REVIEW PAPER ON THE FAILURE ANALYSIS OF BUSH OF CANE CARRIER CHAIN

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Abstract- In Sugar Mill chains are used for carrying cane, bagasse etc. As these chains operate under various forces, failure of chain assembly is the major problem. Causes of these failures are wear, improper material selection, uncertainties in manufacturing, faulty manufacturing processes. Analyzing failures is a critical process in determining the physical root causes of problems. The process is complex, draws upon many different technical disciplines, and uses a variety of observation, inspection, and laboratory techniques. Properly performed, failure analysis and RCA are critical steps in the overall problem-solving process and are key ingredients for correcting and preventing failures, achieving higher levels of quality and reliability, and ultimately enhancing customer satisfaction.

Keywords-Cane carrier chain**,** bush**.**

I. INTRODUCTION

The background for this project is some observations made from the S.M. Industries, Kupwad and Vasantdada Shetakari Sahakari Sakhar Karkhana Ltd.,Sangali. Economy of state is dominated by agricultural as well as industrial sector. Sugar factories play important role in economy of state. The basic structure and components of cane carrier chain and the different types of fits assembled under working conditions is as shown in Figure1.

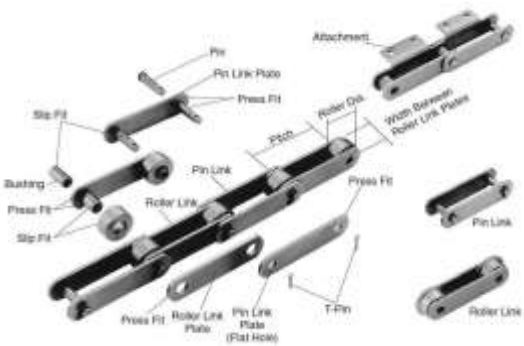

Figure 1: Basic Structure of Cane Carrier Chain

A typical conveyor chain is constructed with two different types of shackles: the roller link or inner link and the pin link or outer link, see Figure 1. The roller link consists of two steel bushings who are press-fitted inside the roller link plates, while the pin link consists out of two steel pins press-fitted inside the pin link plates. To prevent disengaging of plates and pins, riveted pins or t-pins are used. Chain bushing provide the bearing surface for pin rotation when articulating over a sprocket. They also provide the bearing surface for chain rollers or sprocket contact in rollerless chain.

Dimensions of bush vary according to design of conveyors but basic geometry of all bushes remain same. Figure 2 shows the basic geometry of bush.

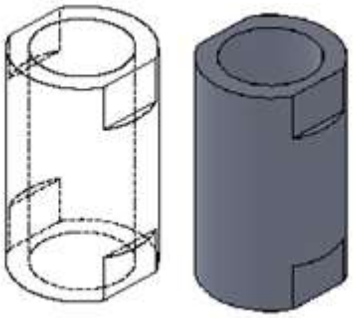

Figure 2: Basic Geometry of Bush

II. LITERATURE REVIEW

1.Dattatraya Lawate, Bhaskar D. Gaikwad [2]: carried out design calculations of cane carrier roller conveyor chain for calculating breaking load. For experimental work universal testing machine is used. Most of the time chain is under tension which causes elastic and plastic stresses which results into elongation of chain. Chain is the most important element of the industrial processes required for transmitting power and conveying of materials. As these chains operate under various forces, failure of chain assembly is the major problem. Causes of these failures are improper material selection, uncertainties in manufacturing.

2.Sumit Patil, Atul Patil, Prashant Gunjawate, Ganesh Rakate[4]: discussed the low cost automation technique for manufacturing of conveyor chain bushes. In this paper the following studies are carried out 1. Reduction in cycle time due to automation, 2. Increase in productivity both qualitative and quantitative, 3. Less human intervention, indirectly reduction in operator fatigue, 4. Less rejection due to automatic controls and 5. Increase the profit of company with economic justification of payback period.

3.Clive G. Wildsmith [3]: studied the chain principle in which reliability of chain performance, whether in transmitting power or in conveying loads, depends on a wide' variety of design, selection and application considerations is observed. Example of bagasse conveyor chain selection is given. In selecting the correct chain for a particular application, thought must be given equally to the load and the operating conditions,

with reliability the ultimate criterion. Otherwise, what may seem a low-cost answer initially will soon turn out to be the most expensive if production is continually interrupted by chain breakage.

III. PROBLEM STATEMENT

The outer diameter of the bush suffers wear from sliding against the roller inner diameter during roller rotation, while the bush inner diameter suffers wear from sliding against the outer diameter of the pin when the chain articulates. Thisbushing may fail due to wear, improper material selection which effects on the performance of the chain. The bushing is subject to shearing and bending stresses transmitted by the plate and roller, and also gets shock loads when the chain engages the sprocket.

Solution-

In such cases analysis is essential.A lot of work has been already done on many roller conveyor chain parts such as chain strip, pin. But there is no any much more work on the bush of roller conveyor chain. So the present work has been done on the various materials of bush of cane carrier chain.

Methodology-

1) To find out the root cause of the bush failure.
2) Determine the load on the bush and prepare engineering drawing of the bush by using the standard data provided by S.M. Industries, Kupwad and Vasantdada Shetakari Sahakari Sakhar Karkhana Ltd., Sangali.
3) To build a 3-D model of bush by using suitable CAD software.
4) To perform stress analysis by using suitable FEA software.
5) To carry out chemical analysis of the various materials of bush.
6) With the help of the experimental setup to determine stresses induced in thebush.
7) Measure the hardness of the bush.
8) Compare the result.

IV. REFERENCES

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