,342,764.84	15,665.59	15,665.59		15,665.59	14,334.41	1,328,430.43
68	1,328,430.43	15,498.36	15,498.36		15,498.36	14,501.64	1,313,928.79
69	1,313,928.79	15,329.17	15,329.17		15,329.17	14,670.83	1,299,257.96
70	1,299,257.96	15,158.01	15,158.01		15,158.01	14,841.99	1,284,415.97
71	1,284,415.97	14,984.85	14,984.85		14,984.85	15,015.15	1,269,400.82
72	1,269,400.82	14,809.68	14,809.68		14,809.68	15,190.32	1,254,210.50
73	1,254,210.50	14,632.46	14,632.46		14,632.46	15,367.54	1,238,842.95
74	1,238,842.95	14,453.17	14,453.17		14,453.17	15,546.83	1,223,296.12
75	1,223,296.12	14,271.79	14,271.79		14,271.79	15,728.21	1,207,567.91
76	1,207,567.91	14,088.29	14,088.29		14,088.29	15,911.71	1,191,656.29
77	1,191,656.29	13,902.66	13,902.66		13,902.66	16,097.34	1,175,558.88
78	1,175,558.88	13,714.85	13,714.85		13,714.85	16,285.15	1,159,273.71
79	1,159,273.71	13,524.86	13,524.86		13,524.86	16,475.14	1,142,798.57
80	1,142,798.57	13,332.65	13,332.65		13,332.65	16,667.35	1,126,131.22
81	1,126,131.22	13,138.20	13,138.20		13,138.20	16,861.80	1,109,269.42
82	1,109,269.42	12,941.48	12,941.48		12,941.48	17,058.52	1,092,210.89
83	1,092,210.89	12,742.46	12,742.46		12,742.46	17,257.54	1,074,953.36
84	1,074,953.36	12,541.12	12,541.12		12,541.12	17,458.68	1,057,494.68
85	1,057,494.68	12,337.44	12,337.44		12,337.44	17,662.56	1,039,831.91
86	1,039,831.91	12,131.37	12,131.37		12,131.37	17,868.63	1,021,963.29
87	1,021,963.29	11,922.90	11,922.90		11,922.90	18,077.10	1,003,886.19
88	1,003,886.19	11,712.01	11,712.01		11,712.01	18,287.99	985,596.20
89	985,596.20	11,498.65	11,498.65		11,498.65	18,501.35	967,096.84
90	967,096.84	11,282.80	11,282.80		11,282.80	18,717.20	948,379.64



Principle Amount 2,000,000.00 Baht  
 Annual Payment 30,000.00 Baht  
 Term for no interest Month

Donna Company



Project B Annual Payment 30,000.00 11M Interest Rate 14.00 % Time 10 year 10 month

