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ESTABLISHMENT OF NEW STANDARD TIME FOR THE MANUFACTURING OF HOT-DIP GALVANIZED STEEL OF TENAGA NASIONAL BERHAD (TNB) CONCRETE POLE ACCESSORIES

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree of Mechanical Engineering Technology
(Maintenance Technology) (Hons)

by

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BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **ESTABLISHMENT OF NEW STANDART TIME FOR THE MANUFACTURING OF HOT-DIP GALVANIZED STEEL OF TENAGA NASIONAL BERHAD (TNB) POLE ACCESSORIES**

SESI PENGAJIAN: **2015/16 Semester 1**

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Date : 25/1/2016

APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the Bachelor's Degree of Mechanical Engineering Technology (Maintenance Technology) (Hons.). The member of the supervisory is as follow:

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ABSTRACT

This study was conducted at Subsea Sdn Bhd, Sepang. This company was established in 2007 and it main business is to supply steel products to large corporation particularly in the field of oil and gas (O & G) and construction. One of the company's main products is Tenaga Nasional Berhad (TNB) hot-dip galvanized concrete pole accessories. There are 17 types of pole accessories that are being produced by Subsea Sdn Bhd which include J hook, bracket D, triangular bracket and band U 10M. This study focused mainly on four products. This company recently established the cycle time and standard time for the manufacturing of the product in order to determine the production target. The calculation of the standard time was based on a constant fatigue allowance, 30%. This 30% of allowance has become a common practice in this company. Fatigue allowance is the adjustment done to cycle time to obtain the standard time for the purpose to recover the loss time due to personnel need and fatigue. By providing small increase to the cycle time, the workers still able to cover loss time and complete the work assign to him/her. In this study, a new standard time for the manufacturing of products was proposed in order to achieve more accurate production target. The calculation of the new standard time incorporated fatigue allowance that is proposed by International Labour Organization (ILO). The fatigue allowances include personnel allowance, standby allowance, abnormal position, noise level and atmospheric condition. Each of the allowance is rated by numerical value, 1, 2 and so on. Stopwatch was used to record the cycle time. Then, the standard time was calculated by dividing the average cycle time to the allowance base on the ILO rating scheme. The results show that the new fatigue allowance were range from 25% to 35% as compared to the constant 30% of the existing allowance adopted by the company. The new standard time result in the increase of production target for manufacturing product with less labour demands while reducing the production target of more labour intensive product. It also became apparent from this study that the production target increases by about 10% to 15% based on this new standard time. The newly established standard time apparently provides a guideline to the company especially to set daily production target that is more realistic and labour-oriented. The production target also could be adopted as a basis for a fairer productivity-linked incentive scheme that is being developed by the company.

ABSTRAK

Kajian ini telah dijalankan di Subsea Sdn Bhd, di Sepang. Syarikat ini telah ditubuhkan pada 2007 dan perniagaan utamanya adalah untuk membekalkan produk keluli untuk syarikat besar terutamanya dalam bidang minyak dan gas (O & G) serta pembinaan. Salah satu produk utama syarikat adalah aksesori tiang konkrit Tenaga Nasional Berhad (TNB) celup panas tergalvani. Terdapat 17 jenis aksesori tiang yang sedang dihasilkan oleh Subsea Sdn Bhd termasuk J hook, Bracket D, Triangular Bracket, Band U 10M dan banyak lagi. Kajian ini tertumpu kepada empat produk. Syarikat ini baru menubuhkan masa kitaran dan masa piawai bagi pembuatan produk untuk menentukan sasaran pengeluaran bagi setiap seorang daripada mereka. Pengiraan masa yang standard adalah berdasarkan elaun keletihan yang berterusan, iaitu sebanyak 30%. 30% ini daripada elaun telah menjadi satu amalan biasa bagi syarikat ini. Elaun Keletihan adalah pelarasan yang dilakukan ke masa kitaran untuk mendapatkan masa yang standard bagi tujuan untuk mendapatkan kembali masa kerugian yang disebabkan oleh keperluan dan keletihan kakitangan. Dengan peningkatan kecil kepada masa kitaran, pekerja masih mampu untuk menampung masa kerugian dan menyiapkan kerja yng telah ditentukan. Dalam kajian ini, masa baru standard untuk pembuatan produk telah dicadangkan untuk mencapai sasaran pengeluaran yang lebih tepat. Pengiraan masa standard digabungkan dengan elaun keletihan baru yang dicadangkan oleh Pertubuhan Buruh Antarabangsa (ILO). Elaun keletihan termasuk elaun kakitangan, elaun siap sedia, kedudukan tidak normal, tahap bunyi dan keadaan atmosfera. Setiap satu daripada elaun itu diberi nilai oleh nilai berangka, 1, 2 dan sebagainya. Jam randik digunakan untuk mencatatkan masa kitaran. Kemudian, masa yang standard telah dikira dengan membahagikan masa kitaran purata ke pangkalan elaun pada skim Kedudukan ILO. Keputusan menunjukkan bahawa elaun keletihan baru adalah pelbagai dari 25% kepada 35% berbanding 30% tetap elaun sedia ada yang diguna pakai oleh syarikat. Hasil masa standard baru dalam peningkatan sasaran pengeluaran untuk produk pembuatan yang kurang penggunaan tenaga di samping mengurangkan sasaran pengeluaran dari tenaga yang lebih menuntut lebih banyak produk. Ia juga menjadi jelas daripada kajian ini bahawa sasaran pengeluaran meningkat sebanyak kira-kira 10% kepada 15% berdasarkan masa standard yang baru. Masa yang baru ditubuhkan standard untuk produk ini nampaknya menyediakan garis panduan kepada syarikat terutama untuk mendapatkan sasaran pengeluaran harian yang lebih realistik dan lebih berorientasikan buruh.. Sasaran pengeluaran boleh diguna pakai sebagai asas untuk mendapatkan produktiviti skim insentif yang lebih adil yang sedang dibangunkan oleh syarikat itu.

