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Industrial Ergonomic Application of Preventing Repetitive Strain Injury to Optimize Work Productivity

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A B S T R A C T

Working with excessive repetitive motions experiencing pain is called repetitive strain injury (RSI). Pain is the result of over-moving muscles, nerves, ligaments and tendons. With the occurrence of pain it makes work productivity not optimal. To prevent repetitive strain injuries, it is necessary to make ergonomic adjustments at work. This scientific writing method uses descriptive literature studies. The main purpose of this paper is to understand the ergonomic requirements so as to prevent repetitive strain injury. With repetitive strain injury (RSI) can be prevented with an ergonomic approach, then productivity will be optimal

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INTRODUCTION

Repetitive and excessive movements are called repetitive strain injuries (RSI), because they experience pain. Neyri is the result of over-moving muscles, nerves, ligaments and tendons. With the occurrence of pain it makes work productivity not optimal.

According to Istiningsih, et al (2012) that "In companies/industries that use computers, repetitive strain injury (RSI) shows 77% of respondents feel aches/pain/discomfort". Then, Renty Anugerah Mahaji Puteri (2020), that "the Fadhel Furniture UKM workforce is a producer of furniture including sofas, dining tables and chairs, cupboards and receives sofa repairs, etc., has a high risk level category, the calculation results show there is a problem or risk from activities on the worker's body that are carried out repeatedly, the danger of repetitive strain injury.

Repetitive strain injury is strongly associated with productivity outcomes. As Magdalena Wartono, et al (2022) said that "reducing or preventing repetitive strain injury complaints is important for workers at this company in the hope of increasing work productivity". In line with that, Flexfree (2022) says that "(Repetitive strain injury) repetitive motion injuries result in major losses in terms of maintenance costs for the workforce, disruption of activity and optimal productivity is disrupted".

Therefore, in order to work to have optimal productivity, it is necessary to prevent repetitive strain injuries. Prevention so that repetitive strain injuries do not arise, it is necessary to make industrial ergonomic arrangements at work.

METHODOLOGY

This scientific writing method uses descriptive. The main purpose of this writing is to find out what ergonomic requirements are so that they can prevent repetitive strain injury. With repetitive strain injury (RSI) can be prevented with an ergonomic approach, then productivity will be optimal. To analyze it using literature study. Various opinion data are analyzed and discussed which can then be drawn deductive conclusions.

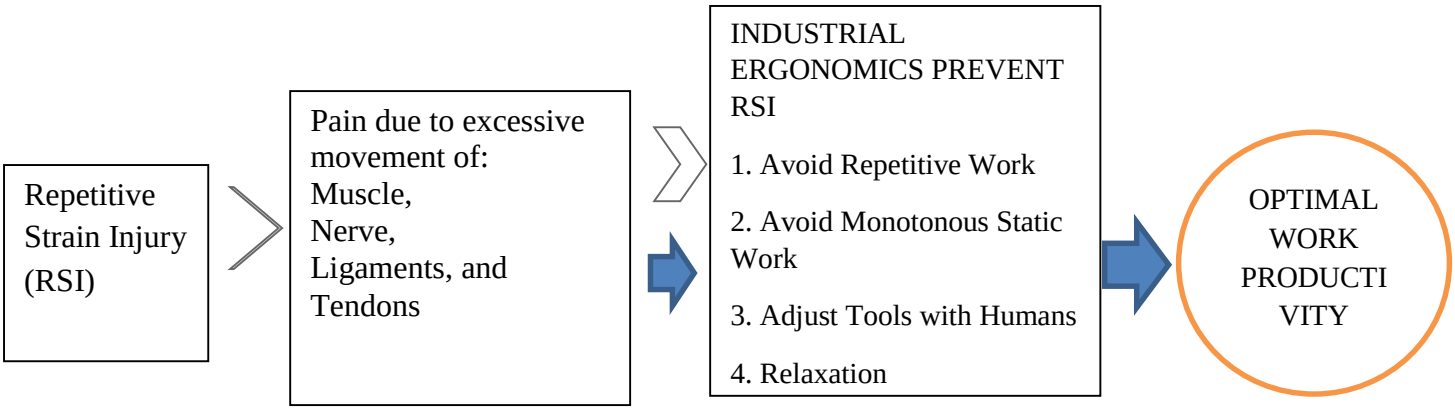

Figure 1. Repetitive Strain Injury

RESULT

First, that in order to work without causing repetitive strain injuries, it is necessary to design ergonomically with the conditions: a) avoiding repetitive work methods, b) avoiding long monotonous static work, c) adapting equipment to the human anthropometric dimensions of the user or using equipment that can adjustable for easy human adjustment, and d) relaxing working position. Second, the application of industrial ergonomics (including training to create awareness about ergonomics, re-design to adapt tools to user anthropometry) so that work is not tired to avoid repetitive strain injuries, so work productivity will be optimal. Suggestions, ergonomic requirements are needed in industrial arrangements in all fields so that repetitive strain injuries do not occur so that work productivity can be optimal.

DISCUSSION

1. Industrial Ergonomics Prevents Repetitive Strain Injury

Repetitive Strain Injury (RSI) is also known as Repetitive Stress Injury, Repetitive Motion Injuries, Repetitive Motion Disorder (RMD), Cumulative Trauma Disorder (CTD), Occupation Overuse Syndrome, Overuse Syndrome, Regional Muscoloskeletal Disorder.