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Month	Principle	Interest	Compound Interest	Interest	Payment		Principle
	Amount	Per Month	14.00%	Balance	Interest	Principle	Balance
01	948,379.64	11,064.43	11,064.43		11,064.43	18,935.57	929,444.07
02	929,444.07	10,843.51	10,843.51		10,843.51	19,156.49	910,287.58
03	910,287.58	10,620.02	10,620.02		10,620.02	19,379.98	890,907.60
04	890,907.60	10,393.92	10,393.92		10,393.92	19,606.08	871,301.53
05	871,301.53	10,165.18	10,165.18		10,165.18	19,834.82	851,456.71
06	851,456.71	9,933.78	9,933.78		9,933.78	20,066.22	831,400.49
07	831,400.49	9,699.67	9,699.67		9,699.67	20,300.33	811,100.16
08	811,100.16	9,462.84	9,462.84		9,462.84	20,537.15	790,563.02
09	790,563.00	9,223.23	9,223.23		9,223.23	20,776.77	769,786.23
100	769,786.23	8,980.84	8,980.84		8,980.84	21,019.16	748,767.07
101	748,767.07	8,735.62	8,735.62		8,735.62	21,264.38	727,502.69
102	727,502.69	8,487.53	8,487.53		8,487.53	21,512.47	705,990.22
103	705,990.22	8,236.55	8,236.55		8,236.55	21,763.45	684,220.77
104	684,220.77	7,982.65	7,982.65		7,982.65	22,017.35	662,209.42
105	662,209.42	7,725.78	7,725.78		7,725.78	22,274.22	639,935.19
106	639,935.19	7,465.91	7,465.91		7,465.91	22,534.09	617,401.10
107	617,401.10	7,203.01	7,203.01		7,203.01	22,796.99	594,604.12
108	594,604.12	6,937.05	6,937.05		6,937.05	23,062.95	571,541.16
109	571,541.16	6,667.98	6,667.98		6,667.98	23,332.02	548,209.14
110	548,209.14	6,395.77	6,395.77		6,395.77	23,604.23	524,604.92
111	524,604.92	6,120.39	6,120.39		6,120.39	23,879.61	500,725.31
112	500,725.31	5,841.80	5,841.80		5,841.80	24,158.20	478,567.10
113	478,567.10	5,559.95	5,559.95		5,559.95	24,440.05	452,127.05
114	452,127.05	5,274.82	5,274.82		5,274.82	24,725.18	427,401.87
115	427,401.87	4,986.36	4,986.36		4,986.36	25,013.64	402,388.22
116	402,388.22	4,694.53	4,694.53		4,694.53	25,305.47	377,082.75
117	377,082.75	4,399.30	4,399.30		4,399.30	25,600.70	351,482.05
118	351,482.05	4,100.82	4,100.82		4,100.82	25,899.38	325,582.67
119	325,582.67	3,798.44	3,798.44		3,798.44	20,201.54	299,381.14
120	299,381.14	3,492.76	3,492.76		3,492.76	20,507.22	272,873.92

Principle Amount 2,000,000.00 Baht  
 Annual Payment 30,000.00 Baht  
 Term for no interest Months

