

DEVELOPMENT OF AN ERGONOMICALLY DESIGNED ENGINE
BLOCK HOLDER FOR SMALL SCALE MACHINE SHOP

THESIS

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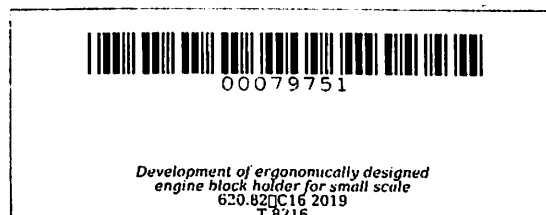
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DEVELOPMENT OF AN ERGONOMICALLY DESIGNED ENGINE BLOCK HOLDER FOR SMALL SCALE MACHINE SHOP

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ABSTRACT

CANILAO, ANGELIKA CHRISTINE L., CRUZATE, JERCY M., MASICAP, HILLARY KIMM A. and TARUC, SOPHIA GRACE S., Development of an Ergonomically Designed Engine Block Holder for Small Scale Machine Shop. Undergraduate Thesis. Bachelor of Science in Industrial Engineering. Cavite State University, Indang, Cavite. June 2019. Adviser: Dr. Willie C. Buclatin.

Manual material handling occurs in almost all working environments, though workers in construction, agriculture, hotels and restaurants are most likely to be exposed to heavy loads. Manual lifting of loads may cause cumulative disorders due to gradual and cumulative deterioration of the musculoskeletal system through continuous lifting and handling activities. It can also cause acute trauma such as cuts or fractures due to accidents.

The problem that was seen in this study was the absence of ergonomically designed engine block holder for transporting operation can cause a physical pain and awkward posture, low productivity and poor quality of work. Through these problems encountered, it gave the researcher enough interest to help the machinist of machine shop to lessen or prevent any musculoskeletal disorder or accidents happening on the current setup of the operation and to increase the job efficiency of workers by designing and developing an ergonomically designed engine block holder.

The researchers used developmental research and used the Define-Measure-Analyze-Design-Validate (DMADV) method to obtain the objectives of the study. The current process of transporting engine block was evaluated in terms of manual transporting, transporting alone, comfortability, makes the operation easier, delays the work, experiencing body pain, safety and need of transporting tool.

The most encountered problem by the machinist in the current process of transporting the engine block was body pain or musculoskeletal disorder. The machinist experience severe pain on different parts of body with a frequency ranging from often to always in neck, back, shoulder, hip, right and left arm, right and left hand, right and left leg; right and left feet. The result shows that there are strong, moderate and weak positive relationships in different parts of the body within the three lifting hours.

The anthropometric data was determined for the design of the engine block holder. The hip height (trochanter) standing anthropometric measurement was chosen to gather the dimension needed for the design. The prototype was then evaluated by the machinists as excellent that mainly focused on the functionality, aesthetics, durability, safety, operability and usefulness of the prototype.

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INTRODUCTION

Manual material handling occurs in almost all working environments, though workers in construction, agriculture, hotels and restaurants are most likely to be exposed to heavy loads. Manual lifting of loads may cause cumulative disorders due to gradual and cumulative deterioration of the musculoskeletal system through continuous lifting and handling activities. It can also cause acute trauma such as cuts or fractures due to accidents (Kroemer, 2013).

According to the Fourth European Working Condition Survey (2005), work-related low back pain and injuries are the most common musculoskeletal disorders caused by manual lifting. There are 35% of all workers that are exposed to the risk of carrying or moving heavy loads for at least a quarter of their working time.

The Centers for Disease Control and Prevention's (CDC) & National Institute for Occupational Safety and Health (NIOSH) (1997), released a review of evidence for