

## A REVIEW PAPER ON DESIGN AND FAILURE ANALYSIS OF CONCRETE MIXER MACHINE BLADES USED IN WAINGANGA SPUN PIPE INDUSTRIES

PVT. LTD, SEWAGRAM

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### ABSTRACT

The horizontal shaft concrete mixer machine is used to make concrete used for making spun pipe. While mixing cement , sand & gravel material machine blades does not mix mixture uniformly and pull all material on one side cause high stresses induced in blade & blade get breaks. Also ununiformed mixture decreases the efficiency of concrete machine. Present design of blades is not strong enough to bear stresses & not satisfactory for making mixture. so the purpose of this study is to Design And Failure Analysis Of Concrete Mixer Machine Blades For Making It More Effective & Strong. Study done on existing concrete machine blades & with the help of existing blades, modified blades design. by making this study blades work more effectively, uniformly mixes all material & increases efficiency of machine.

**Keywords:** single shaft concrete mixer machine, design blades of concrete machine , analysis of concrete mixer blades, concrete mixer machine.

### I. INTRODUCTION

Concrete mixer machine is used for making concrete mixture for making spun pipe in Wainganga spun pipe industries pvt. Ltd , Sewagram road , MIDC Wardha. RCC pipes are categorized as Pressure and Non Pressure pipes like np1, np2, np3, and specific conditions p1, p2, p3 is use . RCC spun pipes are mostly used for irrigation, water drainage, sewerage, and culverts. These pipes are made up of cement, coarse and fine aggregate, sand, Mild steel and HT rods and bars. A cement mixer machine is a device that homogeneously combines cement, aggregate like sand or gravel, and water to make concrete. concrete mixer machine uses a revolving blades on shaft to mix all concrete mixtures homogeneously . In Wainganga Spun Pipe Industry, To supply continuously concrete mixture for pipe making its necessary that the concrete mixer should be effectively working, but it has been observed that the blades of mixer not mix concrete mixture uniformly. present design of blade is not effective & stronger. mixture between blades is not evenly mixed While working of machine & blade design such that it pulls all material on one side causes high stresses on one blade & blade get break. So in this project I am researches to identify the different causes of blade failure & design such blade which is effective & strong. So This study Researches To

- 1) Identify The Different Causes Of Blade Failure & non uniformity of mixtures.
- 2) Design Such Blade Which Is Effective & Strong.

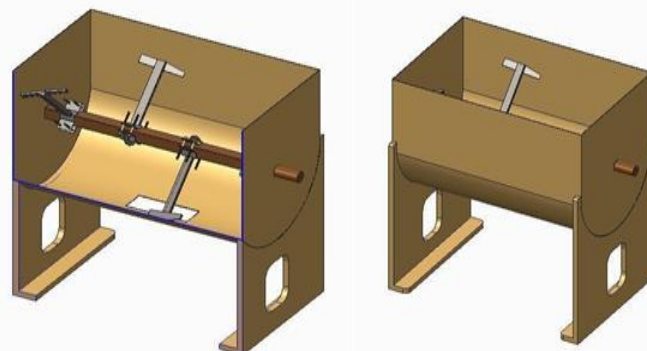


Figure: Concrete Mixer Machine

## II. LITERATURE REVIEW

### a) Number & Height of Blade

Konstantin (2020) It states that effect of the number and height of blades of a concrete mixer on the mixture quality. aim of this exploration was to build up the impact of the number and tallness of cutting edges of a drum blender on the nature of the pre-arranged combination of concentrated feed. The execution of the pre-owned exploration philosophy for the activity of the drum blender made it conceivable to build up a sufficient useful reliance of the impact of the quantity of edges and their stature on the nature of the combination. The quantity of sharp edges utilized basically doesn't influence the coefficient of variety of the substance of the control part. Techniques and Materials accommodated the establishment of replaceable working bodies (L-molded edges) on the internal surface of the pivoting drum of the blender, varying in number and stature; assurance of the nature of the pre-arranged combination and measurable investigation of the outcomes (2).

Wankhede (2016) It states that The property of blade & shaft improved either by changing material or by changing its dimension . Shaft is a significant gear of substantial blender machine use for substantial combination planning and for help a spinning drum. The fundamental goal of this examination is to enhance the plan of substantial blender machine. To investigate this shaft utilizing FEM, first and foremost an appropriate CAD model is created utilizing Pro/E miscreant programming. At that point by utilizing ANSYS programming FEM examination is done to decide the various kinds of stresses and redirection created. After did the investigation it has been discovered that the current plan of shaft of substantial blender machine isn't appropriate and therefor I had proposed to change the material of the shaft for proficient working and to withstand the distinctive static and dynamic burden (10).

### b) Blade Angle

Zechen YAO (2019 ) explores that the mixer blades load increases with the blade setting angle. Also mixing arm is subjected to the combined effect of tensile and bending stresses. when angle between the mixing arm and the mixing shaft is  $\theta=90^\circ$ , the stress reaches its maximum . The motivation behind this paper is to enhance the mathematical boundaries of the blending oar of CSAM blender from the mechanical examination perspective. In this paper, the improvement of a blending arm and sharp edge's mathematical boundaries was completed dependent on mechanical examination utilizing the Matlab programming bundle and FEA. It offers hypothetical help for the plan and streamlining of blending paddles for CSAM blenders. It merits bringing up that the investigation strategy portrayed here can be applied to the plan of blending oar of blender for different businesses. The examination results are summed up: A blending edge's heap FN'is affected by such factors as the material thickness  $\rho$ , blending edge region A, blending rotational speed  $\omega$ , distance between blending cutting edge and hub r, and the blending edge point setting  $\alpha$ . The FN'on a blending sharp edge increments with the cutting edge setting point (3).