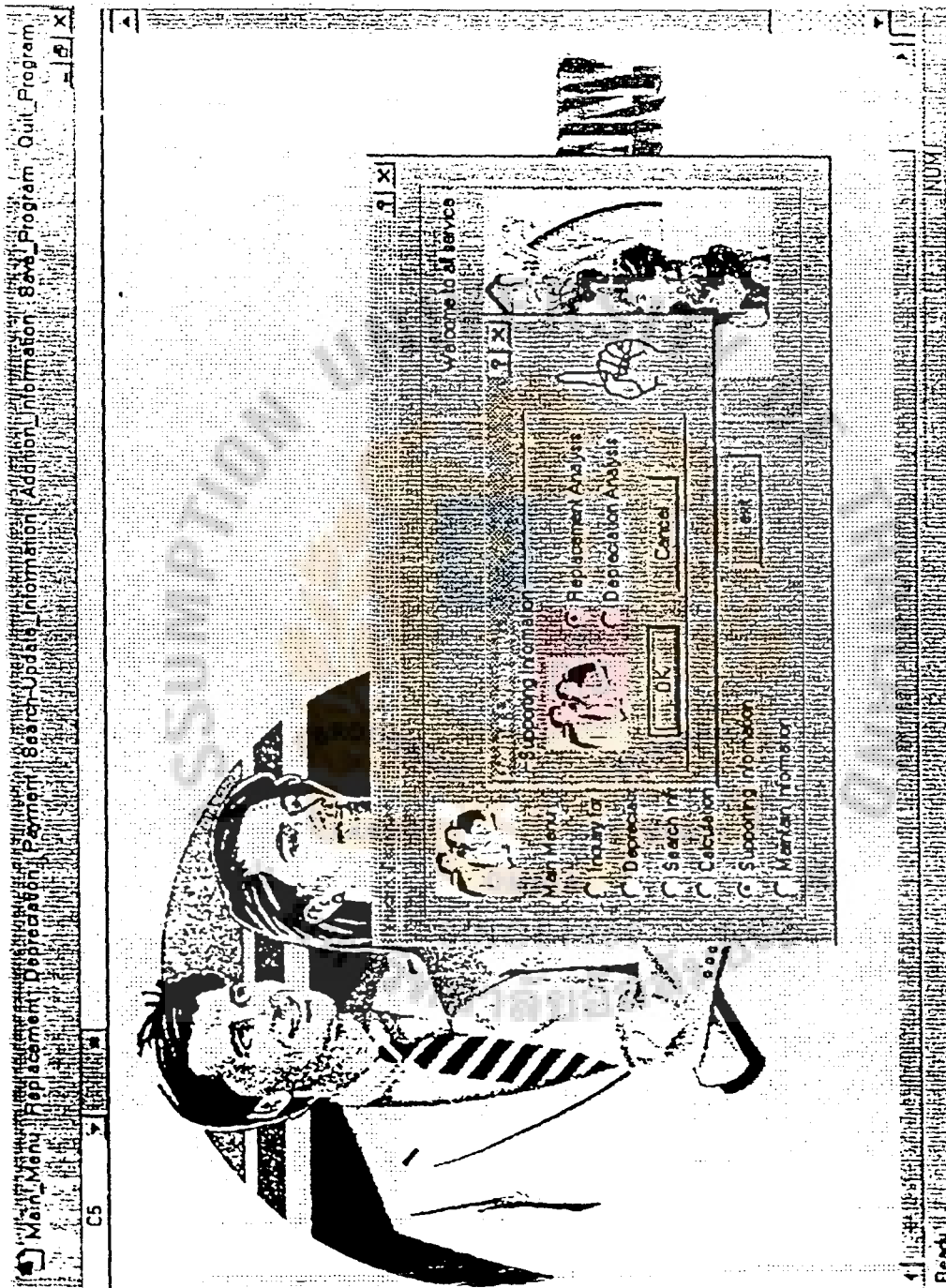
Donna Company



Project B Annual Payment 30,000.00 17M Interest Rate 14.00 % Time 10 year 10 month

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Month	Principle Amount	Interest Per Month	Compound Interest 14.00%	Interest Balance	Payment		Principle Balance
					Interest	Principle	
121	272,873.92	3,183.53	3,183.53		3,183.53	26,616.47	246,057.45
122	246,057.45	2,870.67	2,870.67		2,870.67	27,129.33	218,928.12
123	218,928.12	2,554.16	2,554.16		2,554.16	27,445.84	191,482.28
124	191,482.28	2,233.96	2,233.96		2,233.96	27,766.04	163,716.24
125	163,716.24	1,910.02	1,910.02		1,910.02	28,089.98	135,626.26
126	135,626.26	1,582.31	1,582.31		1,582.31	28,417.69	107,208.57
127	107,208.57	1,250.77	1,250.77		1,250.77	28,749.23	78,459.34
128	78,459.34	915.36	915.36		915.36	29,084.64	49,374.66
129	49,374.66	576.04	576.04		576.04	29,423.96	19,950.73
130	19,950.73	232.76	232.76		232.76	19,950.73	
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# The Short-Cut of the Replacement Analysis



The Replacement Analysis has 2 methods

1. Conventional Approach
2. Cash-Flow Approach

In this report will consider on Cash-Flow Approach because of the easy to calculate and understand. The factors that use for forecasting are:-

1. The old equipment will consider on the remaining of useful life.
2. The new equipment will consider the salvage value, the operation expenses and interest rate.

The old equipment is called Defender and The new equipment called The Challenger.

The factors that must be gathered in the replacement calculation are :-

## The Defender

1. First Cost (Initial Cost)
2. Operating Cost
3. Life, estimated
4. Salvage value, end of life
5. Present age
6. Salvage or resale value at present age (market value or Trade-in value)
7. Interest Rate
8. Reasons of replacement

## The Challenger

1. First Cost (Initial Cost)
2. Operating Cost
3. Life, estimated
4. Salvage value, end of life
5. Interest Rate
6. Reasons why this is a good replacement

Note: Salvage value in the replacement analysis should use the market price or Trade-In value in economy, we will not use book value in the calculation.

