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DESIGN AND FABRICTION OF BURR COLLECTION UNIT WITH MOTORIZED (HYDRAULIC) COMPACTOR

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Abstract:

In this project we fabricate the Burr Collection Unit with Hydraulic Burr Compactor. In this project we are using the Hydraulic Power Pack Unit, Rectangular Bin, Direction Control Valve, Fluid Flow Hoses, Hydraulic Oil, Compactor Plate, etc. The project constructed by the simple arrangements so this project is easily operating to any worker in industries. This project is suitable for small scale industries and workshops.

Keywords — **Burr collector, Hydraulic Compactor.**

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I. INTRODUCTION

In industrial manufacturing, particularly in machining processes, burrs are a common by product. Burrs are the sharp, unwanted protrusions that are left on work pieces after operations such as milling, turning, or grinding. Left unaddressed, burrs not only pose safety risks but also lead to increased material handling and disposal challenges. The need for an efficient, automated solution to address the collection and compaction of burrs is critical in optimizing waste management and ensuring operational efficiency in machining environments. Traditional methods of waste disposal involve manual handling and transportation to scrap collection centres, which can be labour-intensive and inefficient. Additionally, loose burrs are harder to recycle due to their scattered and non-uniform nature. Compaction of this waste into dense blocks improves handling, reduces transportation costs, and facilitates easier recycling. This highlights the necessity of a dedicated hydraulic burr compactor in workshops and machining facilities.

II. PROPOSED SYSTEM

This project focuses on the development of a Hydraulic Burr Compactor with a Burr Collecting Bin, a system designed to tackle these challenges by using hydraulic pressure to compact the burrs and other residual materials. The addition of a dedicated collecting bin ensures that the burrs are captured effectively, preventing spillage and minimizing manual handling. The system is designed to work seamlessly with various types of metal and plastic burrs generated in different manufacturing processes, improving both safety and waste management practices.

The key objectives of this project are to design and construct a compactor that uses hydraulic power to apply high compaction forces, enabling efficient reduction in the volume of waste burrs. The compactor is integrated with a collection bin to store the compacted burrs for safe handling, recycling, or disposal. This project not only focuses on enhancing the mechanical efficiency of the compaction system but also aims to streamline the waste collection process, ultimately contributing to a cleaner, more organized manufacturing

environment.

III.COMPONENT DESCRIPTION:

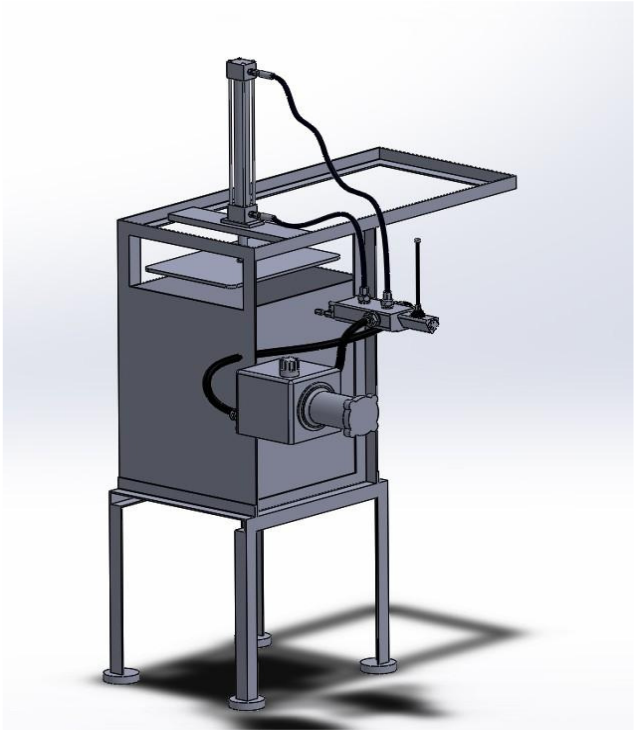
- RECTANGULAR COMPACT BIN
- HYDRAULIC POWER PACK
- CONNECTING HOSES
- COMPACT PLATE
- HYDRAULIC OIL
- DIRECTION CONTROL VALVE

