ANALYSIS OF BUSH OF CANE CARRIER CHAIN

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***Abstract*:** Roller conveyor chains are mostly preferred in production or assembly lines to transport goods as a material handling system. Roller chains have to deal with different environment conditions, chemicals. This causes wear and tear ofcomponents of chains and hence unexpected failure and costly production. In resent work I have studied the material EN 48, EN 353 and SS 304 of bush of roller conveyor chain under different loading conditions.

***Keywords*-** Cane carrier chain bush, analysis using Ansys, experimental analysis.

I. INTRODUCTION

Economy of state is dominated by agricultural as well as industrial sector. Sugar factories play important role in economyof state. About 60 percent processes in these factories are based on roller chain conveyers. Sugar plant is designed to operate with the minimum disruption during the sugar cane harvesting season, and equipment must be maintained in a high standard of repair. When failure of equipment does take place, it is important to identify the cause to minimize the likelihood of any future problems. Main components of roller conveyor chain are pin, link plate (strip), bushing and roller.The bush is a strength-bearing part, receiving tension fromthe chain during sprocket engagement, but its major role is as a bearing part. 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. Bush inner diameter wear is directly expressible as pitch elongation. 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 /traction wheel contact in roller less chain.

II.ANALYSIS USING ANSYS

The bush is first modeled in CATIA V-5 and then exported to ANSYS where it is further meshed, constrained and loaded and simulated further.

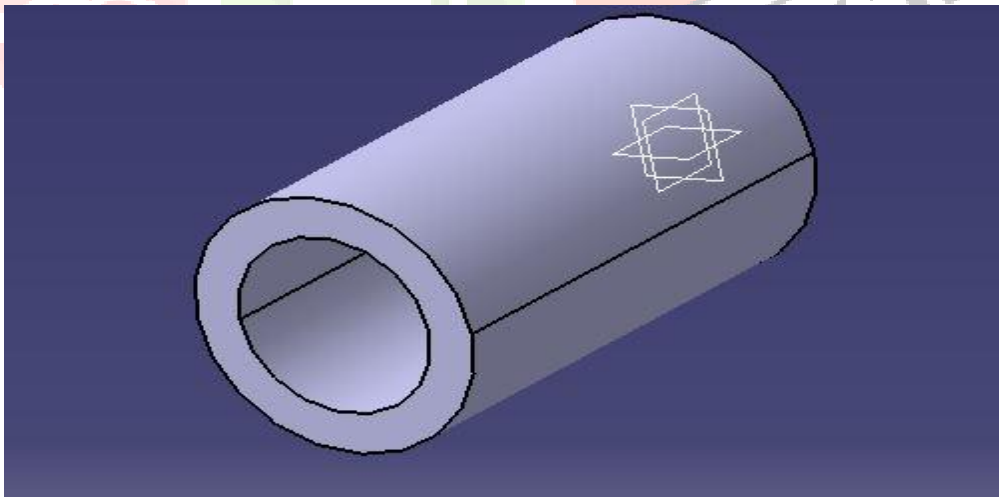

Figure 1: Bush dimensions (58mm x 32mm x 5mm)

First the finite element analysis of original material i.e. En 36 of bush has been carried out. As far as boundary conditions are concerned, total 11679 N static load is applied in negative Y at middle of bush. Figure 2 shows stresses in EN 36 bush and Figure 3 shows strain in EN 36 bush.

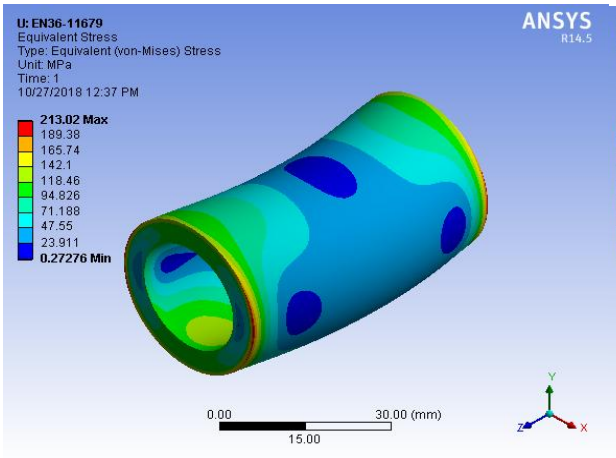

Figure 2: Stresses in EN 36 bush

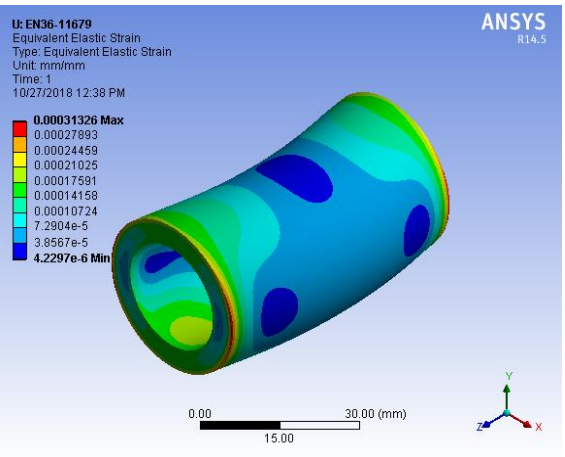

Figure 3: Strain in EN 36 bush

Static analysis is performed on the bush of material EN 48, EN 353 and SS 304.

