

Presentation

On

Design and Fabrication of a Pedal Powered Washing Machine

Supervised by:

Md.Istiaque Zahur

Lecturer

Sonargaon University(SU)

Presented by

02

Name	Student ID
Hafijur Rahman	BME 2001020474
Rejaul Islam	BME 2001020463
Joygopal Mondol	BME 2001020609
Md. Jahirul Islam	BME 1802015068
Hridoy Kumar Karmoker	BME 2001020348
Md. Rakibul Hasan	BME 2001020664

Outline

- ▶ **Introduction.**
- ▶ **Objectives.**
- ▶ **Components Used.**
- ▶ **Working of a Pedal Powered Washing Machine.**
- ▶ **Result & Discussion**
- ▶ **Cost Analysis.**
- ▶ **Advantages & Disadvantages.**
- ▶ **Application.**

Introduction

- ❑ A pedeled washing machine is a type of washing machine that is operated by hand, rather than by electricity.
- ❑ This means that the user must manually agitate the clothes in order to clean them, rather than relying on an electric motor to do so.
- ❑ They can also be used as an alternative to environmentally-friendly, low-energy washing machines.

Objective

- ▶ To Study on washing machines on the basis of design & construction, performance, economy and applications.
- ▶ To Design & construction a working unit of low cost washing machine made up of easily and readily available scrap parts in daily life. It generates power through human pedaling and with the drive mechanism.
- ▶ To make Cost analysis of a unit of pedal powered washing machine

Components Used

06

- **Frame**
- **Sprockets with pedal links**
- **Ball Bearing**
- **Chain**
- **Shaft**
- **Shaft collar**
- **Drum**

Frames

The frame of the product has been fabricated using MS bar. The dimensions of the frame of thickness = 38mm and width of the bar = 660mm.

By performing mechanical operation cutting, rolling, welding, grinding, the final frame of the equipment has been fabricated.



Sprockets with pedal links

08

Sprockets and pedal links are connected to transmit rotary motion to the shaft connected on the inner drum with the help of a chain. Three different sprockets are according to the task purpose. The large, medium and small sprocket is meant for drying, rinsing and washing respectively



Ball Bearing

09

Ball Bearings are a type of rolling-element bearing that uses balls to maintain the separation between the moving parts of the bearing. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. Radial ball bearings can support moderate radial loads and moderate axial loads (parallel to the shaft). They can operate at high speeds very easily.



Chain

Chain plays an important role for transmitting motion from pedal to shaft. The chain is placed between two sprockets. Larger sprocket is placed near the pedal and the smaller sprocket is placed near the drum.



Shaft

Mild-steel shaft of diameter 20mm and length 660 mm is used for the rotation of inner drum. The shaft is exactly placed at the center of the outer drum and inner drum by using plummer block



Shaft Collar

The shaft collar is a simple, yet important, machine component found in many power transmission applications, most notably motors and gearboxes. The collars are used as mechanical stops, locating components, and bearing faces. The simple design lends itself to easy installation.