IV. Technical Specifications:

Component Specifications

Property	Description
Shape	Rectangular box (open-top & bottom)
Material	Mild Steel (MS) plate
Thickness	3 mm
Length (L)	305 mm
Width (W)	254 mm
Height (H)	406 mm
Top	Open
Bottom	Open

- ***DESIGN DIAGRAM***



CONSTRUCTION:

Bin Specifications (MS PLATE, 3 mm thick)

- **Panel Dimensions (in mm):**

Since top and bottom are open, only **4 side panels** are needed:

1. **Front & Back Panels (2 pcs):**
   - **Size:** 254 mm (W) × 406 mm (H)
2. **Left & Right Panels (2 pcs):**
   - **Size:** 305 mm (L) × 406 mm (H)

All panels made from 3 mm MS plate, welded along edges to form a rigid rectangular sleeve.

- **Estimated Weight Calculation (No top/bottom):**
- **Surface area:**
- Front/Back: 2 × (254 × 406) = **206,448 mm²**
- Left/Right: 2 × (305 × 406) = **247,060 mm²**
- **Total area = 453,508 mm² = 0.4535 m²**
- **Volume of MS:**
- 0.4535 m² × 0.003 m = 0.0013605 m³
- **Weight = Volume × Density:**
- 0.0013605 × 7850 kg/m³ ≈ **10.68 kg**

- **HYDRAULIC POWER PACK:**
- **Main Components of a Hydraulic Power Pack**

1. **Electric Motor or Engine**

- Drives the hydraulic pump.
- Can be AC, DC, diesel, or petrol-powered.
- Converts electrical or fuel energy into mechanical energy.

2. **Hydraulic Pump**

- The heart of the system.
- Converts mechanical energy from the motor into hydraulic energy.
- Types include gear pumps, vane pumps, and piston pumps.
- Pressurizes the hydraulic fluid.

3. **Reservoir/Tank**

- Stores hydraulic oil/fluid.
- Allows fluid to cool and settle (air and contaminants separate out).
- Includes a breather, drain plug, and level gauge.

4. **Pressure Relief Valve**

- Prevents system damage by releasing excess pressure.
- A key safety component.

5. **Control Valves**

- Regulate direction, pressure, and flow of the hydraulic fluid.
- Types: directional control valves, pressure control valves, flow control valves.

6. **Filters**

- Remove contaminants from the hydraulic fluid to protect components.
- Located in suction lines, return lines, or pressure lines.

7.Accumulator (Optional)

- Stores pressurized fluid for emergency use or to smooth out pulsations.

8. **Cooling System (Optional)**

- Heat exchanger or oil cooler to prevent fluid from overheating.

- Hydraulic systems generate heat during operation.

9.Manifold

- Connects valves and controls fluid flow paths.
- Reduces need for extensive piping.

10.Pipes and Hoses

- Carry pressurized fluid between the power pack and the machinery it operates.

ADVANTAGES OF PROPOSED SYSTEM

- Time saving, will result in increased production.
- More space management will collect more burrs.
- Portable attachment unit, can be moved and used to different machines.
- Can be operated by low skill worker.

- **USES**
  - Used in all Manufacturing Industries.
  - Highly recommended for CNC machines.
  - Used in scrap recycling places.
  - Most preferable in mass production units.

CONCLUSION

The Hydraulic Burr Compactor successfully addresses the need for compact, efficient waste handling in machining industries. It integrates mechanical, hydraulic, and electrical engineering disciplines into a single, effective product. Future enhancements can further improve usability and automation.

process optimization, and integration into larger smart lab or smart factory systems. It serves as a practical implementation of Industry 4.0 concepts in the thermal processing domain.

R REFERENCES

- Engineering Standards (IS/ANSI) for Hydraulic Systems
- Technical Datasheets of Cylinder and Power Pack Components
- Literature on Metal Waste Management and Recycling

