CHAPTER: 1

1.1 Introduction To Waste Segregation

In recent times, garbage disposal has become a huge cause for concern in the world. A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life. When the waste is segregated into basic streams such as wet, dry and metallic, the waste has a higher potential of recovery, and consequently, recycled and reused. The wet waste fraction is often converted either into compost or methane-gas or both. The metallic waste could be reused or recycled. [1]

The occupational hazard for waste workers is reduced. Also, the segregated waste could be directly sent to the recycling and processing plant instead of sending it to the different segregation plant then to the recycling plant.

We are implementing a new method which is a cheap, easy to use solution for a segregation system. It is designed to sort the refuse into metallic waste, wet waste and dry waste. [2]

1.2 Waste Segregation Methodology

Existing segregation methods include segregating of wet and dry waste as well as magnetic and non-magnetic waste but it is done separately. Wet and dry waste is separated using humidity sensor or manually. While magnetic and non-magnetic waste using an electro-magnet. There is no existing model to segregate wet, dry and magnetic material simultaneously. We are planning to make a cheap Automated Waste Segregator that can segregate the waste into following three groups simultaneously.

- Wet Waste
- Dry Waste
- Magnetic Waste

1.3 Introduction To Product Development

Waste is dropped onto conveyor belt through a hopper, a humidity sensor is placed to sense the humidity of the waste to help the segregation of refuse into wet and dry. The humidity of waste is sent to the microcontroller. Electromagnet is in magnetized to collect the metallic waste. Then demagnetization takes place and waste is dropped into dustbin. The remaining waste is further moved on the conveyor. The data stored on the microcontroller decides which type of waste is it and decides whether the waste would go into dry waste dustbin or wet waste dustbin. If it is wet waste, a blocking system comes forward and the waste falls into wet waste dustbin. If it is dry waste, the blocking system stays in the normal position (i.e there is no movement in the blocking system) and hence, as a result the waste falls into dry waste dustbin at the end of the conveyor system.

CHAPTER: 2

Literature Review

Most of the waste segregation plant segregates either wet and dry or metallic and non-metallic waste. Also some plants have both segregation units in one single plant but they are not done together, they are done separately on different machines.

By this a lot of space is consumed for segregation purposes. This also increases the overall cost of the process which is not required. Government have implemented rules and schemes for segregating wet and dry at initial level by using dustbins, one for wet and other one for dry but that segregation is not done properly so it has to be done from zero at segregation plant.

Also in many places segregation is done with the help of people. They use their hands to segregate the waste which can cause a lot of hazardous accidents. So to reduce this type of segregation purpose we started researching on various methods of segregation of waste and which is the most efficient method to do the same. Also which method is best to reduce the space required for segregation plant.

By researching various papers as well as reports and doing a survey we have come to know that there are a lot of people who have proposed research papers on this topic. They have stated various methods of combining these two segregation process. A lot of experiment is also taken place for this purpose.

In one of the paper it was proposed that by using sensors and electro-magnet we can combine both segregation process and reduce the space used by them when done separately on a huge extent. They have used various sensors such as humidity sensor, moisture sensor, metal - detectors for segregation purpose.

CHAPTER 3

Problem Definition

Till now the segregation of waste was a big issue which was faced by the dumpers. In the dumping site the time taken to segregate the waste was more which was leading to a huge waste of time and money. The proper segregation of the waste was also not followed which was leading to improper disposal of the wastes. This method is largely practiced in India.

To overcome this problem we have built up machine which is called as waste segregator. This machine is built up to overcome the problem of huge loss time and money. And also to properly segregate the three type of waste i.e. the wet, dry and magnetic waste. This machine will reduce the rate of improper disposal of waste. Till now the method of segregation of waste was done manual. In this method the waste was separated by hand picking. This method was leading to various contagious diseases to the workers which used to work. Various types of injurious were also caused to the workers.

In traditional method the segregation was done at one particular plant and the waste was then transported to its dumping site. This method was leading to huge cost in transporting , because of transportation huge pollution was caused to the environment. The residential areas near this dumping sites were also facing various problems such as air pollution, soil pollution, shortage of trees and plants because of erode soil. Our project will reduce the area required for segregating the waste. The distance between the dumping sites will also be reduced to minimum. The cost in transportation will also be reduced to minimum. The pollution caused because of this can be reduced to some cost. Up till now the magnetic waste segregation was very difficult to be done.

The iron particles were very harmful to the workers while working. Sometimes the magnetic waste was carried along with the wet or dry waste. our project has also overcome this problem by using an electromagnet. The magnetic objects/ particles will be properly segregated. This segregation will not cause any harm to the workers. Some of the magnetic wastes were very much harmful to the environment because of the chemicals remaining on them while disposal was done. The wet waste has a large amount of liquid in them some of the liquid are natural while some are harmful to the environment. The storage of this kind of liquid is hazardous to the environment our project will reduce the storage time of the waste and fast disposal can be done in minimum period of time.