The Formulas that use in the Replacement Analysis are :-

To find	Given	Equation	Formula
Present Value	Future Value	$P = F(P/F, i\%, n)$	$P = F[1 / (1+i)^n]$
Future Value	Present Value	$F = P(F/P, i\%, n)$	$F = P(1+i)^n$
Present Value	Present Value	$P = A(P/A, i\%, n)$	$P = A[(1+i)^n - 1 / i(1+i)^n]$
Annual Value	Present Value	$A = P(A/P, i\%, n)$	$A = P[i(1+i)^n / (1+i)^n - 1]$
Annual Value	Future Value	$A = F(A/F, i\%, n)$	$A = F[i / (1+i)^n - 1]$
Future Value	Annual Value	$F = A(F/A, i\%, n)$	$F = A[(1+i)^n - 1 / i]$

The formula that easy to use in the comparison is Annual Value (EUAW) because it compare year per year even we compare 2 or more of machines with different useful life. We can compare easier.

# The Short-Cut of the Depreciation Analysis



## DEPRECIATION METHODS

In this program, the depreciation methods are used in calculation are as follows :-

1. Straight-Line Depreciation Method.
2. Declining-Balance Method.
3. Double-Declining Balance Method.
4. Sum-of-Years-Digits Method.

The formula and detail of each method is shown in below :

### 1. Straight-Line Depreciation Method.

Given,  $B_0$  = Initial cost of machine  
 $SV$  = Salvage value of machine  
 $n$  = Life time of machine  
 $B_N$  = Book value of machine at year N  
 $D_N$  = Depreciation for every year

$$D = [B_0 - SV]^{1/n}$$

$$B_N = B_0 - N * D$$

### 2. Declining-Balance Method

Given,  $B_0$  = Initial cost of machine  
 $SV$  = Salvage value of machine  
 $n$  = Life time of machine  
 $B_N$  = Book value of machine at year N  
 $D_N$  = Depreciation for every year  
 $f$  = Rate of depreciation  
 $N$  = Year N  $1/n$

$$f = 1 - (SV/B_0)^{1/n}$$

$$B_N = B_0 (1-f)^N$$

$$D_N = f * B_N - 1$$

### 3. Double-Declining Balance Method

Given,  $B_0$  = Initial cost of machine  
 $SV$  = Salvage value of machine  
 $n$  = Life time of machine  
 $B_N$  = Book value of machine at year N  
 $D_N$  = Depreciation at year N  
 $f$  = Rate of depreciation  
 $N$  = Year N

$$f = 2/n$$

$$B_N = B_0 (1-f)^N$$

$$D_N = f * B_N - 1$$

### 4. Sum-of-Years-Digits Method

Given,  $B_0$  = Initial cost of machine  
 $SV$  = Salvage value of machine  
 $n$  = Life time of machine  
 $B_N$  = Book value of machine  
 $D_N$  = Depreciation at year N  
 $f_N$  = Rate of depreciation at year N  
 $N$  = Year N

