

# Live Project in Goyal Industry on Design of Wastage and Dust Control System

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**Abstract:** This review deals with the material handling and control of dust during operation. This is done for the safety purpose for optimization to reduce the material loss and dust accumulation in workspace. We are doing modification in already existing production line by some new technique. The basic principle of operation for this system is systematically viewed in this paper and its future scope.

**Key Words:** Container, Mixture, Blower, Lever Mechanism, Container Cover.

## 1. INTRODUCTION:

The paper deals with the live project which is a industrial project .Here dealing with dust control purpose, so as per according to our project, the system control the dust and wastage of raw material. This company made a product which name is “ PHICOL C’ .It a type of powder which is very fine and use for better casting finishing. According to task, the system make a changes on the first portion of the part. The system are using cover which will be held on the container, which move automatically when the container lift and the cover will close automatically with the help of lever mechanism and in this system by using blower ,the control the dust . The detail description is given below.

## 2. CONSTRUCTION:

**A. Container:** Container is used to pour the raw material in to the mixer. Container is attached to the link mechanism (LEVER) so that it crank proportional to the lever.

**B. Cover:** Cover is the main part of container because we are using that container for purpose of covering .Cover is also interlinked with lever mechanism.

**C. Mixer:** Mixer All the raw material is poured into the mixer, then mixer will start rotating and mixed up all raw material.

**D. Lever /Linkage Mechanism:** Linkage mechanism is designed in such a way that it will work as proportional to the cover .Cover and linkage mechanism is interlink age mechanism interlink with each other.

## 3. BLOCK DIAGRAM OF COMPANY PRODUCTION LINE:

**A. Mixer:** Mixer is a device which is used to mix the material properly. Mixer is driven by motor and gear arrangement with the help of chain drive. Mixer start rotating and material get mix in that mixer. This material is became in an powdered form and pass it to the pulveriser by means of flat belt drive.

**B. Flat Belt Drive:** The Powdered material is by passed through flat belt drive. Flat belt drive is in a definite angle so that the powered material is will not slip down. Its inclination is about 15-18 degree After then it will go in pulverizer for the further process.

**C. Pulverizer:** It is a device which is used to again crush the raw material into a fine powder. As the raw material is come through hopper in a pulverizer, this raw material is strike in bitter Biter is a type of hammer of alloy steel which is used to break the raw material. As raw material is come in contact with bitter it will get convert into an fine powder. These powdered is sent into thr pipe. These pipe is connected from pulverizer to the output pipe and these fine powdered is collect into an collecting bag. The compressor is used to remove the dust particle from powder.

**D. Bag Filter:** These bag filter is used to filtered the contaminated dust powdered .After filtering this dust powder it will reutilized.

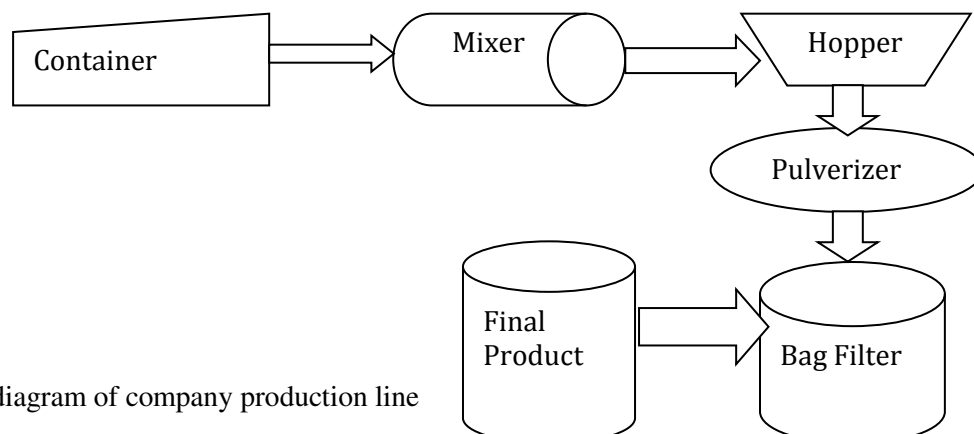


Fig 1 : Block diagram of company production line

#### 4. WORKING:

First, in this process all the different types of raw material is put into the container. The container has divided into a sub two parts with the help of a plate arrangement in the middle of it, which help the raw material will go easily into the mixture without spill apart from it. There is a cover provided to the container, this cover open or closed by lever mechanism. This will be automatic process. Whenever container lifted, the cover will closed and when it comes to rest it will open. So that, we control the wastage of raw material during lifting the material is put into the mixture by the container. It will get mixed completely in a mixture. The arrangement is provide here and that is blower or we can also say that centrifugal blower which suck all the dust particles which comes from mixture mouth continuously during mixing. This high powerful blower can suck all the powder material from the atmosphere for minimizing the dust particles which comes from vent is send to the bag filter which is made up of cotton bags. It collect dust particles into the dust collector and the remains will exhaust to atmosphere. This is achieved by using exhaust ventilation to create a negative air pressure inside the controlled space relative to outside of the controlled space.