Normally the dumping of the wet and dry waste is done at two different sites which are far away from each other. This dumping is done after the segregation is done at the main plant. Our project will reduce the place required for the disposal after segregation. The dumping can be done at one big plant only.

Nowadays the dumping of the waste has become a big issue especially in metropolitan cities like Mumbai. Because of this many times the waste is not segregated and it is directly dumped into the site because of shortage of place to store the waste and to segregate it. Our project will reduce the place required for storage of the waste because the waste will be segregated in a shorter period of time.

Fig: 3.1 Traditional Dumping Grounds

The above image shows the place where the disposal of all the waste is done before its disposal. At this site all the waste from the residential as well as from commercial and industrial areas are bought together and dumped. This is a very serious problem which is faced in nowadays. Our project will reduce this problem to some particular extent.

CHAPTER 4

Research Methodology

It is a process used to collect data and information for making the project

Waste segregation is one of the biggest problems all over the world, so we decided to touch this topic and tried to solve the problem on our level by making a prototype for the system to solve this problem

We did a survey and researched on this topic for some time and found different research papers regarding this topic. After collecting information on this we gained allot of knowledge from the research papers and tried to make their ideas implement by adding modifications of our own

After thinking about the modifications we thought if it was feasible for us to make this prototype and if we did manage to make it, whether the industry will accept this idea. So accordingly we made more changes and came down to this final idea of making a type of system which will segregate the waste into three types and all them at a same level.

This will lead to saving lot resources, time, transportation, capital and much more.

CHAPTER 5

Components Used

5.1 Arduino UNO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consist of microcontroller "Microchip ATmega328P". The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.

Arduino UNO is programmable according to the user need with the help of program named Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery. Arduino UNO accepts the range of 7 volts to 20 volts.

All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

-Technical Specifications

- Microcontroller: Microchip ATmega328P
- Operating Voltage: 5 volts
- Input Voltage: 7 to 20 volts
- Digital I/O Pins: 14(of which 6 provide PWM output)
- Analog Input Pins: 6
- *DC Current per I/O: 20mA
- DC Current for 3.3V Pin: 50mA
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm
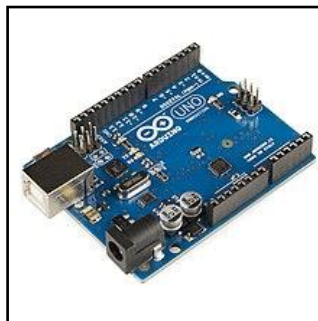- Weight: 25 g

Fig: 5.1 Arduino UNO

5.2 Humidity Sensor HR-202

Humidity sensor module is sensitivity to the humidity in surrounding environment, it is based on the HR202. There is a LM393 used to make the digital signal, the variable resistance make it more useful to set the threshold you want to set.

This module is based on HR202 resistive humidity sensor, which exposes excellent linearity, has a wide measurement range and a low power consumption. The module features both a power output indicator LED and a digital output indicator.

This module is ideal for custom humidity sensing applications, and can be used in fields like meteorology, storage facility humidity control, textile industry and other applications which need ambient humidity monitoring.

The output is available both as an analog output and as a digital output obtained using a comparator based on LM393 integrated circuit.

-Technical Specifications

- Operating range: humidity(20-95%RH) temperature(0-60Celsius)
- Power Supply: 1.5V AC
- Rated Power: 500Hz-2kHz
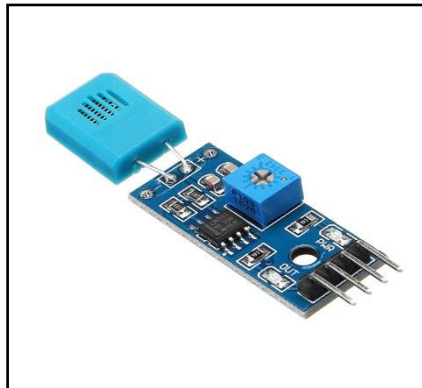- Dimensions: with case 12x15x5mm, without case 8x10x0.7

Fig: 5.2 Humidity Sensor HR-202

5.3 Conveyor Belt

A Conveyor Belt is the carrying medium of a belt conveyor system. Conveyor Belt is a mechanical component used to transfer one material or part from one point to another point. It is most common component used in any type of industry.