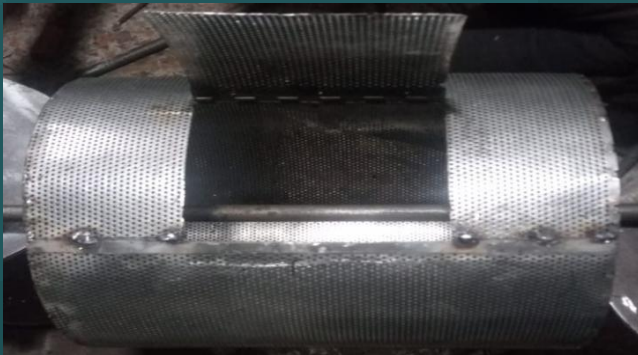


Drum

13

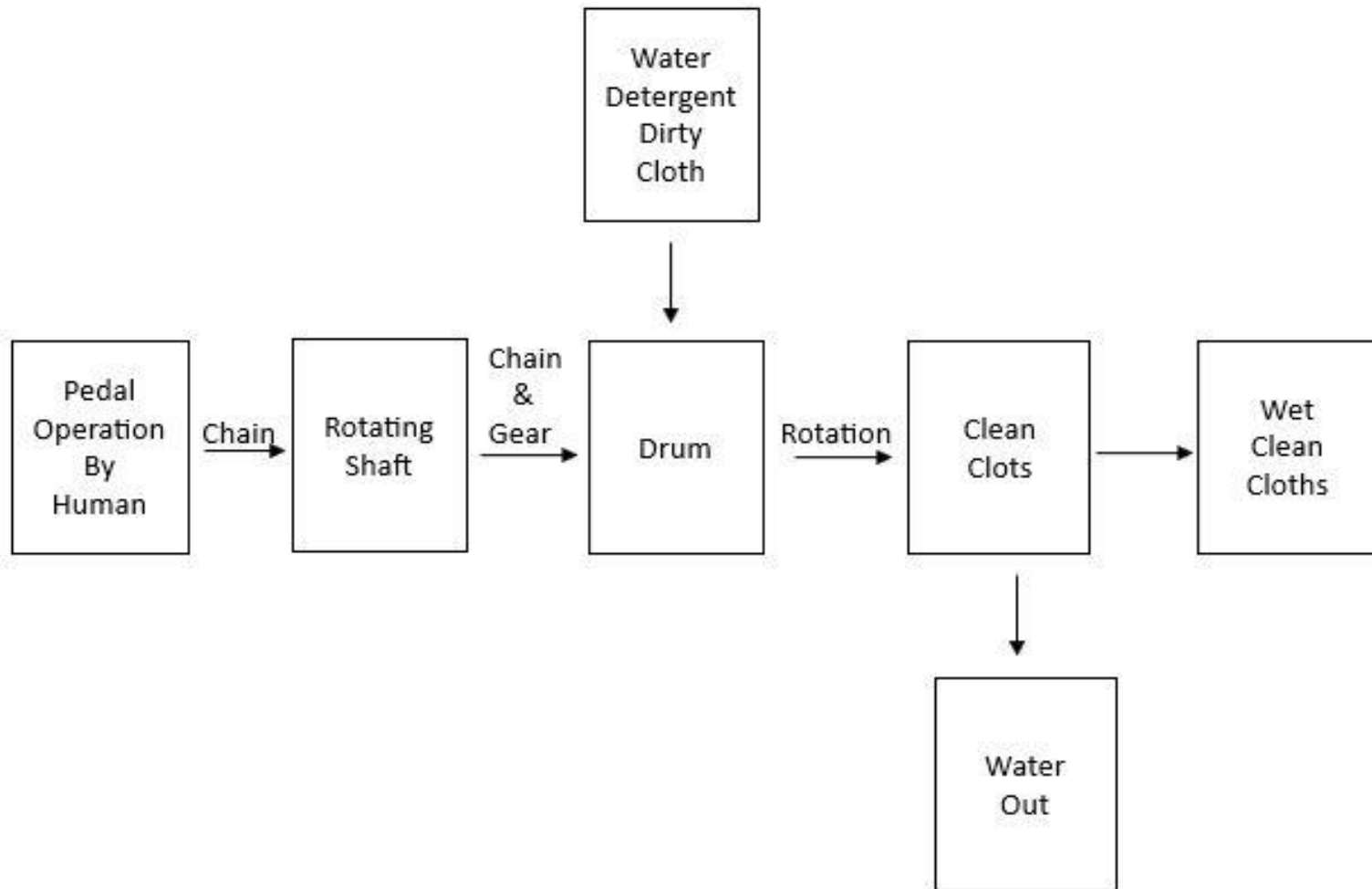
Inner drum: The stainless-steel sheet having small holes through the surface of the sheet is used for the fabrication of inner drum as dimensions of 330mm x 300mm x 1mm. The diameter of the inner drum is 300mm and the length of the inner drum is 330mm and the thickness of the stainless-steel is 1mm. By performing mechanical operation cutting, rolling, welding, grinding, the inner drum has been fabricated.

