

# ERGONOMIC RISK ASSESSMENT OF MUSCULOSKELETAL DISORDERS AMONG THE AIRCRAFT TECHNICIANS: A CASE STUDY IN ROYAL MALAYSIAN AIR FORCE

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Various aircraft maintenance activities carried out in RMAF which is wing checks, radar faulty checks, installation and removal missiles, tyres change, engine replacement and etc



**Exposes aircraft maintenance technicians to various Ergonomic Risks:**



**Awkward body posture, Forceful Movement, Repetitive Task, Static Loading and Vibration Effect**



Concerns on increasing ergonomic risk and handling hazard raised by aircraft technicians of Royal Malaysian Air Force, there has been **lack of risk assessment and ergonomic safe operating procedures.**



This study **examined the musculoskeletal disorders (MSD) risk level** for ergonomic risk factors that aircraft technicians are exposed to in delivering servicing tasks.



## Brief Literature Review

RMAF has faced a lot of increment in operations, training and deployment in all over the country. These situations have made it vital to discover approaches in achieving mission even though manpower has decreased. One of the strategies is to increase longer working period of technicians to do **aircraft servicing routines work** but later may affect their work performance and ergonomic risks specifically can **lead to symptom of musculoskeletal disorders (MSD)** [1,3]. The symptom of MSD was contributed by the insufficient manpower and excessive heavy workload exposed the aircraft technicians to **the risk of neck, back pain, shoulder, hand and wrist injuries besides, repetitive work and manual handling of heavy loads** [2]. MSDs include, any damage or injury of muscles, nerves, tendons and joints, when any of these tissues work harder or get stretched beyond their normal limits [1]. Therefore, This study seeks to **identify types of ergonomic risk factors** that aircraft maintenance technicians are exposed to in delivering servicing task, to examine associated musculoskeletal disorders risk level and to **propose a guideline on manual handling in managing hazard at workplace.**

- [1] Wang, T.-C., & Chuang, L.-H. (2014). Psychological and physiological fatigue variation and fatigue factors in aircraft line maintenance crews. *International Journal of Industrial Ergonomics*, 44, 1 107-113.
- [2] Stader, S. A. (2013). Ergonomic evaluation of aircraft wing recovering tasks in general aviation maintenance. *Proceedings of Human Factor and Ergonomics Society 57th Annual Meeting*, 57, 1, 1249-1253.
- [3] Nakao, M. (2010). Work-related stress and psychosomatic medicine. *BioPsychoSocial Medicine*, 4, 4, 1-8.

## Methodology and Results

Surveyed using **Nordic and Dutch musculoskeletal questionnaires.**

Spearman rank **correlation** and Chi-square **analysis** were performed to examine the associated musculoskeletal disorders risk level for each types of **ergonomic risk factors**

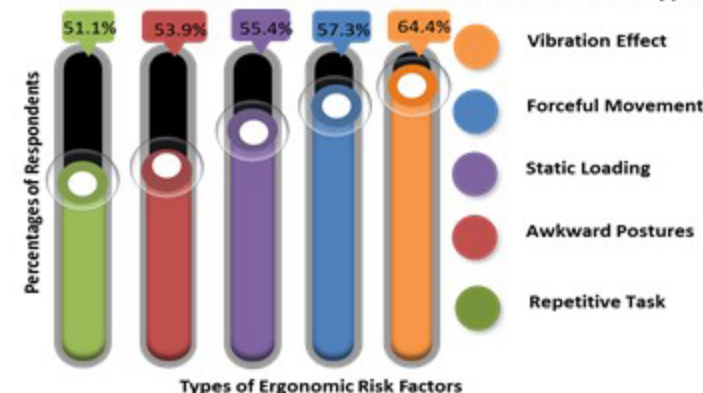


Figure 1: Types of ergonomic risk factors

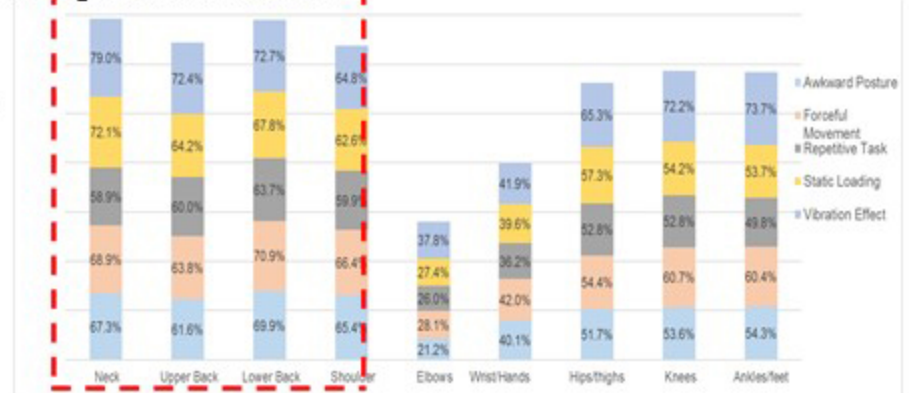


Figure 2: Percentage of respondents who experienced muscle strain

## Conclusion

In conclusion, the findings revealed that RMAF aircraft technicians are facing a significant ergonomic risk and may lead to the musculoskeletal disorders (MSDs). Thus, guideline on manual handling for occupational injuries and MSDs preventive measures among aircraft technicians is recommended.



As presented by  
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