Conveyer belt consist of two or more pulleys or sprockets in our project to create an endless loop of motion. The powered pulley or sprocket is known as drive pulley or sprocket and the unpowered pulley or sprocket is known as idler pullet or sprocket. Conveyor Belts are generally used to move boxes along inside a factory and bulk material handling such as those used to transport large volumes of resources and agricultural materials, such as grain, salt, coal, sand, overburden and more.

Conveyer Belt used in our project is made of material named "Polyamide". It is a synthetic polymer of a type made by the linkage of an amino group of one molecule and a carboxylic acid group of another, including many synthetic fibres such as nylon. For our project the use of conveyor belt is to transport waste from one side to another side

-Specifications

- Material: Polyamide
- Length: 1219.2mm
- Width: 245mm
- Pitch: 50mm
- Thickness: 5mm
- Weight: 13.1234kg/m

Fig: 5.3 Types of Conveyor Belt

Fig: 5.4 Conveyor Belt

5.4 Sprockets

A sprocket or sprocket-wheel is a profiled wheel with teeth, or cogs, that mesh with a chain, track, conveyor belts or other perforated or indented material. The 'sprocket' applies generally to any wheel upon which radial projections engage a chain or belt over it.

 It is distinguished from a gear in that sprockets are never meshed together directly. They are used in different mechanical components such as bicycles, motorcycles and other machinery to transmit the rotary motion of one shaft to another shaft.

In our project we are using sprocket which is made of the same material used for conveyor belt which is "Polyamide". In our project sprockets are mounted on a shaft and on the sprocket conveyor belt is placed. There is also keyway machined in it for a key to transmit motion from shaft to sprocket.

-Specifications

- Material: Polyamide
- Width: 52mm
- Number of teeth: 10
- Pitch Circle Diameter: 162.50mm
- Inner Diameter: 50mm
- Pitch: 50mm
- Weight Per Pcs: 2kg

Fig: 5.5 Sprocket

5.5 Shaft

Shaft is long cylindrical bar that rotates and transmits power. It is a rotating machine element, usually circular in cross section, which is used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power.

The material used for ordinary shafts is "Mild Steel (MS)". They are generally formed by hot rolling and finished to size by cold drawing or turning and grinding. In our project we also have used shaft made of mild steel due to its high strength and because materials are easily available. It has high resistance, high tensile strength and impact strength.

-Specifications

- Material: Mild Steel (MS)
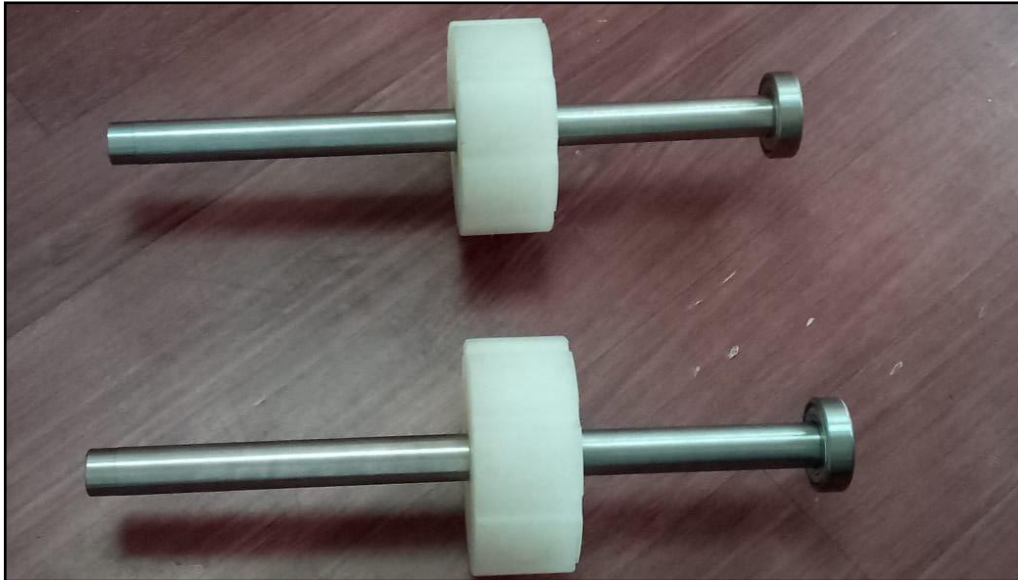- Length: 400mm
- Diameter: 30mm

Fig: 5.6 Shaft Assembly

Fig: 5.7 Shaft with Sprocket and bearing mounted on it

5.6 Key

A key is a machine element used to connect a rotating machine element to a shaft. The key prevents relative rotation between the two parts and may enable torque transmission. For a key to function, the shaft and rotating machine element must have a keyway and a key-seat, which is a slot and pocket in which the key fits. The whole system is called a keyed joint. A keyed joint may allow relative axial movement between the parts.

