Tibuana
Journal of applied Industrial Engineering-University of PGRI AdiBuana

p-ISSN 2622-2027
e-ISSN 2622-2035

Ergonomic Analysis of Working without Fatigue and Increasing Work Productivity

Gempur Santoso[1], Prihono[2]
1) Industrial Engineering, Faculty of Engineering, Ma'arif Hasyim Latif University (UMAHA), Sidoarjo
2) Industrial Engineering, Faculty of Engineering, PGRI Adi Buana University (UNIPA) Surabaya
email: gempur_santoso@dosen.umaha.ac.id

Abstrac-Currently, there is still hard work going on, but the income is not adequate. Therefore, it is necessary to show scientifically that working does not need to be tired, but with an ergonomic system, productivity increases.
This paper is made from various books or literature scientifically and analyzed and discussed descriptively.First, at work, an ergonomic tool must be made, so that at work it is enough to use body energy of 5.0 kcal/hour to 5.2 kcal/hour, so that work is in the heavy category, because using ergonomic tools and systems becomes work in the light and even relaxed category. Second, the application of ergonomics in various fields of work can improve work optimally, and productivity can increase between 10% to 21.28%. it is better to work without wasting the body's energy which makes you tired easily, by providing equipment technology and ergonomic systems.
Keywords: ergonomic, not tired, work productivity.

I. INTRODUCTION

Everyone wants to work tirelessly and get a salary that is sufficient or even more. Of course work must be productive to produce products. Products that can generate financial and the results can be used to pay employees. However, there are also those who have worked hard, but the results are not balanced. Therefore, in this essay, we will discuss about working hard, but productivity is still good.

According to Yenni Ratna Pertiwi (2016), "every job has its own challenges and difficulties. Often this is one of the factors that makes a person feel very tired so that a job cannot be done quickly and takes time." Then Eka Sari Ismirani (2016) also argues that "work tends to be tiring and as a result stress is unavoidable".

According to the P2PTM of the Indonesian Ministry of Health (2018) in his article, he said that "continuous hard work increases the risk of accidents, increases stress levels, and even causes physical pain". Therefore, work that causes unfavorable effects on oneself is not to be expected. We have to work, but earn enough, be safe, comfortable, not tiring, and not hurt.

Every adult (working age productive) must work. At work, it is expected to have an ergonomic work appearance. Ergonomic work appearance is a balance of work tasks and body capabilities. Thus work is not tired and work productivity remains good.

II. METHOD

1. Subject:

This writing is carried out on workers in working conditions. In working conditions, you are not tired because by using ergonomic facilities, an ergonomic work environment, and physiologically a human-machine relationship occurs, namely machines/equipment adapted to humans.

2.Type:

This type or type of writing uses a literature study. This is intended to use various literature books and scientific writings to reveal the issues raised, namely about tireless work and productivity.

3.Analysis Method:

The method of analysis of this paper is descriptive. It has the purpose of presenting opinions and data from various opinions from the literature. Thus finding common ground for the concluded material.

p-ISSN 2622-2027
e-ISSN 2622-2035

III. DISCUSSION

1. Work Fatigue

The NAV (threshold limit value) of working people is 8 hours per day or 40 per hour per week (Permenakertrans, number 13/Men/X/2011). In the long term (long term) if you work more than the NAV, it will cause overload or over time, health problems, illness, accidents.

Then, the work capacity / work energy according to Granjian (1996) that the recommended work rate = 5.2 kcal / min, or 5.00 kcal / min. If you work beyond the recommendation of 5 kcal/minute, the energy reserves in the body will be lost/deficient. Work must use energy less than 5 kcal/minute, so as not to get tired (waste energy). Energy needs are sufficient according to activity (Santoso, 2004) see table 1. below.

Table 1. Activities and Energy Needs

Aktivitas	Energy Needs Activities (Kcal/BB/day)
Casual	30
Light work	35
Medium work	40
Working Weight	50

Then, the various work activities (adapted from Santoso, 2004; and Praama, 2019), as follows:

Light work
Men: office work, doctor, teacher, nurse, lawyer, shop work, unemployed
Women: office work, housework (using machines), teachers, nurses, doctors.

Medium work
Men: light industry, students, need buildings, farmers, (using machines), fishermen
Women: light industry, housework (without using machines), female students, working in shops

Work hard
Men: farmer (without machine), coolie, miner, carpenter (without machine), blacksmith
Women: farmers (without machines) dancers, athletes.

Hard work
Male: carpenter (without machine), blacksmith
Woman: construction worker.
So, the conclusion of the analysis is that the appropriate work needs to be made an egotistical tool so that everything becomes light work, not tiring.

2.Productivity

Next, let's talk about productivity. Productivity means continuously doing work. Because work is not tiring, you can do longer (continuous) work. The result of doing work is the result of work. And, the work can be goods (products) or services. Productivity to measure the results of work. Productivity is output per input. According to Suma'mur (1989) that the application of ergonomics in various fields of work is proven to increase productivity by 10% or more.

