

Electrically Operated Bi-directional Mixer: A Proposed Work

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Abstract – The cleaning department requires large amount of cleaning chemical solutions (phenyl) daily. A bidirectional mixer is a chemical mixing machine which rotates both in clockwise direction as well as the anticlockwise direction. This mixer is driven by an electrical motor. This type of chemical mixers are used in process industries like paint industries, chemical industry, food processing plants etc. They are mainly employee for mixing of powders, chemical solutions semisolid fluids etc. This paper Proposed work of a chemical mixer. This work was undertaken considering reducing human efforts in small scale and institutional level.

Keywords: - bi-directional mixer, chemical solution (phenyl), electrical motor.

1. INTRODUCTION

Mixing of chemical solution can be defined as to create or form solution in the form of liquid by combining ingredients. This mixer is been designed and fabricated for mixing of chemical solution ,which is used to for cleaning purposes in educational institutes, offices, hospitals, large shop floor industries etc. To keep this working area clean, large amount of cleaning solutions is required daily for various cleaning purposes. This solutions are prepared manually, as a results large amount of human efforts are required, the amount of time required to prepare this solution is also very high, and it becomes very difficult to store the solution , hence to overcome all this factors this electrically powered bi-directional chemical mixer is been designed.

By implementation of this mixer in various applications the time required to make the solution will be reduced. Man power required will be comparatively less. And large amount of solution can be stored and can be further used as per the requirement.

2. LITERATURE REVIEW

To study the design and working of Electrically Powered Mixer, we referred the following research papers. Rangunath, NajirKhan & Waghmode (2015) have described the mixing process in bi-directional mixer which conform the proposed mixing to prevent the formation of segregated region, hence it shortens the mixing time than other mixing method (constant speed, manual mixing). Also by using the bidirectional mixer in container it creates turbulent flow of mixture and we get the homogenous mixture. Alok &

Immaneul (2014) investigated the study of various effect of fluid on the blades, by using various software's. Various analyses regarding the flow were carried out and compared. Ashish et al (2015) have done the work on stirrer of conventional machine that rotates in one direction only, which creates a particular flow pattern & ultimately results into poor quality mixture therefore it would be appropriate to have a stirrer which rotates about its own axis as well revolves about another fixed axis which helps it reach all parts of the container. This ensures that turbulence required for mixing which is provided all over the container. It makes it valuable because of high quality of mixing, low cost of production & very fast production rate. Ansi/Agma (2005) has published the data of different types of bevel gears, its fabrication, inspection & mounting of gear. It also includes drawing format, inspection, materials, lubrication, mountings and assembly of bevel gear. Alexander et al (2013) carried out the study and analysis of work of the existing mixing equipment and theory of processing of mixture. It also stated that the techniques of pilot studies on mixing in devices by which bidirectional impact on the material is developed. It also helps in determination of optimum constructive and technological parameters of mixer on period action. V.B. Bhandari & The data book of PSG Institute of technology (2013) has published his latest edition of book "Design of Machine Elements", it consist of design parameters for design of various mechanical components. D.P.Patil & et al (2015) concluded that the bidirectional mixer gives better agitating effects is more uniform mixture of products. It was also observed that the quality of mixture is very high which results in low cost high performance and

structural simplicity. Tomas Jirout, et al (2011) investigated the measurements co-relation and calculation of the impellers. Efficiency of the tested impellers has been compared with the other by means of power consumption.

3. PROPOSED METHODOLOGY

A chemical mixer is being designed which consist of a container impeller blades, electrical motor, pair of gears and drive shafts (Fig2). We are using the container made up of PVC; it is placed at about one feet of height, so that it is easy to clean the tank. The motor is placed horizontally in order to reduce the effect of vibration on to the assembly. This machine is designed to mix the cleaning solution used for cleaning the floors. In electrical powered system an electrical motor is used to run the motor shaft. As the motor shaft rotates, the gear sprocket mounted on it also rotates along with it. The power transmission will be takes place from motor to impeller shaft. As the impeller shaft rotates the impeller blades also rotate along the direction. And hence the mixing of chemical ingredients is obtained. The speed of the electrical motor is controlled using speed regulator. The 3d model of bidirectional mixer is as shown in fig 1 & the 2d model of bidirectional mixer is as shown in fig 2.

