

# The Weposa (Welder's Power Saver)

## Loreto Girls Secondary School

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### Introduction

For the last two years or so; there has been a tremendous growth in the Tanzania's economy.

It is noted that the small scale industries (enterprises) have played a big role due to their capacity in enhancing industrial output and human welfare since it creates employment opportunities. According to the Tanzaniainvest.com, this small scale industries in the year 2018 contributed up to 35% of the economy's growth.

The welding industry, being one of the great contributors of the SME (small and medium sized enterprises) has faced a challenge due to high electrical billing in running this industry leave alone the high cost of purchasing the welding machines.

To curb this problem, and being passionate to aid our country achieve its industrial vision 2025 we have come up with a simple and cheap innovation that uses the concept of resistance of current (ohm's law) without interfering with the output voltage for a given task that will lift the welding industry.

We have named our innovation THE WEPOSA (The Welder's Power Saver).

The WEPOSA will promote industrial development of our country as we yearn to attain our Tanzania Development Vision 2025.

### Method

#### 1.2 STATEMENT OF THE PROBLEM

After undertaking a survey in a suburb of Mwanza city (Nyakato) that is famous for the small scale enterprise of Welding, we found out that more than 80% of the youths involved in this industry could wish to be self-reliant after graduating from VETA but fail because of the high costs of the welding machines leave alone finding it economically paralyzing to foot electrical bills. This necessitated us to integrate our knowledge of resistance and electrolysis of water to curb this problem.

#### OBJECTIVES OF THE STUDY

- To come up with a cheap, easy to make and effective welding machine.
- Creating employment opportunities by encouraging self-reliance.
- Promoting industrialization
- To reduce the consumption of power thus promoting Small and Medium Enterprises (SME) hence in turn boost our economy.

### Procedure

Welding is a fabrication process that joins materials, usually metals by using high temperatures to melt the parts together, then after cooling fusion occurs. The power of a welding machine depends on the amount of current and voltage, since power is the product of the amount of current and voltage level at a given point measured in watts.

Thus; from ohm's law, the power of a welding machine can be demonstrated in formula by the ohm's law pie chart.

Thus since voltage is kept constant, resistance of current by the salt brine water solution will in turn increase the current supplied to the electrode holder, hence the power output of the WEPOSA will practically equivalent to that of the welding machines in the market.

#### EXPERIMENTAL SET UP AND DESIGN

The water is put in a plastic container and mixed with the 1 kg of salt brine. Water is resistive to current, so plain water allows very little current to pass through. So, the addition of salt brine makes it a perfect variable resistor. Also, the salt brine is used as a variable resistor and to prevent melting the line. The salty water powers the amperage up based on electrolysis. When the line is shorted, voltage drops and by ohm's law, current increases hence making the WEPOSA effective.

### Results

The current is made to pass through the salt brine water. The several holes are meant to vary the distance between the copper or steel plates to enable variation of the power output of the WEPOSA when metals that require different amounts of heat/temperature are being fabricated.

Since we can vary the power output, though mechanically, it serves the purpose of a regulator making our innovation more less the same as the welding machines in the market in functioning.

The concentration of the salt brine also affects the current, that is, the increase in the salinity of the water increases the resistance and since voltage is constant, current increases hence increasing the power output.

It should be noted that the salt brine electrolyzes water producing a mixture of hydrogen and oxygen gas as the welding process continues.

A practical demonstration of the workability of the WEPOSA is as herein pictured.

### Conclusions

After constructing the WEPOSA, through analysis and experimentation, our objectives we met for it proved a success.

It proved effective and cost effective compared to other welding machine systems in the market.

The manufacturing of a WEPOSA cost approximately Tshs 50,000/= while the cheapest welding machine system in the market currently costs Tshs 700,000/=. This shows that our innovation is 92.8% cheaper than the cost of a welding machine.

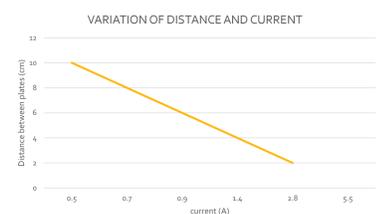
Since our economic vision as a country is to attain a middle class economy by 2025, we should encourage minimization of expenditure to avoid unnecessary expenses, promote local industries (Small and Medium Enterprises) as well as promoting industrialization thus living in rhyme with our slogan "TANZANIA YA VIWANDA INAWEZEKANA!!!!"

This will boost our economic development and if the WEPOSA is industrially incorporated, it create employment opportunities hence help our country attain its industrial development vision 2025.

### Acknowledgments

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We also, in a very sincere way, thank our teacher and patron Mr. Okindo Steward, for giving us a helping hand and advising us in every step we were undertaking throughout our process.



Distance (D) between the plates (cm)	Current, I (A) drawn	Power output in Watts
10.0	0.5	55
8.0	0.7	77
6.0	0.9	99
4.0	1.4	154
2.0	2.8	308
1.0	5.5	605

