FOLDING MECHANISM MODIFICATION OF THE CLSU-DEVELOPED MOBILE SOLAR-POWERED PUMP IRRIGATION SYSTEM (MSPIS)

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ACCEPTANCE SHEET

This undergraduate thesis entitled **"FOLDING MECHANISM MODIFICATION OF THE CLSU-DEVELOPED MOBILE SOLAR-POWERED PUMP IRRIGATION SYSTEM (MSPIS)"**, prepared and submitted by **JUVIE ANNE M. LINGAS** in partial fulfilment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (MAJOR IN AB MACHINERY AND POWER ENGINEERING)**, is hereby accepted:

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BIOGRAPHICAL SKETCH

Juvie Anne Muena Lingas was born on November 02, 2002, at Cabanatuan City, Nueva Ecija. She is the eldest of the three children of Mr. Leonardo A. Lingas Jr. and Mrs. Virgie M. Lingas, who have been there since Day One of her journey. Their unwavering support and belief in her abilities constantly motivated her.

From an early stage in her development, Juvie Anne had a remarkable curiosity and an unwavering determination to conquer her aspirations. In the early stages of her life, she was consumed by an insatiable hunger for knowledge, a never-ending desire to go into the depths of diverse fields of interest. She started her academic journey at the age of three (3) as a Day Care Center student at their barangay. She finished her primary education in 2014 at San Alejandro Elementary School, Quezon, Nueva Ecija; then her secondary education at Dominican High School, Sto. Domingo, Nueva Ecija.

Juvie Anne is currently an undergraduate student at Central Luzon State University (CLSU), taking up Agricultural and Biosystems Engineering. Her strong motivation to acquire knowledge propelled her to achieve exceptional results in her academic endeavors, garnering her the respect of her peers and teachers.

JUVIE ANNE M. LINGAS

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ABSTRACT

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The increasing need for sustainable irrigation solutions in remote agricultural areas has driven the development of Mobile Solar-Powered Pump Irrigation Systems (MSPIS). Although there are clear advantages to using these systems, the process of assembling and folding the solar panels is time-consuming and labor-intensive.

This study was conducted to minimize the time and labor intensity needed to setup the system's solar panel on field. The performance evaluation of the folding mechanism was done in terms of measuring the time consumed in operating the system. The treatments were laid out following a completely randomized design (CRD). Three different factors were considered in gathering the data needed for this study. A set of ranges was distributed to the factors A, B, and C. Factor A represents the age range from 15-31 (A1), 32-48 (A2), and 49-65 (A3). Factor B represents the height range from 149-159cm (B1), 160-170cm (B2), and 171-181cm (B3). Factor C represents the person's sex, male is represented by C1, and female is represented by C2. Combining the three factors resulted in 18 combinations that had three replications, for a total of 54 samples.

The results of this study, which used a factorial ANOVA, show that there was no significant difference between the three factors in terms of assembly, folding, and operation time. A3B1C2 had the longest mean time of assembly, reported at 38.19 seconds, while

A2B2C1 had the shortest mean time of assembly, reported at 32.5 seconds. A1B2C2 has the longest mean time of folding reported at 31.5 sec, while A2B2C1 has the shortest mean time of folding at 24.16 sec. A1B2C2 (69.08 sec) has the longest time consumed, while the combination A2B2C1 (56.58 sec) has the shortest time consumed for the whole operation.

The modified design in this study minimized the time in using the machine and can be easily operated by a single person. Where the assembly time can last up to almost 40 seconds and a folding process takes a maximum of 35 seconds. However, it is recommended to use two people in operating the machine for easier and faster operation. Moreover, observation suggests that adding another pivot arm to connect the two solar panel supports on both sides of the machine to prevent the jamming of the roller bearing of the solar panel frame.

Keyword: Mobile Solar-Powered Pump Irrigation Systems (MSPIS); Assembly; Folding; Operation; Time

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