Commonly keyed components include gears, pulleys, couplings, and washers.

-Specification

- Material: Mild Steel (MS)
- Length: 52mm
- Width: 5mm
- Height:

Fig: 5.8 Parallel Keys

5.7 Bearings

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis.

Bearings are classified broadly according to the type of operation, the motion allowed, or the type of directions of the loads applied to the parts. Bearings in market are available according to different series. For our project we have used bearing of series 6200.

-Specifications

- Material: Stainless Steel (SS)
- Series: 6205-2RSH SKF
- Dimensions: 25x52x15mm

Fig: 5.9 Bearings

5.8 Worm Gear

A worm gear or worm drive is a specific gear composition in which a worm meshes with a gear or wheel similar to a spur gear. The set-up allows the user to determine rotational speed and also allows for higher torque to be transmitted. This mechanism can be found in devices both at home and in heavy machinery.

There are three different types of worm gear:

1] Non-throated – this involves a straight worm without a groove machined around the circumference. A single moving point is what provides tooth contact, meaning these particular types of worm gear are subjective to high unit load wear and tear.

2] Single-throated - concave helical teeth are wrapped around the worm for contact, meaning higher unit loads with less excessive wear

3] Double-throated – usually called a cone of hourglass, this type has concave teeth on both the worm screw and the gear itself. Increasing the contact area in such a way allows for increased   nit loads with lower wear and tear.

For our project we have this type of worm gear

Fig: 5.10 Pair Plastic Spur and Worm Gear

The spur gear is mounted on the shaft and the worm gear is mounted on the motor.

5.9 Rack and Pinion

Rack and pinion is a mechanical structure which converts the rotary motion into linear motion. For this we have used a channel which is used in drawers and a small rack and pinion set. We have fixed rack on the channel and pinion on the shaft of the motor to give the rotary motion

-Specification

Length of the Channel: 200mm

Breadth of the Channel: 45mm

Fig: 5.11 Channel

5.10 Motors

A machine, especially one powered by electricity, that supplies motive power for a vehicle or -for another device with moving parts. We have used gear motor in this project.

A gear motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output. Gear motors can be found in many different applications, and are probably used in many devices in our home

We have used gear motors of two different rpms in this project

1] 100 rpm- For giving motion to the conveyer belt

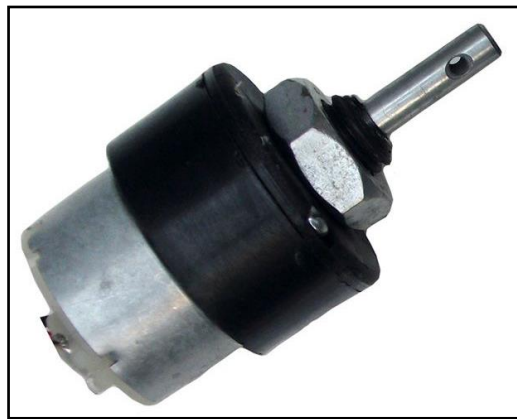2] 60 rpm- For giving motion to the rack and pinion arrangement
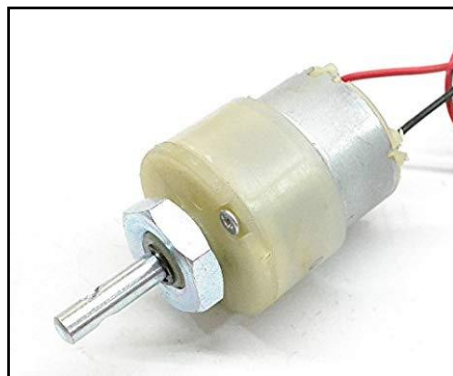

Fig: 5.12 100 rpm Gear Motor

Fig: 5.13 60 rpm Gear Motor

5.11 Wires

We haves used to main types of wires

1] Jumper wires

2] Red and Black wires

-Jumper wires

Jumper wires are used for making connections between items on your Arduino UNO Board/breadboard and your other respective Sensors and devices. Generally these are used to connect all the circuits.

A jumper wire is an electrical wire, or group of them in a cable, with a connector or pin at each end known as "Headers", which is normally used to interconnect the components of a test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in the header connector of a circuit board, or a piece of test equipment.

Jumper wires have two main parts "Male" and "Female". Male is considered to be output pins which are inserted into other pins and Female is considered to input pins in which other pins are inserted.

