



ERGONOMIC APPLICATIONS IN INDUSTRY

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ABSTRACT

Industry players need to understand about ergonomics, including those who work in industry. In fact, if they understand industrial ergonomics, workers will not get tired easily at work, be safe, comfortable, and have good productivity. Therefore, this article will discuss the understanding of ergonomics in industry. This writing is done descriptively or in an exposition. The data collection method is obtained from several opinions by using literature studies. The conclusion is that in designing an ergonomic industry, four aspects can be guided, namely: anthropometry to create tools according to the user's reach and short work paths, work environment, work psychology, and skeletal muscle physiology at work

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1. INTRODUCTION

Not everyone understands about ergonomics, including those who work in industry. In fact, if you understand industrial ergonomics, you will not get tired easily at work, it will be safe, comfortable, and have good productivity. Therefore, this article will discuss the understanding of ergonomics in industry.

Many industrial workers do not understand ergonomics. According to Cempaka Indah Kiswati et al. (2025), the results of the study "showed that 79.1% of respondents did not understand the correct ergonomic sitting position". Likewise, Hari Purnomo (2023) said that "understanding of ergonomics in several companies, especially small and medium industries, is relatively low, so that not many have implemented ergonomics in their work systems".

If the workplace industry is not ergonomic, there will be health problems for workers. As Paoce Pratama et al. (2021) said, "there are ergonomic risks in the work of designers. The ergonomic risks experienced are in the form of disorders and pain felt especially in the neck, back and buttocks".

Understanding ergonomic applications not only has an impact on the health of workers but also has an impact on the size of production. This was conveyed by Tarwaka et al (2004) that "understanding the application of ergonomics, especially to create safe, comfortable, healthy, secure and productive conditions".

Thus it is very necessary to discuss the application of ergonomics in industry. By having an understanding of ergonomics, it can be arranged in industry, so that work occurs healthily, safely without injury, comfortably without getting tired easily and optimally productive.

2. METHOD

This writing design is done descriptively or expositionally. The data collection method is obtained from several opinions by using literature studies. For conclusions, it is done by combining data from several opinions through descriptive analysis.

3. ANALYSIS AND DISCUSSION

Ergonomics comes from the Greek word, ergo is movement, nomos is nature. So ergonomics is the science that studies tools, the environment and humans to be able to move or work naturally (*natural*).

The goal of ergonomics is to create work efficiency, safety, health, security, and comfort. Ergonomics that makes ergonomic movements are physiological movements. This means that physiological is the end of the muscle that moves (*insertion*) is moved by the base of the muscle/end of the muscle does not move (*orig*). This physiological movement will create movement or work that is not easily tired.

Ergonomics also creates ergonomic work performance. Ergonomic work performance is a balance between body capabilities and work tasks. We know that we humans have body capabilities, and every living human being has work tasks or moves/activities.

In industrial ergonomics, at least 4 things are studied, namely: related to anthropometry, related to the environment, related to psychology, and related to the musculus skeletal.

First. Ergonomics related to anthropometry measures and considers a person's vertical reach, a person's horizontal reach. Also studies and calculates ergonomic product design. Ergonomic reach is an area that can be reached comfortably and safely without harming the body. According to Nina Neuschuets (2025) that "excessive reach poses significant ergonomic risks in various industrial environments". In line with that, Indah Arum (2024) said that "reach by a person or worker when doing an activity. This concept is usually present to create an ergonomic work environment".

In creating a work system, it is necessary to arrange tools that are adjusted to anthropometry, so that workers are able to reach and use short paths in working. As Torik Husein (2009) that "Work conditions that are less ergonomic will cause more worker fatigue, which is caused by body parts that feel uncomfortable. Therefore, the existing work system needs to be improved. The work system will be improved by rearranging equipment and changing the layout of the facilities used. To improve the layout of facilities, a cartography of the process flow is created".

All equipment or machines used by humans to work must be in accordance with the vertical and horizontal reach of the anthropometry of the human body. Working that can be reached easily makes it not tiring and fast in working. Therefore, *design* Ergonomics related to anthropometry means that products or equipment must be adjusted to a person's abilities. Not humans adjusted to machines or equipment.

Second. Ergonomics related to the environment. In the work environment there are physical environment, biological environment, and chemical environment. Ergonomics of the factory environment is about designing and arranging the workplace to suit human needs and abilities, reduce the risk of injury, increase comfort, and increase productivity. According to Busyaro HNH et al (2024) that "an ergonomic work environment is designed to improve employee comfort, efficiency, and well-being by optimizing the interaction between individuals and their workspace".

The physical environment includes: noise, vibration, dust, workplace, lighting, odor, etc. All of these must be adjusted to the Threshold Limit Value (NAB/*Threshold Value*).

Then the biological environment, namely the work environment is free from diseases originating from living things, for example: viruses, bacteria, fungi, fungi, and others. Therefore, in this biological environment we must also know *biological oxygen demand* (BOD). Then for a chemical environment in the workplace to be healthy, it must be free from chemical substances that can cause workers to be exposed to chemicals. For example, exposure to ammonia, and others. Therefore, in a chemical environment, you must know and learn *chemical oxygen demand* (COD).

Third. Ergonomics related to psychology. We know that humans consist of physical and psychology. Therefore, in the workplace/activity the color of the workplace must match the color. Because, psychologically, color affects a person's psychological desires which can also affect motivation in working/activity. According to AJ. Tjahjoanggoro (1997) that "psychological environment affects work performance and motivation".

Then, psychologically the eyes also have a range of distance to see. In addition, colors will also be easy to see according to contrast, lighting, size

color on the work tool. In the work tools or machinery there are colored buttons, and the placement of the buttons must be right. With buttons that have color, placement, and size of the button greatly affect the human ability to reach it (the button) so that humans do not get tired easily.

We know that when humans experience fatigue, their concentration in working decreases. When working, less concentration often causes errors, damage, and work accidents. Therefore, the workplace must be *design* ergonomically. This is in accordance with Argho Maha (2016) that "ergonomics or human factor engineering as a multidisciplinary psychology predicts, engineers and solves human performance factor problems related to work tasks, work tools and work environment".

The fourth. Ergonomics related to product design in accordance with the physiology of skeletal muscles (musculus-skeletal). Physiologically, the end of the muscle (insertion) is moved by the base of the muscle (origo). This



physiological work is not easily tired and has stronger power. According to Indah Arum (2024) that "ergonomic work physiology assesses work factors such as work posture, tool design, temperature and lighting, and rest time to minimize the risk and musculoskeletal disorders". This physiological work will occur if the tool is used to cause physiological movements. Therefore, the tool is designed to cause physiological movements when used.

4. CONCLUSION

Based on the analysis and discussion above, in designing an ergonomic industry, four aspects can be guided, namely: anthropometry to create tools according to the user's reach and short work path, work environment, work psychology, and skeletal muscle physiology at work.

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