



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**ESTABLISHMENT OF STANDARD CYCLE TIME AND
PRODUCTION TARGET FOR THE MANUFACTURING OF
TELEKOM MALAYSIA BERHAD (TM) METAL-BASED
PRODUCTS**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Maintenance Technology) with Honours.

by

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ABSTRAK

Kajian ini telah dijalankan di Subsea Supplies Sdn Bhd, Sepang. Syarikat ini ditubuhkan pada tahun 2007 dan perniagaan utamanya adalah untuk membekalkan produk keluli. Baru-baru ini, Subsea Supplies Sdn Bhd telah memulakan pengeluaran produk berasaskan logam bagi Telekom Malaysia Berhad (TM). Terdapat 38 jenis produk yang boleh dibahagikan kepada lima kategori; aksesori tiang, paip GI, paip sangga, pengikat kabel tahan keluli, dan tiang keluli. Oleh itu, syarikat perlu menetapkan masa kitaran dan masa piawai untuk pembuatan setiap produk bagi menentukan sasaran pengeluaran. Kajian ini fokus kepada dua produk TM; iaitu, pendakap tiang besi tiub dan tiang besi. Masa kitaran dicatatkan menggunakan jam randik untuk setiap unsur kerja seperti memotong, membengkok, menindik, menempa dan mengimpal. Masa kitaran piawai dikira dengan mengambil kira pemalar elaun keletihan iaitu 30%. Nilai 30% ini adalah suatu kebiasaan bagi syarikat ini. Elaun Keletihan adalah pelarasan yang dilakukan untuk mendapatkan masa piawai untuk tujuan menebus semula kehilangan masa disebabkan keperluan peribadi dan keletihan yang terhasil daripada faktor fizikal dan biologi kerja dan pekerja. Kajian masa kitaran menentukan sasaran pengeluaran 10 jam bekerja untuk pendakap (untuk tiang besi tiub). Sasaran pengeluaran adalah 12860 keping untuk kerja memotong, 3500 keping untuk membengkok, dan 3960 keping untuk menindik. Untuk tiang besi, sasaran pengeluaran bagi setiap elemen kerja; memotong paip 3 inci, menempa paip 4 inci, mengimpal, menanda secara semburan dan membungkus dalam karung masing-masing adalah 550, 870, 840, 1880, 5710 dan 3300 keping. Berdasarkan kepada sasaran pengeluaran ini, satu skim ganjaran baharu telah dicadangkan supaya pekerja yang mencapai sasaran pengeluaran akan diberi bayaran insentif. Formula skim ini dibangunkan dengan mengikuti pelan italic yang berlandaskan konsep asas bahawa setiap produk boleh dinilai dari segi jam kerja yang diperlukan untuk menghasilkannya.

ABSTRACT

The study was conducted at Subsea Supplies Sdn Bhd, Sepang. The company was established in 2007 and its main business is to supply steel products. Recently, Subsea Supplies Sdn Bhd has started the production of Telekom Malaysia Berhad (TM) metal-based products. There are 38 types of products which can be divided into five categories; pole accessories, GI pipes, strut pipe, stainless steel cable ties, and steel pole. Therefore, the company needs to establish cycle time and standard time for the manufacturing of each product in order to determine the production target. This study focused on two TM metal-based products; i.e., bracket for tubular iron pole and iron pole. The cycle time was recorded by using stopwatch for every job element such as cutting, bending, piercing, swaging and welding. The standard cycle time was calculated by considering constant fatigue allowance which was 30 %. This 30 % allowance has become a common practise for this company. Fatigue allowance is the adjustment done to cycle time to obtain the standard time for purpose of recovering the loss time due to personnel need and fatigue that caused by physical and biological nature of the jobs and workers. The cycle time study determined the production target of 10 working hours for bracket (for tubular iron pole) which based on its job elements. The production target were 12860 pieces for cutting, 3500 pieces for bending, and 3960 pieces for piercing. For iron pole, the production target for each job elements; cutting 3 inch pipe, swaging 4 inch pipe, welding, marking spray and wrapping in sack were 550, 870, 840, 1880, 5710 and 3300 pieces, respectively. Based on these production targets, a new production scheme was proposed so that those workers who achieved the production target will be granted incentive payments. The formula of this scheme was developed by following the improshare plan in which the basic concepts is that every product can be evaluated in term of works hours that are required to produce it.

DEDICATIONS

I dedicated this report to my beloved parents for their endless support, love and encouragement

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

TM	-	Telekom Malaysia Berhad
ILO	-	International Labour Organization
O & G	-	Oil and Gas
BOM	-	Bill of Material
IB	-	Integral Bearer

CHAPTER 1

INTRODUCTION

1.0 Introduction

This section describes the general background of the company that provide the opportunity to conduct this research and its main products on the manufacturing of metal-based product according to Telekom Malaysia Berhad (TM). This section also includes the problem statement, objectives and scopes of this research.