Then, Tomtic (1995) also said that from the results of his research on forest workers by developing new methods and techniques, the machine function provides ergonomic human needs so that machine information is quickly accepted by human workers, the quality of the operator increases professionally, reduces the energy and work of the workers. forest workers can be optimal.

Also, according to the results of Santoso's research (1999) that in wood craft workers the rubbing section of the lesehan workers on the lanai was changed to an ergonomic sitting performance which could

p-ISSN 2622-2027
e-ISSN 2622-2035

increase productivity by 21.28% and reduce fatigue by 4%.

Research Sudarmojo (2016) found that paras carving craftsmen generally work in emergency rooms/buildings with simple work equipment. The working conditions and environment are very uncomfortable, this is because the workplace is in the form of an overhang, exposed to hot sun, wind, and dust. Meanwhile, the work attitude of the craftsmen is also unnatural, with equipment that is not suitable for anthropometry. Such conditions cause workers to tire quickly, experience musculoskeletal disorders, and low back pain and have an impact on low productivity. To overcome this problem, ergonomic interventions were carried out in the form of using a base as a workpiece base, using a seat, training on how to lift weights, and getting used to wearing personal protective equipment. From the various opinions above, it can be analyzed and concluded that the application of ergonomics in various fields of work can improve work optimally, and productivity can increase between 10% to 21.28%.

IV.CONCLUSIONS

a. In work, ergonomic tools must be made, so that at work it is enough to use body energy of 5.0 kcal/hour to 5.2 kcal/hour, so that work is in the heavy category, because using ergonomic tools and systems becomes work in the light and even relaxed category.

b. The application of ergonomics in various fields of work can improve work optimally, and productivity can increase between 10% to 21.28%.

REFERENCES

[1] Andy Pratama, 2019, Baagaimana Cara Menghiung Kebutuhan Kalori?, https://teknorus.com/bagaimana-cara-menghitung-kebutuhan-kalori/amp=3

[2] Anjar, 2017,Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Karyawan Matahari Departement Store Cabang Lippo Plaza Kendari Tahun 2016**.** *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat.* 2 (1).

[3] Chris Dr. , 2021, Upper Arm Pain (Biceps and Triceps) Causes, https://www.healthhype.com/upper-arm-pain-biceps-and-triceps-causes.html

[4] Eka Sari Ismirani, 2016, Menghindari *Burnout Syindrom* Dalam Bekerja, Direktorat Jendral Kekayaan Negara, Kementrian Keuangan Negara Indonesiia (DJKN), Jakarta.

[5] Grandjean E, 1996, *Fitting the task to the man: An ergonomics approach*, Talor and Francis, Philadelpia.

[6] G.Santoso, 2004, Manajemen keselmtn & kesehatan kerja, Prestasi Pustaka Publisher, Jakarta.

[7] G. Santoso, 1999, Pengaruh kursi dan meja kerja terhadap produktivitas tenaga kerja kerajinan kayu (penelitian ekspereimental di CV. Karya Trampil Pandaan Pasuruan).

[8] P2PTM, 2018, Kerja berlebihan itu tidak baik, tapi kenapa banyak orang masih melakukan?, Kementrian kehatan Republik Indosesia, Jakarta.

[9] Siska Maulana Anggrianti, Bina Kurniawan, Baju Widjasena, Hubungan antara postur kerja berdiri dengan keluhan nyeri kaki pada pekrja aktivitas mekanik section welding di PT. X, e-*Journal vol 5 Oktober 2017* ISSN: 2356-3346, Semarang: Universitas Diponegoro.

[10] Suma'mur P.P, 1989, Ergonomi Untuk Produktivitas Kerja, Cetakan pertama, CV. Haji Masagung, Jakarta.

[11] Tarwakala, 2014,Ergonomi Industri dasar-dasar pengetahuan ergonomic dan aplikasi di tempat kerja, Surakarta : Harapan Press.

[12] Wignjosoebroto, 2006, Ergonomi Studi Gerak Dan Waktu, Surabaya : Guna Wid

[13] Yenni Ratna Pertiwi,2016, *Burn Out* dalam Bekerja dan Upaya Mengatasinya,, Direktorat Jendral

p-ISSN 2622-2027
e-ISSN 2622-2035

Kekayaan Negara, Kementrian Keuangan Negara Indonesiia (DJKN), Jakarta

[14] Y.P. Sudarmojo, T.G.T. Nindhia, I G.A.K. Suriadi, I W. Surata4, I.B.P. Adnyana, 2016, Aplikasi ergonomi untuk meningkatkan produktivitas pengrajin seni ukir Batau Paras di desa Nusa Panida , Fakultas Teknik, Universitas Udayana, Bali.