CHAPTER 2
LITERATURE REVIEW

2.1. Previous Research

Maintenance problem is a complex problem. Many methods can be used in order to analyze and solve the problem of maintenance. Until this day, many researchers already did the research about maintenance by using many different methods to achieve different objectives.

Adi Purnomo, done a research about maintenance with purpose to determine the time needed for doing the preventive maintenance to minimize the machines breakdown. The title of this research is "Penentuan Waktu Perawatan Preventif Untuk Minimasi *Downtime.*" The object of observation in this research is production machines at PT. Dhemar Nusantara Semarang and the methods being used are find the distribution of the failure time and find the minimum downtime expectation per cycle (Adi Purnomo, 2005).

Another research about maintenance entitled "Penentuan Interval Penggantian Preventif Jarum Jahit dengan Meminimasi Ekspektasi Biaya Total Penggantian" by Suci Dwiyanti. This research is done with purpose to create a model that is appropriate with the problem and to determine the optimum time of replacing components to minimize the expectation of the total replacement cost. PT. Adi Satria Abadi being chosen as the place for doing the research where the object is the sewing needle. The methods being used in order to gain the purpose of this research is creating the appropriate

calculation model of the problem and determining the appropriate data distribution, where the research objective is to calculate the optimum preventive replacement time interval based on replacement cost and risk cost of defect products (Suci Dwiyanti, 2005).

Sanjaya Purnama Sukma also did the research entitled “Preventive Maintenance Interval of Corrugator Machine in PT. Purinusa Ekapersada.” This research was conducted on parts of corrugator machine and the objective is to determine the interval preventive maintenance of hotplate and mechanical part in order to minimize maintenance cost per unit time. The method being used for solving the problem is by using the output distribution from software Arena based on time to failure data. This research use software of Mapple V release 5 network edition for doing the calculation (Sanjaya Purnama Sukma, 2010).

Jardine, wrote a book entitled “Maintenance, Replacement, and Reliability.” The purpose of this book is to introduce the ways in which the concept of optimization, through the construction and solution of mathematical models, can be brought to bear on the resolution of decision-making problems associated with the maintenance, replacement, and reliability of equipment. This book introduces rational behind the formulation and solution of mathematical models of problems to improve maintenance decision-making. Besides that, this book gives the basic concept of probability and statistics. The statistic is relevant to dealing with the probabilistic problems. The present value concept, which used when evaluating alternative

capital replacement decision and the economic consequences of other long-term maintenance decision, is covered. The main decision areas associated with the maintenance, replacement, and reliability are also cover in this book (Jardine, 1973).

2.2. Current Research

This current research is conducting in the dry processing factory of Cooperativa Café Timor (CCT), East Timor. This research will be done by observing the machines being operated in the production process. The data of machine downtime being used for analyzing and solving the research problem, which is the unknown plant reliability and the inappropriate maintenance strategy applied in the dry processing factory of CCT. The purposes of this research are to determine the plant reliability and propose a proper method of maintenance that can be applied. Besides that, this research will do the calculation for calculating the spare part inventory to ensure that the spare part is available when needed. The problem will be solved through the Weibull++ and Mathcad software. Weibull++ software will be used for determining the parameter based on the type of distribution being used. Otherwise, the MathCad software will be used for calculating the optimum interval preventive maintenance and the spare part inventory will be calculated based on Classical Economic Order Quantity (EOQ) Model.