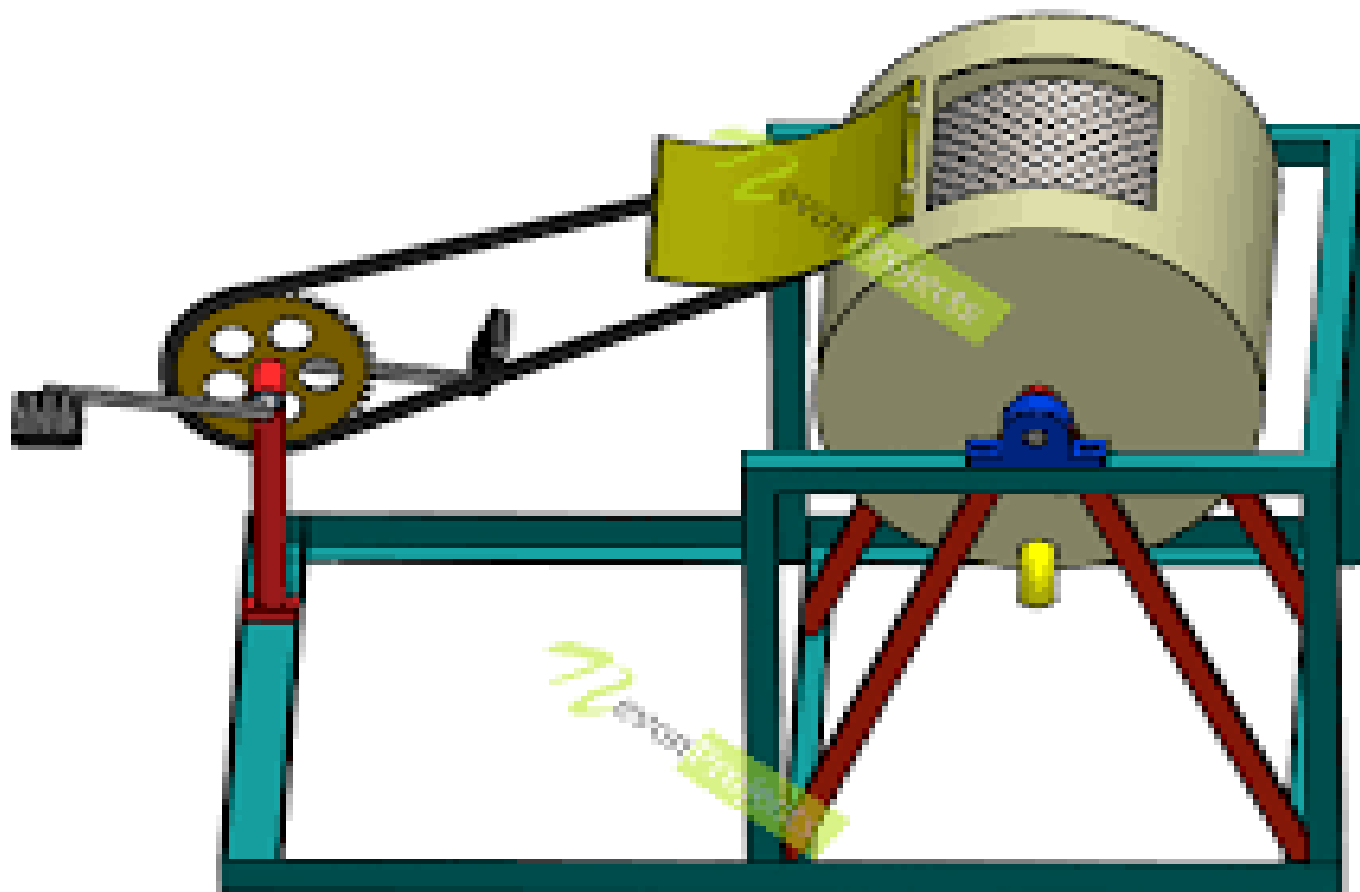
Outer drum: Outer drum is used to store water used for washing the clothes. The diameter of the inner drum is 400mm and the length of the inner drum is 450mm and the thickness of the stainless-steel is 2mm.



Working Flow diagram of a Pedal Powered Washing Machine

14





Block Diagram



Hardware Model

Result & discussion

Test no 1	Accuracy	Ok
Test no 2	Repeatability	Ok
Test no 3	Precision	Ok

The Machine can provide good speed and accuracy while doing the operation. Though due to some friction between the moving parts the machine lack precision at initial stage. But by doing the same operation for a certain time machine can do greater good doing the operation efficiently.

Cost Analysis

The cost estimation cannot be done 100% certainty because price of different material used in the washing machine are highly fluctuating. In this work, a rough estimation of the cost is being reported on the basis of market survey. Approximate cost of different components are given in table

Cost Estimation

19

Sl. No	Name of the Component	Quantity	Price (Taka)
1	Chain	01	500
2	Sprocket Set	01	1500
3	Inner Drum	01	3000
4	Outer Drum	01	2000
5	Pedal set	01	2000
6	Nut bolts	As per need	1000
7	Frames	01	1000
8	Bearing	02	1000
9	Shaft	01	500
10	Welding		500
11	Pipe , socket, bracket		500
12	Overhead		2000
13	Total Cost		16500

Advantages, Disadvantages & Application

Advantages

- ❖ Uses less water, power, and soap.
- ❖ Cleans as well as commercial washer with similar capacity.
- ❖ Spin dries so no wringing needed.
- ❖ Comfortable to use.
- ❖ Enables women to do more rewarding things.
- ❖ Community investment that also benefits the poor.
- ❖ Sustainable with local production and maintenance.
- ❖ Replicable anywhere with bicycles.
- ❖ Save the water.
- ❖ It is a non-polluting, as well as not using any types of electricity.
- ❖ Also we get the advantage of exercises with washing the cloth by means of applying the pedal.

Disadvantages

- ❖ It is not suitable for all ages.
- ❖ The capacity is less in washing cloths.
- ❖ Human effort is needed.
- ❖ The structure is complex

Application

- ❖ It is very useful into the local rural areas.
- ❖ Saving in detergent and the water
- ❖ Scale free tub
- ❖ Reduced traces of detergent on clothes
- ❖ Better wash quality
- ❖ Softer clothes
- ❖ Easy to operate and the less effect of chemical on the women hand.
- ❖ Exercise is also done with the applying the pedal

THANK YOU

Any
Question