Jumper wires are further classified into three types

1. Male to Male

   In this type of wires both ends have output pins

2. Male to Female
   In this type of wires one end have input and other have output pins
3. Female to Female
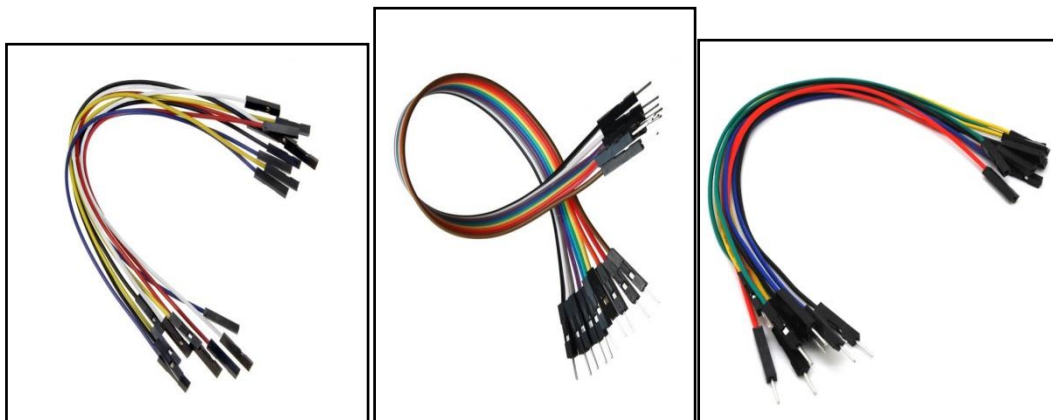   In this type of wires both the ends have input pins

Fig: 5.14 Female to Female Jumper Wires   Fig: 5.15 Male to Male Jumper Wires   Fig: 5.16 Male to Female Jumper Wires

-Red and Black wires

These are the normal wires which are used most frequently. They are used in almost all electrical as well as electronics work. For example connecting a motor to a switch and much other work.

Fig: 5.17 Red and Black Wires

5.12 Switches

Switch is basically a device which is used for making or breaking the connection in an electric circuit. It is a device which when pushed up or down controls the ON and OFF of an electric current.

We have used two types of switches

1] DPDT Switch

 It is a short form of Double Pole Double Switch. It is a switch that has 2 inputs and 4 outputs, each input has 2 corresponding outputs that it can connect to. Each of the terminals of a double pole double switch can be either in 1 of 2 positions.

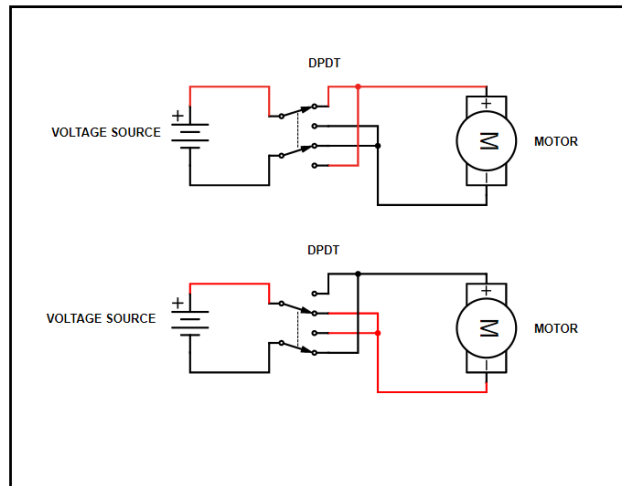Fig: 5.18 Double Pole Double Switch

(DPDT)

Fig: 5.19 Circuit Diagram for

DPDT Switch

2] 1/0 Switches

It is the most commonly used switch. The numbers 1 and 0 refers to binary numbers. When the switch is in1 position the current is supplied and when the switch is in 0 position the current is not supplied
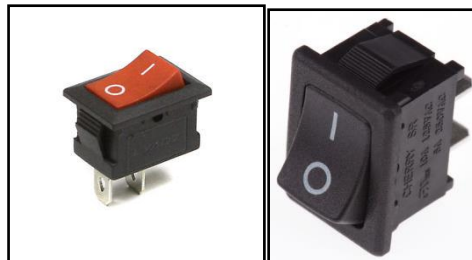

Fig: 5.20 Different types of 1/0 Switch

5.13 Sun Board

Sun board or foam board is a very strong, light, and easily cut sheet material used for the mounting of vinyl prints, as backing in framing, and for painting. It usually has three layers - an inner layer of polystyrene foam and a white clay-coated paper on the outside. We have used sun board for mounting our motors and as a blocking element which segregates the wet and dry waste.
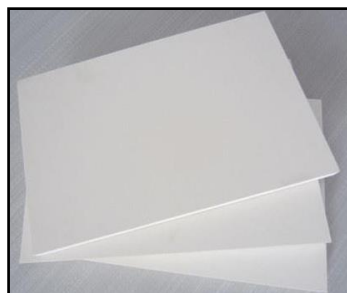

Fig: 5.21 Sun Board

5.14 Funnel

It is a tube or a pipe that is wide at the top and narrow at the bottom, used for guiding liquid or powder into a small opening

We are using funnel to introduce the waste on the conveyor belt.

