

Industrial Ergonomics Approach to Avoid Work Delays and Increase Work Productivity

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ARTICLE INFO

Keywords: Industrial Ergonomics, Work Delay, Work Productivity

Received : 3 August

Revised : 18 September

Accepted: 20 October

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ABSTRACT

Work delays are still common and result in less-than optimal productivity. The ergonomic approach emphasizes analysis to avoid work delays. Writing method based on literature study. The analysis and discussion use descriptive, namely the presentation of several opinions from the results of research by experts. Conclusion: a) several factors that result in work delays, namely: availability and expertise of labor, availability of tools, location/place of work, adequacy of salary, stage planning, communication, occurrence of work accidents, discipline and work motivation; b) at work, an ergonomic approach, namely tools made according to the user, a healthy company environment makes the workforce healthy, and psychologically good work motivation and all range of work becomes easy. So, it makes work not experience delays in work. By not working late, many products are produced, so that productivity is optimal. Suggestion: it is hoped that the industry (company) pays attention to all the factors that result in work delays to be corrected with an ergonomic approach, it will prevent work delays and work productivity will increase

INTRODUCTION

Work delays often result in decreased productivity, and costs incurred by the company swell. Ergonomic approach as a solution to improve work delays and productivity. This article discusses this, so that you are no longer late for work and productivity remains optimal.

Several factors cause delays, as Fredy Kurniawan *et al.* (2018), says that "In the scope of Government projects, the three dominant factors that affect delays in construction projects are weather, labor, and design. In the scope of private projects, the three dominant factors that affect delays in construction projects are weather, materials and finance. Then, there is evidence of delays in project work. Also, as Fitri Nur Kharina *et al.*, 2019 states that "the completion of the project has an additional time whose duration has increased from the planned 98 weeks or 685 days to 109,624 weeks or 768 days".

LITERATURE REVIEW

Work delays have an impact on cost escalation, as Hana Wardani Puruhita (2014) states that "based on the results of the analysis, the highest percentage of priority criteria for 5 factors of project delays in Rosalia Indah was obtained, namely: the occurrence of design changes by the owner, changes in specifications while the project was still in progress, extra work, inappropriate execution of project schedules, and labor shortages. All the projects studied experienced delays and resulted in cost overruns.

Therefore, the problem of work delays needs to be resolved, so as not to experience losses. Need action in working to stay in ergonomic conditions. Ergonomic measures, namely the need to design work equipment adapted to the user, work flow that is not convoluted and between activities in the production process is close, and the work environment is adjusted to threshold values. All of that is an ergonomics approach. So that work delays do not occur or it does not take a long time to manufacture products, which in turn increases productivity.

METHODOLOGY

Writing method based on literature study. Related data is taken from several literatures (books, research results, journals). The place or object of data used is related to the industry. The analysis and discussion use descriptive (exposition) about work delays and provides solutions using an ergonomics approach.

RESULTS AND DISCUSSIONS

Work Delay and Work Productivity

Delay in work on a project has several causative factors, as Dhian C.Nur Astina et al (2012) said that "delay factors based on factor analysis are sub-factors of unqualified workforce skills, delays in goods delivery sub-factors, sub-factors of equipment availability that are inadequate/appropriate needs, access to the project location sub-factor, difficulties in payment by the owner sub-factor, unexpected things such as fire, flood, bad weather, landslides, storms/hurricanes, earthquakes and landslides, design changes by the owner sub-factor, the owner's delay sub-factor in determining the materials, the communication sub-factor between the owner's representative and the contractor.

Mickson Pinori et al (2015) also stated that "the influence of factors causing delays on inappropriate schedule planning, it was found that the most influential was the poor implementation of work stages, insufficient volume of material sent to locations, labor shortages, with the meaning that the three delay factors each influence the inappropriate schedule planning. In addition, Ahmad Faisal Romadhona et al (2020) stated that "The increase in the delay factor from the employment aspect will most affect the increase in the risk of project delays. The employment aspect includes: the availability of the current workforce, the skills of the current workforce, numbers absence of workers, the level of discipline and motivation possessed by the workforce, poor communication between workers and the foreman/foreman".

Then, the occurrence of work accidents also causes delays in work and productivity, as Rara Dinara Putri (2020) states that "work accidents and reduce delays in the production process. So, the higher the level of work safety and employee work discipline, the higher the work productivity produced. Regular work delays are calculated per unit of time. For example: how many hours late production, how many seconds late, and others. We know that productivity is output per input. If there is no work delay, productivity will increase. It is indicated that production results increase but the time used remains the same.

Why is there a delay in work. There are at least four elements that make work delays. First, work delays are unavoidable (unavoidable delay). For example: because of a disaster. Or there is damage to the production equipment. Or, there are other dependencies, waiting for raw materials. And others. Second, delays can be avoided (avoidable delay). For example, there is a disturbance that is sudden and quickly resolved. Technically. Third, planning the production process (plan of production). It could be production layout. Or, the work flow is not good. Or, the means of production are not ergonomic, meaning that the tools do not fit the anthropometric dimensions of the human workforce. And others. Fourth, tiring working hours and lack of rest (rest to overcome fatigue). The rhythm of working and resting hours is important. Labor man needs rest. Overtime over load over time makes humans unhealthy. Or sick. If the workforce is sick can make the production process stop. Please note that humans have body limitations.

