CHAPTER I INTRODUCTION

I.1 Background

PT. Indonesian Aerospace or well known as PTDI is a company that engaged in the manufacture of aircraft. The company competencies are included the design and development of aircraft, the manufacture of aircraft structures, aircraft assembly, and aircraft services. Those competencies are available not only for civilian but also for a military in custom size. PT Indonesian Aerospace was established in 1976 as a state-owned company in Bandung, Indonesia. The company has produced various types of aircraft such as CN295, CN235, NC212, N219 and manufactures the aircraft component to be exported such as a component of Airbus A320, CN235, CN295, and MK-II.

Currently PT Indonesian Aerospace is conducting a tail boom project for MK-II to meet subcontract demand from France. Tail boom is the back side or the tail part of the airplane. It divided into two main parts there are Cone and Pylon as shown in Figure I-1.

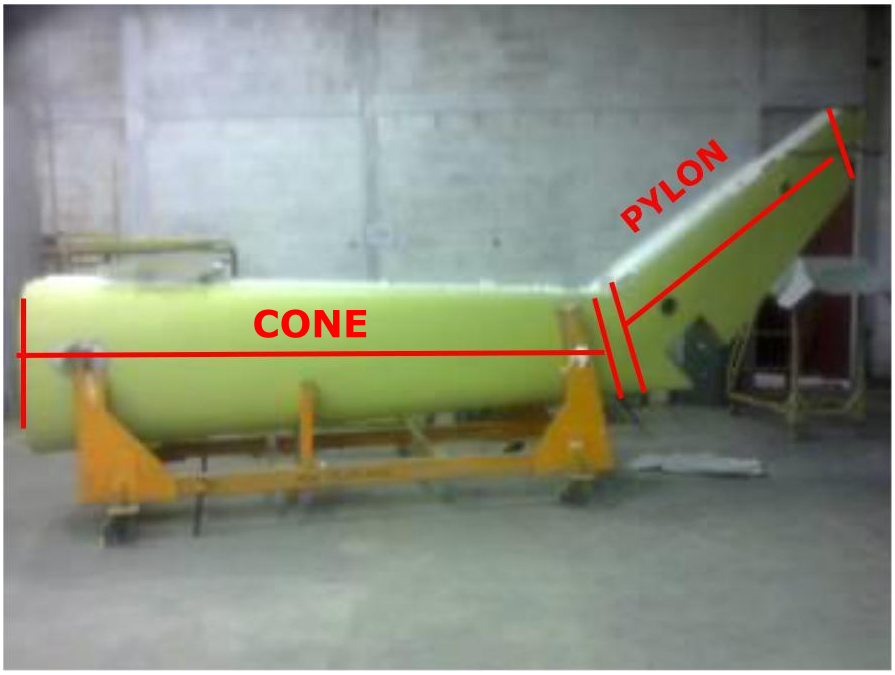

Figure I-1 Component of Tailboom Helicopter

To meet the customer demand, the company must produce different amounts of tail boom each year as shown in Table I-1. However, the company only can meet 48.39% of the average demand.

Table I-1 Historical Demand

Year	Demand (Unit)	Fulfilled Demand (Unit)
2015	4	3
2016	4	3
2017	8	7
2018	15	5

Based on production time data from 2015 to 2018, it can be seen that one of the company problems are some delay in pylon production as shown in Figure I-2. The historical data shows that there is some delay while assemble the pylon in units.

