

**DEVELOPMENT OF BLENDER-HAMMER MILL FOR
MULTIPURPOSE USE**

BY

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JULY 2017

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**A THESIS SUBMITTED TO THE SCHOOL OF
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ENGINEERING**

JULY 2017

ACCEPTANCE

This is to attest that thesis is recognized as part of required accomplishment for the award of the degree of **Post Graduate Diploma in Manufacturing/Production Engineering** in the **Department of Mechanical Engineering**, College of Engineering, Covenant University, Ota.

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DECLARATION

I, AJAYI CHRISTOPHER OLA, (15PCM01279), affirm that this investigation was performed by me with supervision by Professor F. A Oyawale of the Department of Mechanical Engineering, Covenant University, Ota. I attest that the thesis has not been presented either wholly or partly for the award of any degree elsewhere. All sources of data and scholarly information used in this thesis are duly acknowledged.

AJAYI, Christopher Ola

.....

Signature and Date

CERTIFICATION

We certify that this thesis titled “Development of Blender Hammer for multipurpose use” is an original work carried out by Ajayi Christopher Ola, (15PCM012579), in the Department of Mechanical Engineering, College of Engineering, Covenant University, Ota, and Ogun State, Nigeria. Under the supervision of Professor F. A Oyawale. The work has been keenly reviewed and found it acceptable for the award of degree of Postgraduate diploma in Mechanical Engineering.

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DEDICATION

I dedicate this research work to Almighty God my Saviour, defender and provider. To Him alone be all the glory, praise and adoration.

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ABSTRACT

Few problems that have been identified with most of the existing developed blending and hammering machines/mills are as follows: low efficiency and output rate, metal particulate in ground product or flour which is hazardous for consumption and good health. Lubrication systems of some were faulty in that hazardous lubricants get mixed with milled products.

The aim of this project is to develop a blender-hammer crushing machine suitable for domestic and laboratory use for production of fine paste and coarse aggregates. The design was based on elimination of metal to metal contact, contamination of grinded material and excessive vibration.

The blender-hammer mill consists of the following components; inlet hopper, grinding chamber, a combined crushing hammer blades vertically set and blending blade that are horizontally fixed. The mill was constructed from locally sourced martensitic stainless steel 420 series. A sieve was introduced beneath the hammer chamber to sieve the ground mass. The main shaft was mounted on two sealed ball bearings, and it rotate at speed of 2880 rpm transmitted by two 'B'V belt driven from a 3.75 kilowatt electric motor.

The results showed that the crushing efficiency ranged from 86% for dry corn to 98% for cassava. We conclude that a blender hammer machine developed is capable of grinding grains legumes, dry cassava, and yams into fine and coarse aggregates.

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