1.1 Background

Subsea Supplies Sdn Bhd is a one of medium-sized company that are making metal-based product for TM such as pole accessories, GI pipes, pole strut, stainless steel cable ties, and pole steel. Figure 1.1 shows the company manufacturing environment.



Figure 1.1: The factory environment

Besides that, this company also supply their products for oil and gas companies and Tenaga Nasional Berhad (TNB). The metal-based product that are being manufactured in the factory are support hook, stray rod, stray plate, integral bearer (IB) clamp, clamp pole head ring, clamp pole step, bridle ring, pole head ring, eyebolt, thimble and many others. Subsea Sdn Bhd produces these products in mass-scale of all manufacturing processes for the pole accessories are made in the same factory. There are 38 types of products and specification where it requires effective measures to control the entire production. Furthermore, the time taken to produce each product is very crucial because it determines the quantity and quality of the products produced.

In Subsea Supplies Sdn Bhd factory, there are some workers who are the backbone of the company. It consists of managers, engineers, supervisors, administrators and clerks workers is management. Therefore, the company has developed improvement plan in the management and operations to strengthen its business. Background of the company is shown in Table 1.1.

Table 1.1: Company Background

Subsea Supplies Sdn Bhd	
Address	<ul style="list-style-type: none"> • Jalan Besar Salak Sepang, Kampung Lembah Paya 43900, Sepang Selangor • Near the old Salak Tinggi town
Customer	<ul style="list-style-type: none"> • Oil and gas companies • Currently major customer is Telekom Malaysia • Production based on TM requirement
Business	<ul style="list-style-type: none"> • Supply metal-based products
Production	<ul style="list-style-type: none"> • Produce 38 types of steel product • Major production using the stamping machine and experienced worker to run production
Equipments	<ul style="list-style-type: none"> • Stamping machine • Lathe machine • Drilling and welding machine

In the production of these products, many manufacturing processes are involved and carried out by the operators with the aid of machines such as stamping machine which involved in manufacturing process, example such as cutting, bending, blanking, piercing and many others. Figure 1.2 below shows the machines threading, cutting, and bending.



(a) Threading machine

(b) Cutting machine



(c) Bending machine

Figure 1.2: Machines at production site

1.2 Telekom Malaysia(TM) Metal-Based Products

Subsea Company manufactures 38 metal-based products to be supplied to TM. There are two types of pole accessories, concrete pole accessories and iron pole accessories. The production of these products require is very cautious and quality of

the product depends on the types of the materials used. The metal-based products are grouped into five main categories as shown in Table 1.2.

Table 1.2: List of TM Metal-Based Products



No	Category	Product/Component
1	Pole Accessories	<p><u>Common item</u></p> <ul style="list-style-type: none"> • Support Hook (Size 1 & Size 2) • Stay Rod Set (Size 1 & Size 2) • Stay Plate (Size 1 & Size 2) • Integral Bearer Cable Clamp (Size 1 & Size 2) <p><u>Iron Pole</u></p> <ul style="list-style-type: none"> • Clamp Pole Head Ring • Brackets • Clamp Pole Step • Pole Clamp • Bridle Ring <p><u>Concrete Pole</u></p> <ul style="list-style-type: none"> • Pole Head Ring • Eyebolt • Pole Step • Pole Clip • Bridle Ring with Locking Nut
2	GI pipe, Socket & Bend	<ul style="list-style-type: none"> • 4 meter Galvanized Pipes with sizes 25 mm, 50 mm and 100 mm • 6 meter Galvanized Pipes with sizes 25 mm, 50 mm and 100 mm • Sockets with sizes 25 mm, 50 mm and 100 mm • Bends with sizes 25 mm, 50 mm and 100 mm
3	Strut Pipe & Accessories	<ul style="list-style-type: none"> • Pole Strut with sizes 6.1 m and 7.6 m • Base Plate • Bracket • Bolt • Nut
4	Stainless Cable Tie	<ul style="list-style-type: none"> • Two sizes of lengths range from 335 mm and 490 mm.

5	Steel Pole	<ul style="list-style-type: none"> • Steel Pole with sizes 6.7 m and 7.6 m • Base Plate • Surface Plate • U-Bolt • Lightning Spike
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1.3 Pole Accessories

Pole accessories are the accessories that fitted on utility poles. Table 1.3 show the photo and description of the accessories. Mostly accessories made from metals and finished with galvanized coating to make them more corrosion resistant.