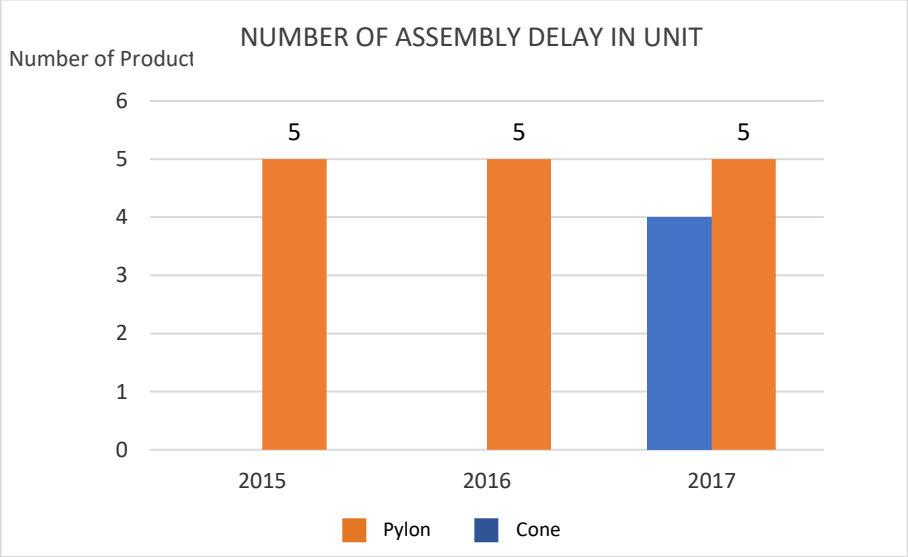

Figure I-2 Delay Comparison of Pylon and Cone

In 2015 and 2016 there are 5 pylons which are late from the production target, while the cone was produced at the right time. In 2017 there are 5 pylons and 4 cones that produced over the production target. The delay occurs for several reasons, one of the reason is the incorrect time in order fulfillment so that it causes the lack of part needed on pylon assembly. Pylon assembly consists of skin assy right and left, floor assy lower and floor assy upper as shown in Figure I-3. Every subassembly should be ready for final assembly at the right time but in real condition some of components are not ready to be assembled because of the part that is not available to assemble the component.

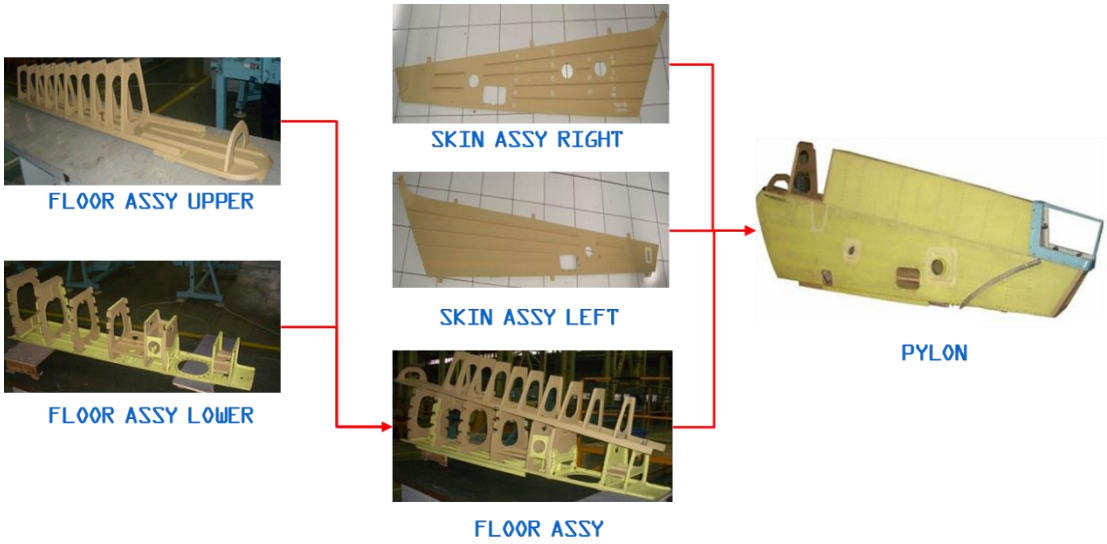

Figure I-3 Pylon Component

On pylon assembly process there are several parts needed such as WEB, RIB, AFT, STIF, PLATE, REINF, and Fasteners. Because there is a delay in getting information about the parts needed and there is no warning about the availability of the parts needed, it makes some parts are not available in store. The lack of the parts and component from the required above causes the assembly line stop running. So that tail boom assembly process will also be delayed. Incorrect item arrival schedule and unsuitable quantities are a major problem in the airbus tail boom assembly line.