Fig: 5.22 Funnel

5.15 Casing

Casing is made up of "Acrylic". We haves used this material because it is transparent and most important it is hard material and not brittle

-Specifications

- Length: 700mm
- Width: 400mm
- Height: 500mm
- Thickness: 5mm

Fig: 5.23 Casing

CHAPTER 6

Construction

When all the parts were bought together we first started with mini assembly of shaft with the sprocket. In this assembly the shaft was inserted inside the sprocket with key in it. The key helps to lock the shaft with the sprocket.
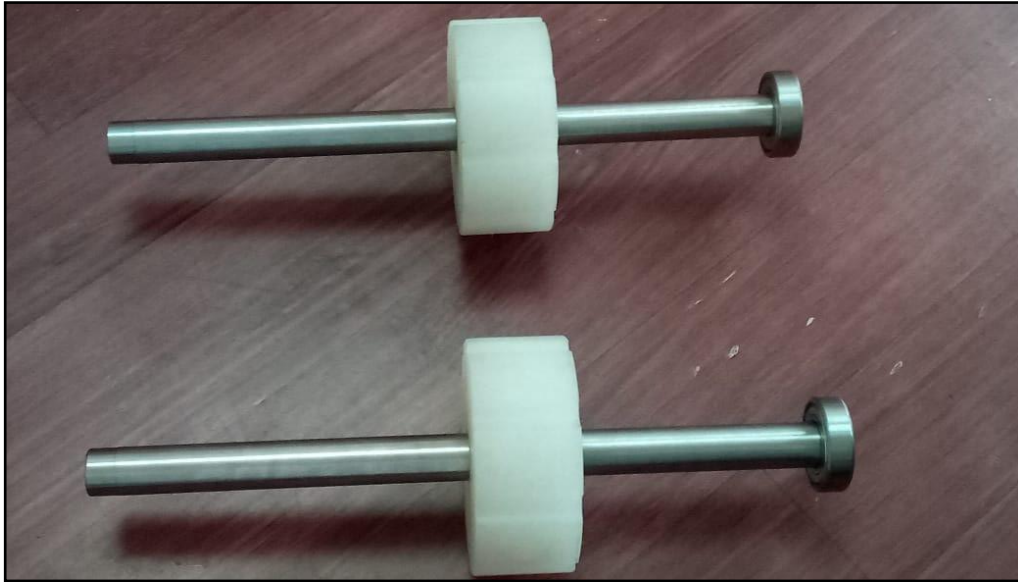

Fig: 6.1 Shaft Assembly

 A worm wheel was then fitted on one of the shaft. When the worm wheel on the shaft is meshed with the spur gear on fitted on the motor, this transfers the motion from motor to the shaft. Afterwards bearings were fitted on both the shafts. First the supports of the shaft were fitted on the casing. This supports were installed to fix the shaft with the casing. When the shaft was fixed, the conveyor belt was mounted on the shaft. Then the base of the casing was fixed with the supports on which the belt mounting was done.
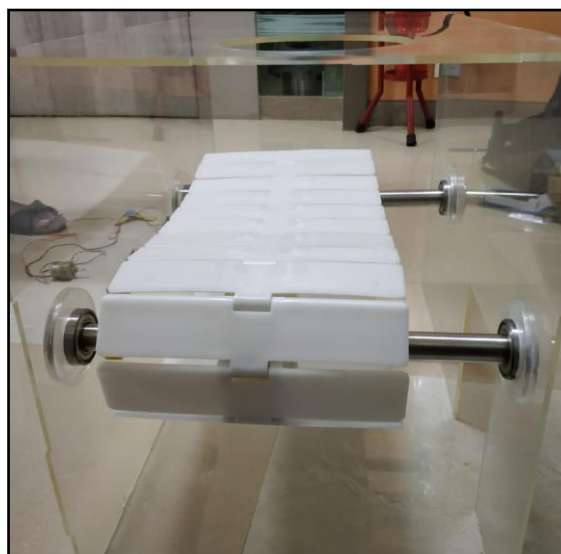

Fig: 6.2 Conveyor and Shaft Assembly

(Side View)

Fig: 6.3 Conveyor and Shaft Assembly

(Top View)

A channel used for the drawers was used for doing the partition of the wet waste. On the channel a big block made of sun board was fixed. Behind the block a rack was installed on the channel. The rack is connected with a pinion.

The motor is then connected with a double pole double switch. All this arrangement was connected with a 9V battery. The battery, double pole double switch and motor all are connected together with a red and black wire. The motor was then fixed on the casing with the help of sun board which formed the support for the motor. This arrangement of the channel is then fitted with the casing.

