



FACULTY OF ENGINEERING
DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING
FINAL YEAR PROJECT REPORT
**DESIGN AND CONSTRUCTION OF AN AUTOMATED GARBAGE
SORTING, MONITORING AND COMPACTING MACHINE**

(Case study: Old Kampala Secondary School, Kampala)

BY

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ABSTRACT

Solid waste management is one of the primary problems that the world faces irrespective of the case of developed or developing countries (Maheshwaran et al., 2018).

The central division of Kampala is concentrated with businesses and institutions that generate very high quantities of recyclable material, usually not sorted until it reaches a dumping site or sometimes sorted on the collection trucks by those who find value in it. This reduces the amount of waste from the division and the waste continues to reduce as more people get involved in waste picking. However, well-coordinated and managed efforts to increase the separation of wastes at the source would enhance the removal of recyclables, which would greatly reduce the waste destined for disposal (Aryampa et al., 2019).

The idea to design and build an automatic waste sorting recycle bin is to support the initiative to separate different kind of trash according to specific categories at the early stage which is at domestic user such as at home and office.

The mechanism adapted for compacting the waste is a scissor mechanism which is connected to a lead screw coupled to the DC gear motor, which is actuated by solar powered battery. By compacting, the volume of wastes in the container bin was reduced with a compaction ratio of 1.09 and 1.22 for plastic and paper respectively. The angle of inclination for the scissor mechanism is about 35° to 50° to vertical axis for compacting the wastes inside the bin. This project uses a Wi-Fi module which alerts with a notification to the operator stating that the bin is filled when the volume of container bin reaches 100%.



DECLARATION

We, LUWEDDE I RENE SEJINJA and NAAYO SHARON ANNEYS declare that all the material portrayed in this final year project report is original and has never been submitted for award of any Degree, certificate, or diploma to any university or institution of higher learning.

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NAAYO SHARON ANNEYS

Signature:

Date:

ACKNOWLEDGEMENT

We extend our sincere thanks to the almighty GOD who has gifted us with life and enabled us to reach this far despite the prevailing conditions.

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APPROVAL

This is to certify that this project has been done by **LUWEDDE IRENE SEJINJA** and **NAAYO SHARON ANNEYS**, and is ready for submission with our approval.

PROJECT SUPERVISOR: **MR. MASERUKA .S. BENEDICTO**

SIGNATURE:

DATE:/...../.....

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$\rho = \text{mass/volume Kg/m}^3$	Equation 1.....	27
moisture content % = $\frac{\text{wet weight} - \text{dry weight}}{\text{wet weight}} \times 100$	Equation 2.....	28
per capita generation = $\frac{\text{total weight of daily waste}}{\text{number of users in habitat}}$	Equation 3.....	28
Material % = $\frac{\text{material fraction weight}}{\text{total sample weight}}$	Equation 4.....	28
$S_c = l + w + h^3$	Equation 5.....	29
Therefore, force the waste exerts on the bin, $F_w = M_w \times \text{gravity}$	Equation 6.....	29
$F = L + wc^2nt \sin \theta$	Equation 7.....	30
Power = $2 \times \pi \times N \times T^60$	Equation 8.....	30
Total weight of the compaction system = $W_c + W_{cp}$	Equation 9.....	31



LI ST OF ABBREVI ATI ONS

KCCA	Kampala Capit al City Aut hority
SDG'S	Sust ainable Development Goals
KSWC	Kampala Solid Waste Consort ium
IoT	Internet of Things
RTC	Real Time Clock
LED	Light Emit ting Diode
HTML	Hyper Text Markup Language
URL	Unif orm Resource Locat or
USB	Univer sal Serial Bus
UGX	Uganda shillings