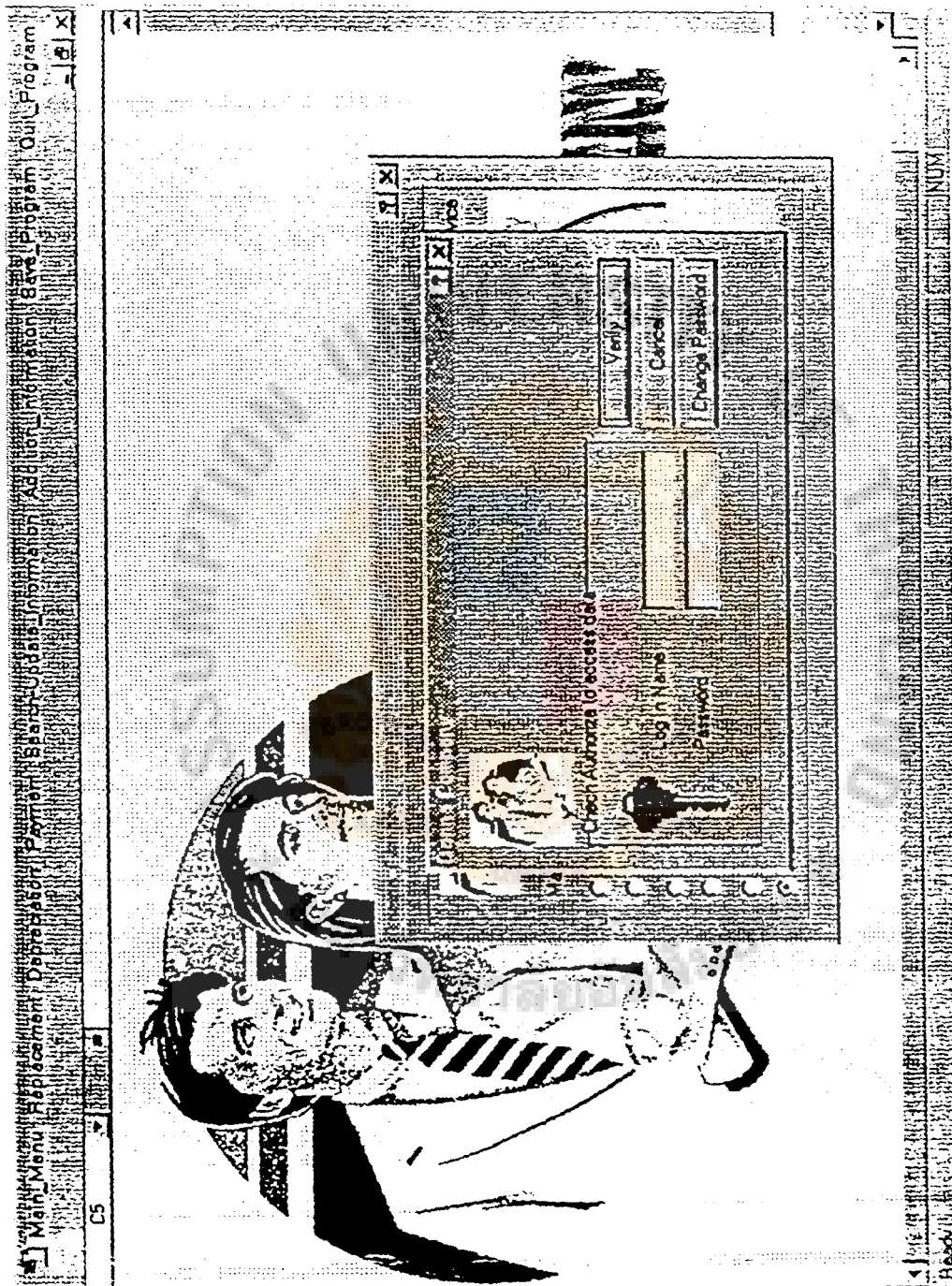
$$SYD = n(n+1)/2$$

$$f_N = n - N + 1 / SYD$$

$$B_N = B_0 - [N((n - (N/2) + 0.5) / SYD)] (B_0 - SV)$$

$$D_N = f_N (B_0 - SV)$$





Menu Replacement Depreciation Payment Search Updates Information Addition Information Save Program Quit Program

A1 DONNA COMPANY

**DONNA COMPANY** ADD / CHANGE Menu

Maintain List of source company Company Inf.

Key Company Name

Address

Province

Tel.