The worm wheel placed on the shaft is connected with a spur gear. The humidity sensor is placed just above the conveyer belt. This humidity sensor is connected with Arduino UNO. The power connection was given with adaptor to the Arduino, with the help of an adaptor which was connected to the socket on the switch board,
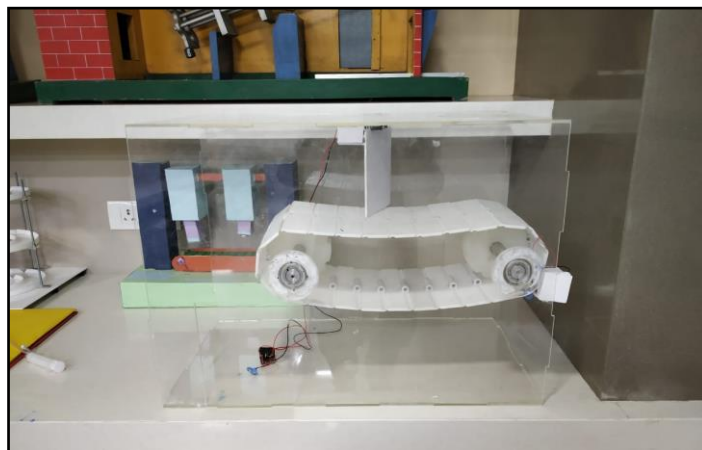

Fig: 6.4 Final Assembly

CHAPTER 7

Working

There are three forms of working for our product one for each type of waste

1] Magnetic Waste

For "Magnetic Waste" working is as follows:

When a metal waste enters the casing through the funnel which is attached on top of the casing, it falls on the conveyor which is rotating continuously. As conveyor moves forward the magnetic waste also moves with it. After some distance is covered the waste comes in front of electro magnet which is operated with the help of a switch.

The electro-magnet is kept on from start of the process, so when the waste comes in front it due to the magnetic properties of the waste it starts getting attracted towards the electro-magnet. As the force generated by the electro-magnet is considerably high, the waste slowly starts getting attracted towards it and after some time it gets attached to the electro-magnet.

During the process of segregation whenever a magnetic waste is introduced to the system the same process is carried out for segregating it. After sometime when a lot of magnetic waste gets attached to the electro-magnet the system is stopped and the electro-magnet is shut down with the help of the switch and all the waste gets detached from the electro-magnet. As this happens all the waste that is detached falls down in the bin provided underneath the electro-magnet. The bin is then removed from the casing through the slot provided in it.

After the bin is emptied and again placed underneath the electro-magnet, the system is again started as well as the electro-magnet by the switch.

2] Wet waste

For "Wet Waste" working is as follows:

When a wet waste enters the casing through the funnel which is attached on top of the casing, it falls on the conveyor which is rotating continuously. As conveyor moves forward the wet waste also moves with it. After some distance is covered the waste comes in front of electro-magnet which is operated with the help of a switch.

But as that wet waste does not have any magnetic properties it does not react on magnetic pull which is generated by the electro-magnet and moves forward without any change in motion.

The waste then moves forward and comes in front of the humidity sensor which is placed just beside the conveyor from where it can detect the humidity of waste without any problem. When the waste comes in front of the humidity sensor, sensor starts detecting the humidity of the waste. This process takes some time, so according to this time delay due to sensing process we have reduced the speed of the conveyor so there is no problem for sensor to sense the humidity of the waste.

When the humidity of the waste is sensed by the sensor, it decides whether the waste is wet or dry, in this case it is wet so the sensor will send the signal to the main processor which is Arduino UNO. As the signal is received by the processor we operate the Double Pole Double

Switch (DPDT) which is connected to the motor which is further connected to the rack pinion arrangement on the channel.

When the switch is pressed for the forward motion of the channel on which the blocking system is fixed the motor the start rotating and the pinion placed attached on the shaft starts rotating as well. As pinion start rotating, due to its meshing with rack fixed on the channel, the channel starts moving forward.

After some distance covered by the channel when the waste comes in front of the blocking system, this is also fixed on the channel, the waste touches the blocking system. Due to the blocking system the wet waste does not move any forward but due to the continuous rotation of the conveyor the waste starts moving in sideways direction as it cannot move any forward. After some time the wet waste falls in the bin which is placed on one of the side of the casing and the segregation process is completed.

As the segregation process goes on the bin gets full. As the bin is full, the bin is then removed from the casing through the slot provided in it. After the bin is emptied it is again placed where it was placed before. During this the system is stopped so that no energy is wasted.

