Research Article Impact Factor: 0.621 ISSN: 2319-507X
PS Kulat, IJPRET, 2014; Volume 2 (9): 97-102 IJPRET

INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

3D MOTION MIXER FOR MATERIAL

P. S. KULAT[1], PROF. R. B. CHADGE[*2]

1. M. Tech (CAD/CAM), second year dept of mechanical, Yeshwantrao Chavan College of Engineering, Hingna road Nagpur.

2. Asst. Professor, Dept. of Mechanical, Yeshwantrao Chavan College of Engineering, Hingna Road Nagpur, India.

Accepted Date: 27/02/2014 ; Published Date: 01/05/2014

Abstract: As my research concerned it is basically concentrate on "To Design and Fabrication of 3D motion mixer Industrial Mixers and Blenders are used to mix or blend a wide range of materials used in different industries including the food, chemical, pharmaceutical, plastic and mineral industries. They are mainly used to mix different materials using different types of blades to make a good quality homogeneous mixture. Included are dry blending devices, paste mixing designs for high viscosity products and high shear models for emulsification, particle size reduction and homogenization.

Keywords: Mixer, Blender, V-blender, Homogeneous mixing, flow ability

Corresponding Author: MR. P. S. KULAT

PAPER-QR CODE

Access Online On:

www.ijpret.com

How to Cite This Article:

PS Kulat, IJPRET, 2014; Volume 2 (9): 97-102

INTRODUCTION

Industrial Mixers and Blenders are used to mix or blend a wide range of materials used in different industries including the food, chemical, pharmaceutical, plastic and mineral industries. They are mainly used to mix different materials using different types of blades to make a good quality homogeneous mixture. Included are dry blending devices, paste mixing designs for high viscosity products and high shear models for emulsification, particle size reduction and homogenization. Industrial mixers range from laboratory to production line scale, including Ribbon Blender, V Blender, Cone Screw Blender, Screw blender, Double Cone Blender, Double Planetary High Viscosity Mixer, Counter-rotating, Double & Triple Shaft, Vacuum Mixer, Planetary Disperser, High Shear Rotor Stator and Dispersion Mixers, Paddle, Jet Mixer, Mobile Mixers and Drum Blenders. Mixing fulfills many objectives beyond simple combination of raw ingredients. These include preparing fine emulsions, reducing particle size, carrying out chemical reactions, manipulating rheology, dissolving components, facilitating heat transfer, etc. So even within a single pharmaceutical product line, it is not uncommon to employ a number of different style mixers to process raw ingredients, handle intermediates and prepare the finished product.

II. NEED OF 3D MOTION/CONE MIXER

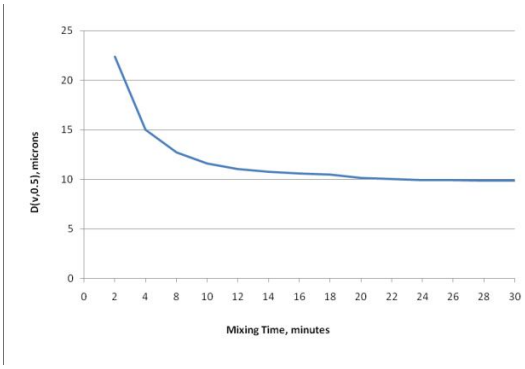
In order to improve both the Mixing and Time of mixing. Makes the surface layer known as the case significantly harder than the residual material known as the core.

Case hardness depth or the thickness of the hardened layer, is an important quality attribute of the case hardening process. Mixing devices (Naranjan *et al* 1994) can be classified into two groups with respect to segregation: segregating mixers—which have mainly diffusive mechanisms, encouraging the movement of individual particles, making segregation more significant, non-impeller type mixers tend to be of this type.

III.PURPOSE OF 3D MTION MIXER

A conventional design of mixing equipment is a vertical cylindrical apparatus with a stirrer the axis of rotation of which coincides with the apparatus axis. Stirred apparatuses have been designed and used for many years and the experience gained shows that this design is the most rational. This design was established more than two thousand years ago and has not been changed since. Mechanically, such an apparatus, albeit simple in appearance, differs essentially from other equipment with rotating shafts, specifically, by the fact that the cantilever shafts of stirrers have a high ratio of the length of a shaft to its diameter. End supports of the shafts are

rarely used because attrition products may end up in the medium or abrasive particles may occur there. Less segregating mixers have mainly convective mixing mechanisms. These are typically impeller types in which blades, screws, ploughs, etc. sweep groups of particles through the mixing zone. Mixing devices are chosen according to the material mixed; therefore, it is important to know the particle size as well as their flow properties. The variability of powders arises from the many ways in which their flow properties may be changed such as: physical properties of the powder particles such as their size, size range, shape, hardness, elasticity, porosity, mass, interactions between particles, texture, angularity and so on. Environmental factors that affect the powder bulk properties, such as the air or moisture content, external pressure, vibration, etc. These factors modify the physical distribution and arrangement of the particles in the powder mass. Individual particle changes caused by factors such as attrition, agglomeration, electrostatic charge and chemical changes.