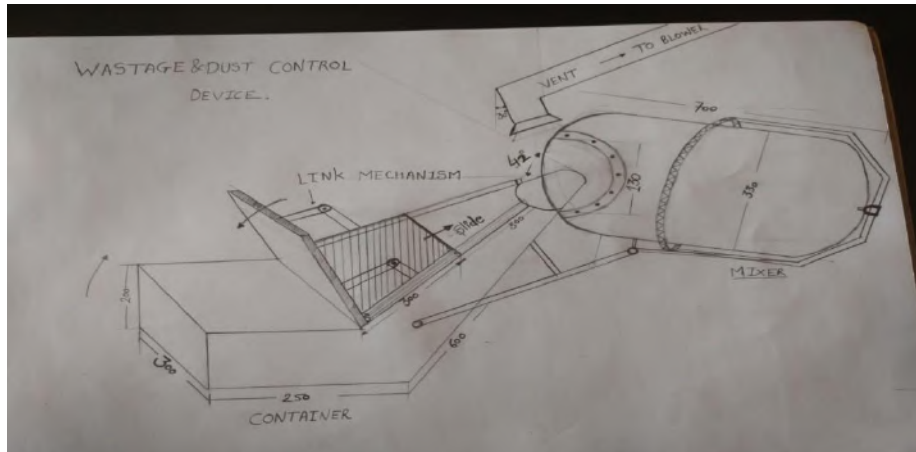


Fig 2.1: Working Diagram



Fig 2.2: Actual Container

#### 5. DESIGN OF LINK MECHANISM:

To design the mechanism, we should check the number of degree of freedom of the mechanism. The degree of mechanism is the number of inputs required to control the position of all links of the mechanism. It usually the number of actuators needed to operate the mechanism.

We can use Gruebler's equation to calculate the number of degree of freedom of the mechanism as follows.

$$F=3(n-1)-2L-H$$

where

F = number of degree of freedom

N = total number of links in the mechanism

L = total number of lower pair (1 DOF such as pins and sliding joints)

H = total number of higher pair (2 DOF such as cam and gear joints)

Here **Slider Crank Mechanism** is used, where it has the following number of links and joints.

- n = 4 --- 2 links + 1 ground link + 1 slider
- L = 4 --- 3 pins + 1 slider
- H = 0 --- no higher pairs

$$F = 3(4-1)-2(4)-0 \\ = 9-8-0$$

$$F = 1$$

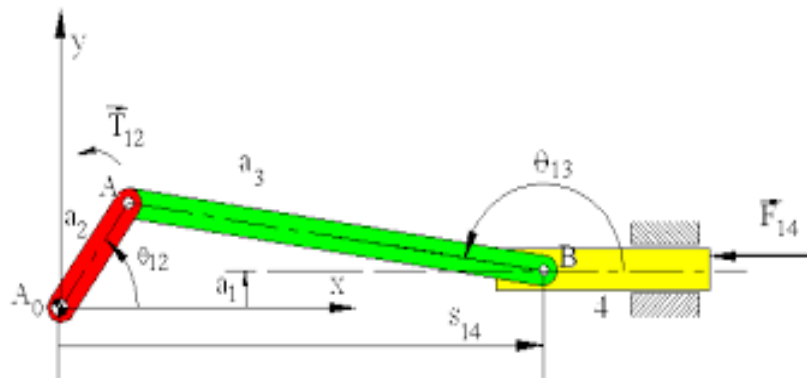


Fig 3: Slider Crank mechanism

## 6. LITERATURE REVIEW:

A. In an article of **Paul F. Fennelly**, he discusses primary and secondary particulates with respect to their size distribution, origin. Primary particulates are particles that are injected directly into the atmosphere. Usually their sizes are within the range 1 to 20um. Common sources are windblown soil, industrial emission. Examples of typical primary particulates are relatively small; their size range is 0.001 to 0.1 um. The proposed mechanisms for a number of these reactions are outline and their relative importance is discussed. The impact of both primary and secondary particulates on health and esthetics is also discussed. Particulates are usually characterized as primary or secondary. Primary particulates are those produced as a direct result of the chemical or physical process peculiar to any emission source. Secondary particulates, on the other hand, are those that are produced as a result of chemical reaction that occur in the atmosphere.

B. **Deborah Elspeth Young** August 3, 2007, a review of this literature was undertaken and is summarized here to describe the nature of particulate respiratory hazards in general, the importance of size selective sampling and size classes of importance in this project, the evidence of respiratory disease in construction and in drywall finishing workers, and the theoretical frameworks employed in the present studies of organizational, technological, and personnel aspects of the work system. For the organizational subsystem, the concept of risk perception, and its application to occupational safety and health, is examined. Usability is the theoretical framework employed in the study of the technological subsystem.

C. **Blue Skies Campaign**, Arizona [2010] An atmospheric and air pollution are unwelcome companions of researchers, since the space research emits pollutants that harmfully affect the humanity and ecosystem. The pollutants shadow all stage of the voyage. From manufacturing to the final journey. It contaminates both earth's orbits and other planets with chemical that are hazardous. Scientists are aware of this problem. With the help of governmental initiatives they are trying to eradicate this problem This helps to control the manufacturing related pollution. It covers both the industry and the space-related manufacturing works. It protects the earth from the emission of toxic chemical which pollutes water, air and health and wealth of human life. The noise level generated is strictly limited as it harmfully affects the mental balance of human and animals. The rocket and missiles which are disposed after the completion of their life-span emit hazardous chemicals. The regulation already covers this emission of gases that destruct the ozone layer. The best remedy is the limitation of the number of voyages and the use of less harmful propellants.

## 7. CONCLUSION:

In this project we controlled the wastage of raw material and dust pollution. This task is done very effectively. By providing sliding linkage mechanism which reduces the wastage of raw material during unloading. Large amount of dust is also comes from mixture which increase pollution, this is also eliminated with the help of blower. Basically we controlled the pollution from the mixer by venting it through bag filter. This project gives more production in less time.

## REFERENCES:

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