OIL AND SCRAP SEPARATOR

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Abstract: **The main aim of the project is to improvise the quality of scrap and to reduce the time required for separation of scrap and oil so as to consume less time in separation of scrap and to get good value of scrap. As a part of industrial project under the syllabus prescribed for Mechanical Engineering, we as a group are working with collaboration of VERMA ENTERPRISES Pvt. Ltd. The various type of scrap is generated in the company. A new system for separation of scrap & oil tends to improve functionally, longer service life, consumes less time, easy installation, user friendliness and ensuring proper optimization of cost, material, timing as well as the prevention of wastage of oil.**

Keywords: Centrifugal force, Filter net.

I. INTRODUCTION

Centrifugation is one of the most important and widely applied research techniques in biochemistry, cellular and molecular biology, and in medicine. Current research applications rely on isolation of cells, subcellular organelles, and macromolecules, often in high yields.A centrifuge uses centrifugal force (g- force) to isolate suspended particles from their surrounding medium on either a batch or a continuous-flow basis. Applications for centrifugation are many and may include sedimentation of cells and viruses, separation of subcellular organelles and isolation of macromolecules such as DNA, RNA, proteins, or lipids. But we are using this centrifugal force for separation of oil & scrap filter. Industrial centrifugal separator is a coolant filtration system for separating particles from liquid like, grinding machining coolant. It is usually used for non-ferrous particles separation such as, silicon, glass, ceramic, and graphite etc. The filtering process does not require any consumption parts like filter bags, which saves the earth from harm.

II. PROBLEM STATEMENT

The conventional system used for separation of oil and scrap is time consuming. It takes about 2-3 days for separation of 650 kilograms of scrap and oil mixture. Also scrap separated by this system is wet scrap which has low market value. Thus company was getting less profit due to wet scrap. Also less amount of cutting oil is generated from this conventional system. This directly affects the quality of scrap and thus profit of company.

III. PRIMARY SEPARATION TECHNIQUE

A company used to rely on conventional system which includes of a drum, capacity of 650-700 kg having holes at its bottom side.In this system, workers feed scrap-oil mixture of 600-650 kg to separate. It works on the gravitational force. Oil starts coming downwards due to acceleration. But this process takes almost 2-3 days to get separated. But most of the oil sticks between the scrap. Thus separated scrap is in wet form.

Fig. 1:

Conventional System

IV. NEW SYSTEM

The problems were identified and various techniques were studied so as to improve quality of scrap & to minimize the time required for the separation of oil & scrap. The study resulted in the use of centrifugal separation process the oil separation is needed from the oil-scrap mixture. After submitting the proposal for the new system for separation, the company observed the differences & decided to switch to the new method of separation as it was found to be less time consuming system, so we started working on this new oil & scrap separator.

V.   WORKING

In this project, we have a –phase A.C. motor of 2hp on its shaft end it has a solid pulley of 4 inches in diameter is of mild steel. The shaft is fitted inside a hollow shaft by bearing arrangement through forging process .One end of the shaft is fitted to a pulley of 10 inch diameter. The bearings used are roller bearings used are cylindrical roller bearing. On the frame fixed drum is fitted through welding. The drum earlier was a M.S sheet of 4mm thickness which is than roller cylindrical shape. In that filter there is one rotary drum (i.e. filter) which is 5 feet *1 feet in which there are holes of 1micron. For transmission of power a v-belt is used to avoid the slipping as in the flat belt.. According to working, as the motor starts rotating, the shaft end also starts rotating. Pulley connected to motor shaft starts rotating and thus driven pulley also starts rotating. It rotates the main shaft. One end of the shaft is linked to the rotating drum as the rotating drum (i.e. filter) starts rotating, the scrap inside in it also rotates. Because of centrifugal action the oil and scrap gets separated.The separation action is done in such a way that oil is splashed on the walls of fixed drum & scrap remains in rotary drum. An oil seal is provided in between rotary drum which is made up of cast iron with the help of nut and bolting assembly. By providing the oil seal, the leakage oil from rotating drum to shaft in has been completely avoided or stopped. After the centrifugal action, the oil flows down from fixed drum and remains In between the gap of filter and drum at bottom. This oil is than drained out by providing a drain pipe is made up of mild steel which has 20mm diameter. This oil flows down and is collected in various operations. The machine is mostly preferred in small scale industries where initial investment is less.

VI.   OBSERVATION

For 50 KG mixture of scrap and oil, machine takes 12 minutes. So, for 650 KG it will take 2 Hours & 36 Minutes. Electricity consume by this machine for 650 KG is 3.5 KWH.

VII.   FUTURE SCOPE

In these machines further improvement can be done. Even after filtration small amount of scrap materials may enter. To avoided these secondary filter can be introduced this secondary filter is stationary have very small holes so as to block that very fine particles of scrap. Oil will go to secondary filter this filter will block the small particles and very clean filtered oil can be obtained. Also some automation can be done by providing density sensor as density of oil &scrap mixture come to a certain level machine will start automatically.

VIII.   CONCLUSION

This process is faster than conventional process.

It takes maximum 3 Hours for separation of 650 KG of mixture.
Wastage of cutting oil is stopped.
Dry scrap is separated.

IX.   COMPANY PROFILE

[1]   Factory & Office:

Unit 1: PandurangWadi, Opp.ZenithRubber,Golavli, Kalyan-ShilphataRoad,MIDC, Dombivli (East): 421 203
Unit 2: MhatrePada, Sonarpada, MIDC, Phase-II,Near W-22O, Dombivli (East):42L243Dist: Thane (Maharashtra)

[2]   SHORT INTRODUCTION OF COMPANY

Company Incorporated in the Year L973 & Since Last 39 Years we are working for INDIAN INDUSTRIES, as a Job
Work & Supply Components Counter Gear, Pinion shaft, Pinion, load Chain Wheel, Hand Chain Wheel, Serration Shaft, Intermediate axle, Trolley Wheel, Guide Roller, Die Making, Spur Ring & Heat Treatment Facility by [Excalibur Industry, Dombivli, east an ISO 9001 :2008 Certified]

X.   REFERENCES

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