3] Dry Waste

For "Dry Waste" working is as follows:

When a dry waste enters the casing through the funnel which is attached on top of the casing, it falls on the conveyor which is rotating continuously. As conveyor moves forward the dry waste also moves with it. After some distance is covered the waste comes in front of electro-magnet which is operated with the help of a switch.

As the dry waste which is introduced to the system as no magnetic properties as well it reacts exactly in the same way the wet waste with m=no magnetic properties did to the electro-magnet

The waste then moves forward and comes in front of the humidity sensor which is placed just beside the conveyor from where it can detect the humidity of waste without any problem. When the waste comes in front of the humidity sensor, sensor starts detecting the humidity of the waste. This process takes some time, so according to this time delay due to sensing process we have reduced the speed of the conveyor so there is no problem for sensor to sense the humidity of the waste.

When the humidity of the waste is sensed by the sensor, it decides whether the waste is wet or dry, in this case it is dry so the sensor will send the signal to the main processor which is Arduino UNO. As the signal is received by the processor we do not operate the Double Pole Double Switch (DPDT) which is connected to the motor which is further connected to the rack pinion arrangement on the channel.

This is because we are letting the dry waste to move forward till the end of the conveyor belt and letting it fall at last in the bin which is provided there. This done so that there is mixing of wet and dry and they do not fall in the same bin and the segregation process is done properly.

This is how the system works for different type of wastes.

CHAPTER 8

Advantages

- It keeps our surroundings clean and green and free from bad odour of wastes, emphasizes on healthy environment and keeps cities more beautiful.
- It further reduces manpower requirements to handle the garbage segregation process.
- The depth of the existing landfills and incinerations will be curbed, thereby cutting down the harmful factors that affect the environment.
- Right from old and used bottles to tin cans and magnetic wastes, all kinds of wastes are segregated.
- As the segregation is done simultaneously there is no need of segregating waste in to different plants, which will reduce time and cost.

Disadvantages

- High capital investment
- Periodic maintenance required
- It reduces man power requirements which results into increase in unemployment for unskilled people.

CHAPTER 9

Cost

Table: 9.1 Cost Table

Part	Quantity/Length	Rate	Price
Arduino UNO	1 Pcs	Rs 450/Pcs	Rs 450
Humidity Sensor HR-202	1 Pcs	Rs 500/Pcs	Rs 500
Conveyor Belt	4 Feet	Rs 700/Feet	Rs 2800
Sprocket	2 Pcs	Rs 500/Pcs	Rs 1000
Shaft	2 Pcs	Rs 400/Pcs	Rs 800
Key	2 Pcs	Rs 20/Pcs	Rs 40
Bearings	4 Pcs	Rs 140/Pcs	Rs 560
Worm Gear	1 Pcs	Rs 800/Pcs	Rs 800
Rack	0.5 Feet	Rs 200/Feet	Rs 100
Pinion	1 Pcs	Rs 200	Rs 200
Motor (100 RPM)	1 Pcs	Rs 450	Rs 450
Motor (60 RPM)	1 Pcs	Rs 500	Rs 500
Wires	40 pcs	Rs 1/ Pcs	Rs 40
1/0 Switch	1 Pcs	Rs 10	Rs 10
DPDT Switch	1 Pcs	Rs 20	Rs 20
Casing	1 Pcs	Rs 2000	Rs 2000
Funnel	1 Pcs	Rs 500	Rs 500

CHAPTER 10

Activity Plan

Table: 10.1 Activity Chart

Date		Activity
From	To	
Jan 15	-	Idea approval for project
Jan16	Jan 29	Planning of parts requirement
Jan 30	Feb 13	Approximate costing of the parts, Approximate design
Feb14	Feb 25	Final Design
Feb 26	March 6	Purchasing of parts
Feb 27	March 17	Manufacturing of casing, conveyor system
March 17	April 9	Test Runs
April 11	-	Final Submission

CHAPTER 11

Conclusion

Waste segregation using this system can be implemented for segregating waste into metallic, dry and wet waste in segregation plant. By implementing this system a lot of space which is wasted can be reduced. One of several environmental problems is bad waste management practices which can result in land and air pollution and cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body.

The method presented provides a fruitful way to come out of this problem by making entire system automated. The components used for this system are easily available in the market and are economical and environment friendly and gives accurate results separating three different types of the wastes which are generally produced at places like shopping malls, offices, houses, schools and colleges etc. The wastes is collected from here and are send to different plants which is not necessary if this system is used.

Presently there is no system available for segregation of waste at same plant other than doing it at different plants. The biggest advantage of this system is that it reduces the transportation cost, as all types of waste can be segregated at one particular location. Also the energy wastage is also less. So this more appropriate system to adopt, to reduce the cost as well as the time required for segregation.

CHAPTER 12

References

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