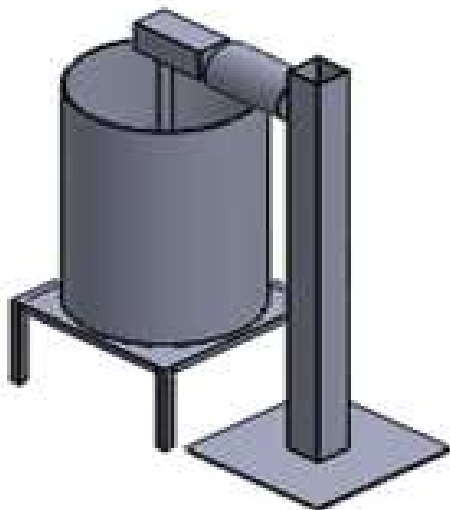


Fig: 1 3D CAD Model

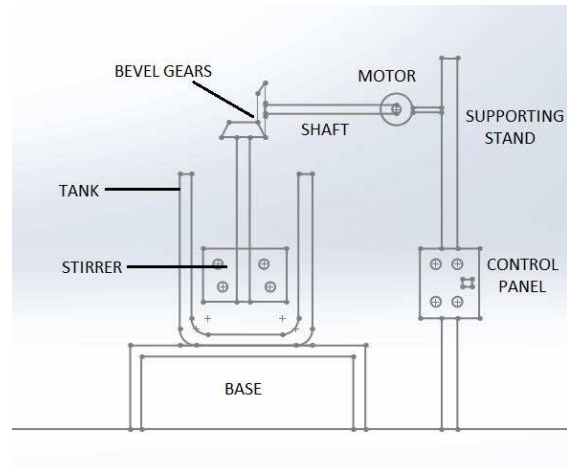


Fig: 2 2D CAD Model

4. DISCUSSION

We have referred above papers in the literature review. Here they have discussed various views from their study on different topics. Ragunath Rajput said that mixing process has been performed which conform that the proposed mixing prevent the formation of segregated region hence shorten the mixing time than other mixing method. Also he said that by using the bidirectional mixer in container create turbulent flow of mixture and we get the homogenous mixture. Alok & Immanuel summarized effect of fluid on the blades, with the help of various software's. Various analyses regarding the flow were carried out and compared. Ashish Panchgatte said that the stirrer of conventional machine rotates in one direction only, which creates a particular flow pattern & ultimately results into poor quality mixture therefore it would be appropriate to have. a stirrer that rotates such that rotates about own axis as well revolves about another fixed axis which helps it reach all parts of the container. This ensures that turbulence required for thorough mixing is provided all over the container. It makes it valuable because of high quality of mixing, low cost of production & very fast production rate. Konstantin Anatolyevich Yudin gives the analysis of work of the existing mixing equipment's and theories of process of mixing showed need of development of a technique of determination of optimum parameters of interaction of mixes with chemical characteristics and quality of mix. We received output as –different types of bevel gears, its fabrication, inspection & mounting of gear. It also includes drawing format, inspection, materials, lubrication, mountings and assembly of bevel gear.

5. CONCLUSION

The conventional method of preparing cleaning solution is replaced by the “bi-directional electrically powered mixer” by using this we can stir large amount of various types of chemicals using. We can also store the prepared chemical mixture, which can be used for various purposes in various factories, educational institutes, small scale industries etc. This mixer can be used to mix acidic as well as nonacidic chemicals in educational institutes. Also it can be used to mix cleaning solutions in hospitals. This mixer is able to mix any other chemical solution. It also can be used can be used as skimming machine. This type of mixer reduces the man efforts required to prepare the chemical solution.

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