Table 1.3: Description of several pole accessories

Name of accessories	Description
1) Pole Head Ring 	<ul style="list-style-type: none"> • Bridle Ring manufactured from mild steel round bar • Welding complies with British Standard (BS) • For drop wire distribution
2) Eyebolt 	<ul style="list-style-type: none"> • Eyebolt has an eye which is hot formed and welded as required by BS • For suspension of support hook

3) Pole Step



- Pole step is consists of 12 mm MS Bolt (fully threaded) and 12 mm Spring Washer
- Clamp pole steps for pre-stressed spun concrete pole

4) Pole Clip



- Pole clip fabricated from 6 mm x 30 mm Mild Steel Flat Bar formed and drilled
- It comes together with 2 halves of clip bolted together hand tight with 2 M10 x 100 MS Hexagonal Bolts and nuts and a 2.5 mm Spring Washer

5) Bridle Ring With Locking Nut



- Bridle Ring made of from 6 mm Mild Steel Round Bar
- It must be attached with 6 mm hexagonal locking nut running freely along the thread end

6) Cable tie



- For the outdoor usage such as attaching distribution box, pipes and other telephone line plant items to the poles
- Designed in the form of a strap and buckle arrangement with

self-locking when strapped
without any special tool

7) Hook No 1 A



- To suspend the aerial cable clamps
- Act as “mechanical fuses” to protect the cables from damages due to heavy object falling on cables

8) Clamp IB No 1



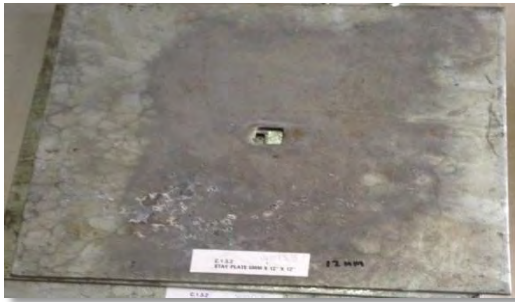
- Each cable clamp consists of a pair of aluminium plates secured by two mild steel galvanized bolts
- To support Integral Bearer Cable on Poles

9) Thimble



- Comes with eyebolt if required
 - Metal ring, concave design on the outside, around which a loop of rope is spliced
-

10) Stay plate



- Stay Rod is manufactured from high strength steel (S355)
- Remaining components can be from Mild Steel (S275) and cast irons

11) Clamp IB No 2



- Each cable clamp consists of one pair of aluminium plates secured by two mild steel galvanized bolts

12) Bracket



- Brackets consist of 2 halves bolted together with 2 bolts, 2 spring washers and 2 nuts
- Flat bar 6 mm x 36 mm x 225 mm
- Bolt M8 x 65 mm x 45 T/L, HDG
- Spring washer M8 x 3 mm

1.4 Production Background

Telekom Malaysia Berhad (TM) pole accessories production process consists of several aspects such as machine, raw materials, product methods and manpower. To ensure a more systematic production, the machine has been used to optimum

operating level used preferably close to 80% for all products. The machine used a variety of specifications and applications and optimized using a modified die according to the product specifications. Figure 1.3 shows the stamping machine used in the production site.



Figure 1.3: Stamping Machine

To ensure that the machine can operate with the same functionality but different processes, the use of die is very important because it concerns the quality of the products. Other than that, the cycles time of every process also important to achieve the production daily target. Thus, good quality and time efficiently can be implemented optimally. These machines are arranged in order to ensure that the production process is not disrupted. The composition of the machine is also important to ensure that the operator uses maximum movement. Therefore, a wide space is required to ensure the movement of the operator. It also allows space to store more products and operators to organize the finished product. The finished product is heavy and used a forklift to transport the product.

1.5 Problem Statement

Subsea Supplies Sdn Bhd company are produces of steel product. The company has been making products for Tenaga Nasional Berhad (TNB) as J-hook, Triangular bracket, Street lighting bracket long, Q-hook and etc. All of these products are still ongoing and produced. In addition, recently the Subsea Supplies Company has received a new project from Telekom Malaysia Berhad (TM) to create products based on metal. Product to be focused is the pole accessories. The problems faced by this company, this is the first time company to develop TM Metal-based products. In the initial stage, company is still in planning. The company must design die that suitable for each product and material that should be chosen for making the products such as pole head ring, pole step, bridle ring, thimble, bracket and many others. Besides, company also have to manufacture of new equipment to make the all type of pole accessories. Other than that, company also do the arrangement the machine that will be used to produce the products such as stamping machine, lathe machine and other. Therefore, the manpower for operates the machine is also important because to reduce the cost and to make sure the production is continue smoothly followed on schedule time. Lastly, cycle time and production target has not been established. Hence, the study was to determine the manufacturing process of TM Metal-based products, and establish better standard cycle time and production target for the product produced.