How to fix work delays, so that productivity remains good. Namely: first, adjust the workplace to human capabilities and limitations (ergonomics). Second, the accuracy of using the body (ergonomic work procedures). Third, the work environment must be ergonomic. Concerning the physical, chemical, and biological environment. Fourth, work position or work performance must be ergonomic. And, fifth, work nutrition must be sufficient and balanced. Because nutritional intake as work energy.

Based on the analysis of the discussion above, it can be concluded that work delays are caused by several factors, namely: availability and expertise of the workforce, availability of tools, location/workplace, adequacy of salary, stage planning, communication, occurrence of work accidents, discipline and work motivation. If all of these factors are corrected with an ergonomic approach, then there will be no delays and work productivity will increase.

Industrial Ergonomics Approach to Avoid Work Delays

Industrial ergonomics has certain standards, except for human standards, as Yassierli (2018) says that "if in the industrial world, more and more product variations become a mistake, then in the world of ergonomics more and more variations are a challenge. This is because in the industry certain products have certain standards which make it not permissible for large variations. While ergonomics which measure the dimensions of the human body, so it does not have a certain standard considering that humans vary physically, mentally and in behavior.

However, ergonomics has benefits in industry, as Khoiri (2021) says that "practicing ergonomics will provide some extraordinary benefits for industry, here are 7 benefits of ergonomics for industry: 1). Improving occupational health and safety, 2). Reducing and preventing work accidents, 3). Increase work efficiency and effectiveness, 4). Optimizing employee working hours, 5). Make the company's products preferred by customers, 6). Making the company more competitive, 7). Increase company profits".

This was confirmed by Lusi Susanti et al (2015), saying that "the scope of ergonomics is a scientific discipline related to the interaction between humans and the objects used. Then, the most important thing in ergonomics is the equipment and working environment conditions that affect work performance. If products, equipment, work stations and work methods are designed according to human capabilities and limitations, then the performance and results provided will be better.

Ergonomics approach is very influential in increasing productivity. As Ningtyas Dewanasari Kinasih (2022), states that "The main advantage of ergonomics is that it can increase employee productivity. Designing equipment or facilities to allow employees to maintain good posture while working, waste less effort, and have better reach will make the workplace more efficient. An efficient workplace will certainly increase the productivity of each employee.

Ergonomics for industrial systems: human-centered, building work systems tailored to the user, and improving work systems. This will achieve production optimization, efficiency (productivity), health, safety and security will be achieved, comfortable at work. Then in work to quickly be able to adapt

to industrial organizations, production processes, machine tools, other equipment and facilities.

Ergonomics comes from the Greek word, ergo is motion, nomos is natural. So ergonomics is the science that studies tools, the environment and humans to be able to move or work naturally (naturally). The aim of ergonomics is the emergence of work efficiency, safety, health, security, and comfort. Ergonomic movement is a physiological movement. The physiological meaning is that the end of the muscle (origo) is moved by the base of the muscle (insertio). This physiological movement will cause movement or work that is not easily tired.

Ergonomics also creates an ergonomic work appearance. Ergonomic work performance is a balance between the body's ability to work tasks. We know that we humans have bodily abilities, and every living human has a work assignment or movement/activity.

In industrial ergonomics, at least learn 3 things, namely: related to anthropometry, related to the environment, and related to psychology. First. Ergonomics related to anthropometry measures and considers a person's vertical reach, a person's horizontal reach. Also study and calculate ergonomic product design. All equipment or machines used by humans must comply with the vertical and horizontal anthropometric range of human body parts. Work that can be reached easily makes you not tired and fast at work. Therefore, ergonomic design related to anthropometry meaning that the product or equipment must be adapted to one's abilities. Not human adapted machines or equipment.

Second. Ergonomics related to the environment. In the existing work environment is the physical environment, biological environment, and chemical environment. The physical environment includes: noise, vibration, dust, workplace, lighting, smell, and others. All of that must be adjusted to the Threshold Value (NAV).

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

Third. Ergonomics is psychologically related. We know that humans consist of physical and psychological. Therefore, in the workplace/activity the color of the workplace must match the color. Because, psychologically, color affects a person's psychological appetite which can also affect motivation in work/activity.

Then, psychologically the eyes also have a range of distances to see. In addition, colors will also be easy to see according to the contrast, illumination, color size on the work tool. Inside work tools or machinery there are colored buttons, and the placement of these buttons must be correct. With buttons that have color, placement, and the size of the buttons really affect the ability of humans to reach them (buttons) so that humans don't get tired easily.

We know that when humans experience fatigue, the concentration in work decreases. When working with less concentration, it often results in errors, damage, and work accidents. Therefore, the workplace must be designed ergonomically.

Based on the analysis of the discussion above, it can be concluded that, at work, if the tools are made according to the user, a healthy company environment makes the workforce healthy, and psychologically good work motivation and all ranges of work become easy. So, it makes work not experience delays in work. By not working late, many products are produced, so that work productivity is optimal.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

- a) Work delays are caused by several factors, namely: the availability and expertise of the workforce, availability of tools, location/place of work, adequacy of salary, stage planning, communication, occurrence of work accidents, discipline and work motivation.
- b) At work, the ergonomic approach is that tools are made according to the user, a healthy company environment makes the workforce healthy, and psychologically good work motivation and all ranges of work become easy. So, it makes work not experience delays in work. By not working late, many products are produced, so that productivity is optimal.

Recommendations

It is better if the company/industry pays attention to all the factors that cause work delays to be corrected with an ergonomic approach, this will prevent work delays and work productivity will increase

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