Name

Business type

Ready



## **APPENDIX C**

**RESULTS FROM COMPUTER PROGRAM FOR CASE STUDIES**



## DONNA COMPANY

## Conclusion of the Replacement Machines Report



Computerize calculation: Case study 1

Name of Machine	Defender	Challenger					
	Old:SB-29	New:SB-29	Angelos	D	B	F	G
Initial Cost	-	1,000,000.00	3,000,000.00				
Trade-In Value							
Salvage Value	-						
Annual Operating Cost	79,920.00	79,920.00	80,328.00				
Annual Maintenance Cost	70,480.00	40,730.00	37,080.00				
Remaining Life/Useful Life	3.00	10.00	10.00				
Interest Rate	14.00%						

EUAIV	\$160,400.00	\$312,363.54	\$692,548.62				

## Conclusion:

We suggest to replace the old machine with Machine New:SB-29

Leasing Machine	Defender	Challenger					
	Old:SB-29	New:SB-29	Angelos	D	B	F	G
Leasing Cost							
Expense Cost							
Annual Cost							
Total Cost Per Year							

# DONNA COMPANY (Purchasing Machine)



Optimum for using

Machine New SB-29 ▼

Selected Machine		EAUW
Initial Cost	1,000,000.00	
Trade-In Value	-	
Annual Operating Cost	79,920.00	
Annual Maintenance Cost	40,730.00	
Remaining Life/Useful Life	10	
Interest Rate	14.00%	
KEY SALVAGE VALUE	AMOUNT	EAUW
Salvage ValueYear 1		-฿1,260,650.00
Salvage ValueYear 2		-฿727,939.72
Salvage ValueYear 3		-฿551,381.48
Salvage ValueYear 4		-฿463,854.78
Salvage ValueYear 5		-฿411,933.55
Salvage ValueYear 6		-฿377,807.50
Salvage ValueYear 7		-฿353,842.38
Salvage ValueYear 8		-฿336,220.02
Salvage ValueYear 9		-฿322,818.38
Salvage ValueYear 10		-฿312,363.54

**DONNA COMPANY (Purchasing Machine)**



Optimum for using

Selected Machine		EAUW
Initial Cost	100,000.00	
Trade-In Value	-	
Annual Operating Cost	66,700.00	
Annual Maintenance Cost	-	
Remaining Life/Useful Life	3	
Interest Rate	14.00%	
KEY SALVAGE VALUE	AMOUNT	EAUW
Salvage Value Year 1	100,000.00	-฿80,700.00
Salvage Value Year 2		-฿127,428.97
Salvage Value Year 3		-฿109,773.15



## DONNA COMPANY

## Conclusion of the Replacement Machines Report



Computerize calculation: Case study 2

Name of Machine	Defender	Challenger					
	Old SF-7750	SF-8300	C	D	E	F	G
Initial Cost	8,000.00	158,000.00					
Trade-in Value		8,000.00					
Salvage Value	5,000.00	10,000.00					
Annual Operating Cost	94,550.00	55,550.00					
Annual Maintenance Cost	8,000.00	10,900.00					
Remaining Life/Useful Life	3.00	8.00					
Interest Rate	14.00%						

EUAW	-8102,542.19	-898,029.80					

## Conclusion:

We suggest to replace the old machine with Machine SF-8300 By Purchasing Machine

	Defender	Challenger					
Leasing Machine	Old SF-7750	SF-8300	C	D	E	F	G
Leasing Cost		12,000.00					
Expense Cost		92,520.00					
Annual Cost		-					
Total Cost Per Year		104,520.00					

# DONNA COMPANY

## Conclusion of the Replacement Machines Report



Computerize calculation: Case study 3

Name of Machine	Defender	Challenger					
	Gas Chlorinator	Ozone	C	D	E	F	G
Initial Cost	15,000.00	380,000.00					
Trade-In Value							
Salvage Value							
Annual Operating Cost	184,530.00	66,290.00					
Annual Maintenance Cost							
Remaining Life/Useful Life	3.00	6.00					
Interest Rate	14.00%						

EJAW	\$170,890.97	\$164,009.85					

### Conclusion:

We suggest to replace the old machine with Machine Ozone

Leasing Machine	Defender	Challenger					
	Gas Chlorinator	Ozone	C	D	E	F	G
Leasing Cost							
Expense Cost							
Annual Cost							
Total Cost Per Year							

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