To obtain all the components and sub assembly that are needed in the right item, in the right amount and at the right time, the appropriate control system that can be used is Kanban. Kanban is a signboard which is used to control the production flow (Ahmad, Markkula and Ovio, 2013). As stated by (Panneerselvam, 2007), that Kanban is card that contain the product information required for production or assembly at each stage and details of the completion path. By using Kanban, the minimum inventory can be achieved at one time (Rahman, Sharif and Esa, 2013).

However, there are some weaknesses while using Kanban card. Information on Kanban card will be recorded manually by operator, this will take operator's time while assembling the product and it takes up a lot of paper to use. Besides that, the results of manual record must be inputed into the system, the delay of inputting the data will hold over the update of the latest information which is integrated by all departments.

From these problems, the electronic Kanban system is designed to tackle the problem. Electronic Kanban (E-Kanban) is a variation of conventional Kanban by converting physical signals into electronics, so it has more accuracy in transmitting information (Lage and Godinho, 2010). The Information supplied by electronic Kanban is more efficient and effective compared to conventional systems caused by lead time reduction (Print *et al.*, 2018)

I.2 Problem Formulation

Based on the background above, it can be defined that the main topic in this final project is how to design the electronics Kanban on Pylon Assembly Line in PT. Dirgantara Indonesia to control buffer stock in order to improve order fulfillment?

I.3 Research Objectives

This research aims to know how to design the electronics Kanban on Pylon Assembly Line in PT. Dirgantara Indonesia to control buffer stock in order to improve order fulfillment.

I.4 Research Limitation

To pursue the discussion of the problem in this final project research, it is necessary to limit the problem, including:

1. Focus on component that made in PTDI
2. This research used the required data as an input, there are Bill Of Material, Operation Time, Setup time, Lead Time, Capacity Box and historical demand.
3. Demand are deterministic dan repetitive.
4. The design of E-Kanban application is only for pylon assembly line and sub assembly store area.
5. The required part is assumed to be available in fabrication.
6. From the electronic system, the customers are assumed to know about the warning of product approval.

I.5 Research Benefits

The benefit of this research is providing electronic Kanban system so that:

1 The pylon assembly process can be monitored easily so that the operator can see the working status without have to check the related part (does not disturb the working process).
2 It facilitates control process of material or component needed in assembly process, so that it can be available at the right time according to the type and the amount of goods needed.
3 Order fulfillment can be improved due to the reduction of delays.

I.6 Writing Systematics

CHAPTER I **Introduction**

This chapter contains descriptions of background research, problem formulation, research objectives, research limits, research benefits, and systematics of writing.

CHAPTER II **Theoretical Background**

In this chapter contains literature relevant to the problems studied and also discussed the results of previous research. The basic theories listed are used as theories that support the problem solving in the preparation of the final task.

CHAPTER III **Research Methodology**

This chapter describes detailed research steps including: the stage of formulating research problems, formulating hypotheses, and developing research models, identifying and operationalizing research variables, preparing research questionnaires, designing data collection and processing, conducting instrument tests, designing data processing analysis.

CHAPTER IV **Data Collecting and Processing**

This chapter contains data that has been collected and processed. The data describes Kanban system design that includes of values stream mapping (VSM), Kanban cards calculation and the mechanism for using the Kanban system design.

CHAPTER V **Data Analysis**

This chapter describes the analysis of the data that has been collected. The analysis includes of the advantages and disadvantages of Kanban system that have been designed and the analysis of stock replenishment schedules.

CHAPTER VI **Conclusion and Recommendation**

This chapter discusses about conclusion of this studies and the recommendation for the future research.