

## Fabrication of Dip Coating Apparatus



### Engineering

**KEYWORDS :** Apparatus, components, working mechanism, design, fabrication technique, materials used

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### ABSTRACT

*Catalytic converters are devices that are used to reduce the harmful emissions of the vehicles that use petroleum products as their fuel. These converters are coated by different chemicals and its combinations over the surface, which would act as a redox agent to reduce and oxidize the emission gasses. To coat the chemicals all over the converter we use a dip coating apparatus. A dip coating apparatus can dip the converter into the slurry of chemicals and develop the converter with the chemicals coated over it. There is no commercial equipment's for experimenting the different chemical behaviors; hence we decided to fabricate the dip coating apparatus for a catalytic converter*

### INTRODUCTION

Issue always been debated among the environmentalists over the decades and recent years is air pollution. As the technology keep on evolving and emerging, it carries along undesirable effects apart from its broad application and use. One of the main contributors is said to be the emission of harmful gases produced by vehicle exhaust lines. The number of vehicles miles travels per year continues to increase as a result of higher demand and needs. Consequently, an increase in the number led to the increase of the content of pollutants in air. The need to control engine emissions was recognized as early as 1909. Due to the more stringent rules and emission standards, automotive manufacturers begun to develop a treatment device for exhaust gases known as catalytic converter for their vehicle models. pollution generated from mobile sources such as automobiles contributes major air quality problems in rural as well as urban and industrialized areas in both developed and developing countries. About 50 million cars are produced every year and over 700 million cars are used worldwide. Vehicle population is projected to grow close to 1300 million by the year 2030. Most vehicular transportation relies on combustion of gasoline, diesel and jet fuels with large amount of emission of carbon monoxide (CO), unburned hydrocarbons (HC), and nitrogen oxides

(NOx). The aim of this paper is to Use experimental data to achieve an experimentally of manufacturing process.

Use experimentally determined design of apparatus data along with its calculations data to make useful predictions about dip coating equipment performance. Use their understanding of Newton's laws of motion, torque and rotational speed to compute the performance requirements of a DC motor system. Use engineering methods and mathematical models in an effort to most closely match design of Apparatus performance to a given set of functional requirements and design parameters

### COMPONENTS OF APPARATUS

#### 1.VOLT MOTOR



A DC motor relies on the facts that like magnet poles repels and unlike magnetic poles attract each other. A coil of wire with a current running through it generates a electromagnetic field aligned with the center of the coil. By switching the current on or off in a coil its magnet field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°. A simple *DC motor* typically has a stationary set of magnets in the stator and an armature with a series of two or more windings of wire wrapped in insulated stack slots around iron pole pieces (called stack teeth) with the ends of the wires terminating on a commutator. The armature includes the mounting bearings that keep it in the center of the motor and the power shaft of the motor and the commutator connections. The winding in the armature continues to loop all the way around the armature and uses either single or parallel conductors (wires).

## 2. SCREW ROD:



A **screw rod** has a mechanism that converts rotational motion to linear motion, and a torque (rotational force) to a linear force. It is one of the six classical simple machines. The most common form consists of a cylindrical with helical grooves or ridges called *threads* around the outside. The screw passes through a hole in another object or medium, with threads on the inside of the hole that mesh with the screw's threads. When the shaft of the screw is rotated relative to the stationary threads, the screw moves along its axis relative to the medium surrounding it; for example rotating a wood screw forces it into wood. In screw mechanisms, the screw shaft can rotate through a threaded hole in a stationary object, or a threaded collar such as a nut can rotate around a stationary screw shaft. Geometrically, a screw can be viewed as a narrow inclined plane wrapped around a cylinder. Other mechanisms that use the same principle, also called screws, don't necessarily have a shaft or threads. For example, a corkscrew is a helix-shaped rod with a sharp point, and an Archimedes' screw is a water pump that uses a rotating helical chamber to move water uphill. The common principle of all screws is that a rotating helix can cause linear motion. A screw can amplify force; a small rotational force (torque) on the shaft can exert a large axial force on a load. The smaller the pitch, the distance between the screws' threads, the greater the mechanical advantage, the ratio of output to input force. Screws are widely used in threaded fasteners to hold objects together, and in devices such as screw tops for containers, vises, screw jacks and screw presses

## 3. SLIDER

Which is holding the motor setup and move along with the tool holding bar The above fig shows the motor and its gears setup is fixed with slider While the motor is running with a screw rod, due to the arresting of bolt in our apparatus the rod moves up and down motion along with the slider The screw rod rotates due to the rotation of the gear. Due to this motion the bolt pulls/pushes the slider down/up.



## 4. TOOLHOLDING DEVICE

This device is fixed over on the frame. The slider is slide along with the motor setup on this device. It is engaged with the gear which is connected to the motor. Due to gear motion the screw rod moves up and down. A device used to locate and hold a work piece. The work holding device references the tool performing the operation on the part being held. Referencing the tool performing the operation on the part being held.

## 5. BASE WITH FRAME

The total setup is fixed over on this frame. This base having a flat platform, in it's the tank is placed. The frame is having a support at two side of its base. Used as a stand to fix the motor rail arrangement. Also used as a stand.

## WORKING

As the circuit is closed and when the power is supplied to the motor the gear in the motor starts rotating. This in turn rotates the screw rod in one direction. By this rotation the fixed bolt pulls or pushes the screw rod through the rails. As the DPDT switch is changed the direction of motion also changes.

## APPLICATION

Dip coating is as much an alternative to traditional coating processes, like powder coating and painting, as it is an alternative to plastics processes. The most common dip coating process is the application of grips to hand tools, such as pliers and clipper. It is much more cost effective to do a one step dip to coat a handle than it is to injection mold a grip and then apply it to a handle. The coated grip is softer, has no seam lines, and adheres better to the tool. Applications for dip coating include. And in addition to plastisol the process is ideal for latex, fluidized powder, and even epoxies applications.

## ADVANTAGES

- It requires simple maintenance cares
- Low cost to coating a catalytic converter
- Checking and cleaning are easy, because of the main parts are

easy to Handle.

- Low cost automation Project
- Repairing is easy.
- Replacement of parts is easy

**REFERENCE**

➤ Makwana et al., International Journal of Advanced Engineering Technology E-ISSN 0976-3945 IJAET/Vol. IV/ Issue II/April-June, 2013/10-13 Research Paper "DEVELOPMENT AND PERFORMANCE ANALYSIS OF NICKEL BASED CATALYTIC CONVERTER " || ➤ International Journal of Scientific Engineering and Technology (ISSN : 2277-1581) IJSET Page ---Flow in Catalytic Converter of Spark Ignition Engine with Air Box Ch. Indira Priyadarsini. |