Repetitive Strain Injury (RSI) is an injury to the musculoskeletal (muscle-bone) and nervous system caused by repetitive movements, excessive exertion, vibration, pressing equipment (pressing hard surfaces), or working continuously in an uncomfortable position . According to Kevin Jaquith (2015) "RSI stands for repetitive strain injury that occurs when the same physical movement is repeated over a long period of time. Repetitive strain injuries are injuries to a body part caused by overuse or strain on that body part. Strain occurs when a part of the body is asked to work harder, stretch further, be impacted more directly or otherwise function at a higher level than it is prepared for."

In a state of static and repetitive work resulting in physical fatigue. Repetitive physical work is a repetitive strain injury. As Rakhmad Rosadi, et al (2021) said

that "Ergonomics is a science, technology, and an art to mix and match tools, ways of working and the environment according to human abilities, skills and limits, so that working conditions and a healthy, safe, comfortable, effective environment are obtained." and efficiently to achieve maximum productivity. Many factors can affect occupational diseases, one of which is physiological factors, where body positions that are not ergonomic and static and are carried out repeatedly can result in physical fatigue. Therefore, ergonomically: avoid long static repetitive work, adapt the tool to the user's human dimensions.

In doing the work required relaxation. Work has time for relaxation, that's very important, so it's not static and monotonous. As the results of Ni Made Putri Wulandari's research (2011) stated that "the level of mental workload of workers is in the high range. Due to the existing initial conditions, it is necessary to carry out ergonomic interventions to reduce the level of BKM (mental workload) of workers with breathing relaxation and muscle stretching methods. After the ergonomics intervention was carried out, the level of BKM (mental workload) of workers decreased. Ergonomic intervention is a relaxing work position.

Kevin Jaquith (2015) "Ergonomics make sure your hand-adjustable bench is suitable for the task. Most chairs offer several adjustment options to raise or lower you to the specific height needed for the task. Remember that poor ergonomics and poor posture can lead you to develop RSI." This shows that the equipment must be adjusted according to the anthropometry of the human dimension.

Knowledge can also prevent accidents. Knowledge of repetitive strain injuries can prevent repetitive strain injuries from occurring. As Magdalena Wartono, et al (2022) said that "the way to prevent repetitive strain injury (RSI knowledge is 68% to 93%). Thus educational activities about repetitive strain injury and its prevention are useful in increasing the knowledge of workers. Of course knowledge of ergonomics will also be able to reduce the occurrence of repetitive strain injuries.

Based on the various opinion data above, it can be concluded that the analysis is ergonomic by avoiding long static repetitive work, adjusting the tool to the user's human dimensions, and working positions that can make work relaxing.

2. Ergonomics and Work Productivity

Providing knowledge training can increase work productivity. As Magdalena Wartono, et al (2022) "understanding of repetitive strain injury, such as its symptoms and effects, as well as training to reduce or prevent repetitive strain injury complaints is important for workers in this company in the hope of increasing work productivity".

Then the re-design of the tool to be ergonomic with tools adjusted for hand anthropometry, can also increase work productivity. As I Made Astika Yasa, et al (2018) concluded that "The results of the study show that the redesign of sanding and hand stretching work tools can reduce workload by 8.4% and reduce musculoskeletal pain by 53.8% and increase work productivity by 63.2 %. So it can be concluded that the re-design of sanding tools and hand stretching can reduce musculoskeletal loads and pain and increase the productivity of motorcycle paint sanders.

Likewise, I Waya Gede Suarjana (2018) that "The results of the study showed that there was a significant difference in reducing physiological loads and increasing the work productivity of skewer dough (meluh) makers. The redesign of the coconut grater reduced workload by 18.14%, musculoskeletal complaints by 28.07%**,** fatigue by 25.98%, and increased work productivity by 62.39%.

Equipment re-design is equipment re-design to suit the body size (anthropometry) of human organs. With equipment adapted to the user's human organs, work becomes easy, safe, comfortable, and doesn't tire quickly. Thus, work productivity can be optimally increased.

Ergonomics approach should be applied in the workplace, because it will increase work productivity. As Supriyanta (2007) said that "Ergonomics should be applied to all areas of work, the application of ergonomics to increase work productivity". In line with that, I Nyoman Dana (2016) stated that "efforts to improve it so that the productivity of the company's workforce can achieve optimal results, the supervisors and managers of the company need to know the application of ergonomics."

Based on the various opinion data above, that the application of ergonomics (training to create awareness about ergonomics, re-design for adjusting tools with user anthropometry), work is not tired, then work productivity will be optimal.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of the analysis above, it can be concluded as follows:

a. Whereas ergonomic requirements by avoiding long static repetitive work, adapting the equipment to the user's human anthropometric dimensions or using equipment that can be adjusted to easily adjust by humans, and work positions that can be relaxed. The ergonomic requirements are that there will be no repetitive strain injury.

b. Application of industrial ergonomics requirements (including training to create awareness about ergonomics, re-design to adapt tools to user anthropometry), makes work less tiring/painful because you don't experience repetitive strain injuries, so work productivity will be optimal.

Recommendations

Based on the conclusions above, it can be suggested to owners or industry players that ergonomic requirements are needed in industrial arrangements in all fields so that repetitive strain injuries do not occur so that work productivity can be optimal.

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