Zhang (2020) explore that The smaller the blade installation angle, the more evenly the pressure distribution on blade. This study can give a reference to the plan decision of the establishment point of the blending cutting edge of substantial blenders. The surface pressing factor disseminations of the blending component under the five edge establishment points were gotten. The greatest pressing factor is dispersed at the highest point of the pressing factor surface of the blending edge. The hypothetical most extreme line wear pace of the edges for the five cutting edge establishment points was examined, and the hypothetical life at five points was determined by the comparing transformation on the foundations of the scraped spot system of the blender and rough wear recipe. Moreover, the ideal establishment point and its reach were resolved (4).

### c) Size & Shape of Blade

Khidir(2018)studied that Centrifugal Blades is best from the Other ones for effectiveness . This paper manages the plan and investigation of an edge for concrete blender in a reason to track down a safe planned removable cutting edge for multi use concrete blender. It's a principle part of a blender which helps blending the elements of the concrete for better quality cement. For side cutting edges type the sharp edges pivots with drum however in Centrifugal Blades Type the edges turns straightforwardly. We utilize the edges a few times to track down the ideal edge shape for better blending, least disappointment, simpler to supplant and less expensive in value hence keeping away from change in the entire drum when the edge falls flat (5).

Valigi(2019) Studied that the mixer with total regime power with the T blades is 3.8% above than the case with the L shape which permit energy saving and enhanced production rates. In this paper, the mechanical conduct of substantial twin-shaft blenders is broke down as far as force utilization and traded powers between the combination and the blending organs during the blending cycle. The blending cycle is separated into two large scale stages, named transient and system stage, where the conduct of the combination is demonstrated in two distinct manners. A power assessment and force utilization expectation model are introduced for both the considered stages and they are approved by test crusades. From the use of this model to various machines and by changing diverse plan boundaries, the streamlining of the force utilization of the substantial twin-shaft blenders is examined. Aftereffects of this work can be utilized to expand efficiency and benefit of substantial blenders and diminish energy squander in the ventures which include blending measures (6).

Maria(2016) explores that improved geometry of mixing blades for planetary concrete mixers allowed lower wear rates and longer durability. Wear of machine segments is one of the fundamental marvels to control and restrict to improve the presentation and diminish the creation costs. In this paper, the enhancement of a planetary substantial blender as far as wear obstruction of sharp edges is proposed and another plan of the blending cutting edges' shape is appeared and examined. Test tests performed with two stars planetary substantial blenders are depicted and accomplished trial results are appeared. Those outcomes show the advancement of sharp edges' wear over the long haul and demonstrate that the proposed changed edge's calculation improves the wear opposition and broadens the valuable life (7).

#### **d) Material of Blade**

Samual(2018) studied that the by selecting stainless steel material as the blade material, there is increase of strength, corrosion. Concrete is utilized broadly for development reason. Thinking about the use of cement, automation of the interaction is needed to expand creation yield. This exploration work is centered around the plan of a minimal expense substantial blender machine. The machine was effectively designed. The productivity of a blender is dictated by the consistency of the substantial created. It could likewise be considered as being dictated by the force utilized in delivering a given amount of cement of the necessary consistency. Others boundaries like power, and force was sensible enough that the result delivered a minimal expense machine(8).

Torotwa(2018) explores that the impeller blade configuration affect the performance of a mixer. Design and activity of blending frameworks utilizing fomented vessels is a troublesome undertaking because of the test of acquiring precise data on impeller-prompted choppiness. The utilization of CFD can give point by point comprehension of such frameworks. In this examination, test tests and computational liquid elements reproductions were performed to look at the stream qualities of four impeller plans (anchor, saw-tooth, counter-stream and Rushton turbine), in accomplishing arrangement homogeneity. It was inferred that, through CFD investigation, itemized data can be gotten for ideal plan of blending contraption. These discoveries are important in picking the best blending hardware and gives a premise to increasing blending tasks in bigger frameworks (9).

### **III. EXISTING MACHINE BLADE MODEL**

Following figure shows the existing blade of concrete mixer machine.

there are 4 blades mounted on square shaft as shown in pictures. Blade is made up of M.S. material.

Length=36 cm

Height = 7 cm thickness= 1.5 cm



Figure: Blade assembly

#### IV. PROBLEM IDENTIFICATION

While working of concrete mixer , we found that mixture between Blades are not uniformly mixed in concrete mixture machine. Uneven concrete mixture affects on pipe manufacturing



Fig :- Mixture Between Blades Are Not Mixed In Concrete Mixture Machine

b) One side Blade get all load because all material forced on it & due to this Blade get break. Also chances of Gear breakage. When blade break , whole lines stop causes loss of production.

#### V. CONCLUSION

In Wainganga industries it is found that due to blade design of machine various problems occurs while making concrete mixture. Existing blade design does not uniformly mixes concrete mixture material hence decreasing efficiency of concrete machine. Also existing blade does not bear high stresses induced during mixing caused break of blade. The aim of this study is to redesign & modify the existing blade of machine to improve the performance of machine by studying & analyzing existing machine. Redesign of blade makes it more effective & strong .

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