IV. Details To Be Looked After in a Mixer

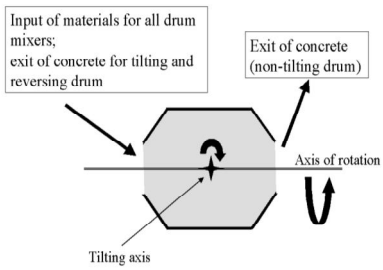
There are two main categories of mixer: batch mixers and continuous mixers. The first type of mixer produces one batch at a time, while the second type produces concrete at a constant rate. The first type needs to be emptied completely after each mixing cycle, cleaned (if possible), and reloaded with the materials for the next batch of concrete. In the second type, the constituents are continuously entered at one end as the fresh concrete exits the other end. The various designs of each type of mixer will now be discussed.

I. Batch Mixers

Two main types of batch mixer can be distinguished by the orientation of the axis of rotation: horizontal or inclined (drum mixers) or vertical (pan mixers). The drum mixers have a drum, with fixed blades, rotating around its axis, while the pan mixers may have either the blades or the pan rotating around the axis.

II. Drum Mixers

All the drum mixers have a container with a cross section similar to that shown in Fig. 1. The blades are attached to the inside of the movable drum. Their main purpose is to lift the materials as the drum rotates. In each rotation, the lifted material drops back into the mixer at the bottom of the drum and the cycle starts again. Parameters that can be controlled are the rotation speed of the drum and, in certain mixers, the angle of inclination of the rotation axis



V.DESIGN OF INDUSTRIAL EQUIPMENT AND WAYS TO INCREASE ITS EFFICIENCY

A conventional design of mixing equipment is a vertical cylindrical apparatus with a stirrer the axis of rotation of which coincides with the apparatus axis. Stirred apparatuses have been designed and used for many years and the experience gained shows that this design is the most rational. This design was established more than two thousand years ago and has not been changed since. Mechanically, such an apparatus, albeit simple in appearance, differs essentially from other equipment with rotating shafts, specifically, by the fact that the cantilever shafts of stirrers have a high ratio of the length of a shaft to its diameter. End supports of the shafts are rarely used because attrition products may end up in the medium or abrasive particles may occur there. The rotation speed of such a shaft is limited by vibration resistance requirements.

VI.Different 2D mixer

v-cone mixer

2 way v-cone mixer

VII.RESULT & CONCLUSION

A mixture can be defined as homogenous if every sample of the mixture has the same composition and properties as any other. The results have been presented through a standard deviation. (Hersey 1982) defined an ordered mixture as having zero standard deviation of the

sample concentration at all sample sizes provided that the sample size is greater than the size of a single order unit as opposed to a random mixture where the standard deviation decreases with the increasing of the sample size.

The main problem with mixing powders is their determination in the mixture before and after the mixing process (Kaye 1997). The dynamics of mixing has been tested by continuous sampling. Granulometric analysis explains it only partially; the rest of the problem must be characterized by statistics. The important thing is to get reproducibility, which has been achieved, considering low values of standard deviation obtained in all samples (from 0 · 05 to 0 · 1). Kenics type of a static mixing device has been investigated, which has been proven as the best type of a powdered material (Regner *et al* 2006). Static mixers can replace standard device types and they can contribute to the mixtures quality in processes such as backfilling material during packaging. Many producers mix several batches before they start the packaging of the material. During storage of different batches, the powders have a tendency to segregate. A static mixer added to storage devices outlet would lead to the final products quality.

VIII.REFERENCES

1. Experimental validated computations of flow, mixing and segregation of non-cohesive grains in 3D tumbling blenders By:-Maher Moakher, Troy Shinbort and Fernando J. Muzzio

2. Pharmaceutical engineering and mixing By:- Dr. Bhawan Bhatt

3. The influence of mineral admixtures on the rehelogy of cement paste and concrete By:- Chiaraf F. Ferraris

4. Mapping approach for 3D laminar mixing simulation application ton industrial flows By:-P.D. Anderson, H.E. Meijer

5. Regner M, Ostergren K, Tragardh C 2006 Effects of geometry and flow rate on secondary flow and the mixing processes in static mixers—A numerical study *Chem. Eng. Sci.* 61: 6133–6141

6. Ristow G H 2000 Mixing and segregation in rotating drums, *Proc. Symposium on Segregation in Granular Flows*, The Netherlands: Kluwer Academic publishers, 311–320

7. Turbula T2C Heavy-Duty Shaker-Mixer 2004 www.artisan-scientific.com/ 49853.asp accessed 12.06. 2007.