DEDICATIONS

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

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TNB	=	Tenaga Nasional Berhad
ILO	=	International Labour Organization
O & G		Oil and Gas

CHAPTER 1
INTRODUCTION

1.0 Introduction

Production of quality products is one of the key elements that should be included in every manufacturing industry. It is the key or basis that should be maintained to ensure their enterprise is last long. Subsea Sdn Bhd is no exception, where it is also a company that produce a massive product. Therefore, time plays an important role in this industry to ensure that costs are controlled and can be reduced. Therefore, time study research is very important to ensure that companies can make improvements in terms of production in order to get a system that is transparent and reduced cost and thus improve profitability and productivity.

1.1 Background

This factory is a steel manufacturing plant where it produces accessories for TNB concrete pole accessories as shown in Figure 1.1. There are many types of pole accessories produced by Subsea Supplies for their customer such as J-hook, u-band, bracket D and others that use for TNB project. All of these products are galvanized before delivered to the customer, which is TNB. Subsea Sdn Bhd produces mass scale of this products in which almost 90% of all manufacturing processes for the pole accessory are made in the same factory. The products produced by this factory contain 17 kinds of different type and specification where it requires an efficient measure to control the entire product manufacture. Therefore, the time taken to produce each product is very important because it will determine the quality and the quantity of the product to be produced. The company also seeks to attain total customer satisfaction and for this reason, it strives to provide the best possible level service at all the times

Figure 1.1: TNB Pole Accessories

In the production of these products, many manufacturing processes would be involved and carried out by the operator with the help of specific machines such as stamping machine, bend saw for cutting and etc. The processes involved in this manufacturing process for example, cutting, bending, blanking, piercing and many more. Figure 1.2 shown cutting processes. These processes are controlled by experienced operators that work in machining and supervised by a qualified supervisor. Then, the quality of the product is checked from time to time so that the entire product is maintained at the required level.

Figure 1.2: Cutting Process

In Subsea Supplies Sdn Bhd factory, there are some workers who form the backbone of the company. It consists of a manager, engineers, administrators and clerks are an employee for the management and the total for management department is 8 people. The company has a history of its own, but, sometimes, current development and economic factors affecting the stability and integrity of the company. Therefore, the company has developed a number of elements in the management and operation to strengthen its business. For the operation, there are two supervisors and 16 numbers of operators. The company background is show in Table 1.1.

Table 1.1: Company Background

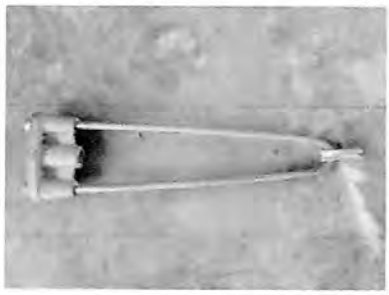
Subsea Supplies Sdn Bhd	
Background	• Steel Factory • Produce TNB pole accessory • Based on galvanized coating
Business	• Currently major customer is TNB • O&G companies • Production base on TNB requirement
Location	• Jalan Besar Salak Sepang, Kampung Lembah Paya 43900 Sepang, Selangor • In the proximity of the old Salak tinggi town
Production	• Produce 17 types of steel product • Involve of human operator and machine

1.2 TNB Pole Accessories

Subsea companies produce 17 iron-based products to be supplied to the TNB. These products are used in open areas and more likely to experience corrosion. Therefore, the production of this product is very cautious and quality of the products depends on the durability of the materials used. The iron core materials are coated by a layer of zinc to form anti-rust coating. List of the product is shown in Table 1.2

Table 1.2: Product List

No	Product name	Photo
1	J-Hook	
2	Bracket D	
3	Triangular Bracket	
4	U-band 7.5	
5	U-band 10	

6	Stay Thimble	
7	Bow with thimble	
8	Stay plate	
9	Stay rod ¾"	
10	Street lighting bracket long	

11	Street lighting bracket short	
12	Hexagon bolt & nut 5/8" x 40 mm TL x 4 ½" Lg	
13	Hexagon bolt & nut 5/8" x 50 mm TL x 5" Lg	
14	Hexagon bolt & nut 5/8" x 55 mm TL x 12" Lg	

15	Dead end clamp-single	
16	Dead end clamp-double	
17	Q-hook	

1.3 Production Background

TNB pole accessories production process consists of several aspects such as use of machinery, raw materials, processing methods and also hired operator or employee. To ensure a more systematic production, the machines were used to optimum level of operation which is used preferably close to 80% for all products. The machines used have a variety of specifications and application and optimized using a modified mold according to the specifications of the product to be produced. Figure 1.3 shows the stamping machine used in the production site.

Figure 1.3: Silverpress SPA-110D & SPA 200D

To ensure that the machine can operate with the same functionality but different process, the use of mold is very critical as it will involve the quality of the product and the time taken to produce the product. Table 1.3 shows the variety of mold used in the manufacturing of pole accessories. Hence, good quality and time-efficient can be implemented optimally. These machines are organized in order to ensure that the production process is not disrupted. Machine arrangement is also important to ensure the operator is using maximum movement. So, wide space is needed to ensure the operator movement. This is also allows the room to store more products and operator easily to organize the finished product. Finished product is heavy and forklift is used to transport the products.