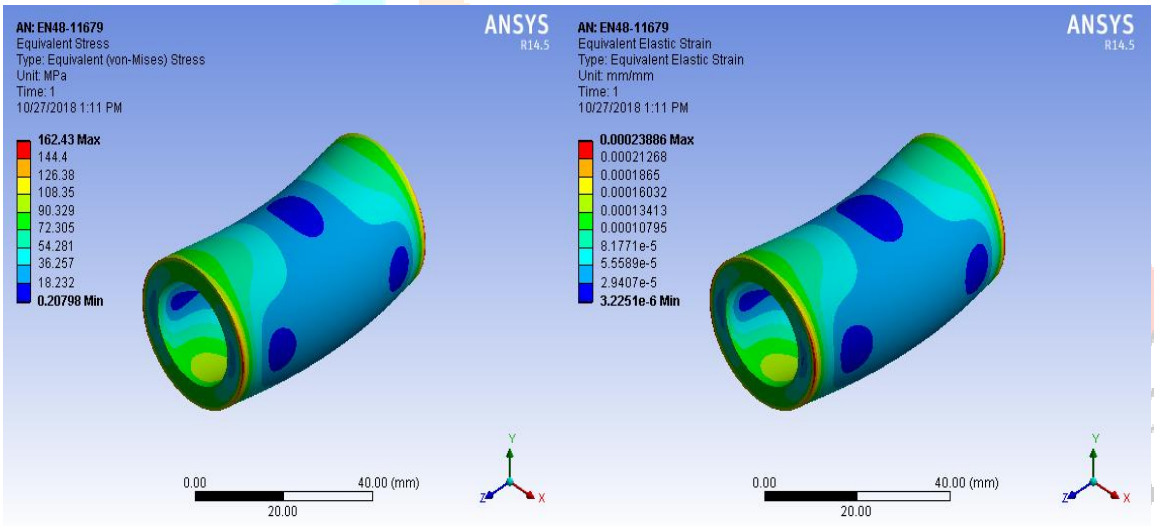

Figure 4: Stresses in EN 48 bush

Figure 5: Strain in EN 48 bush

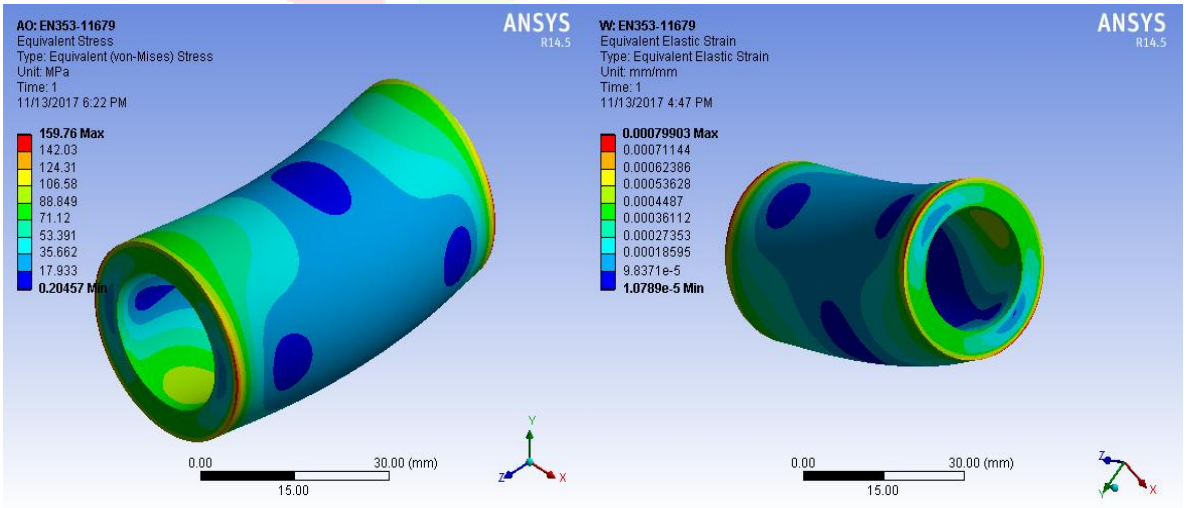

Figure 6: Stresses in EN 353 bush

Figure 7: Strain in EN 353 bush

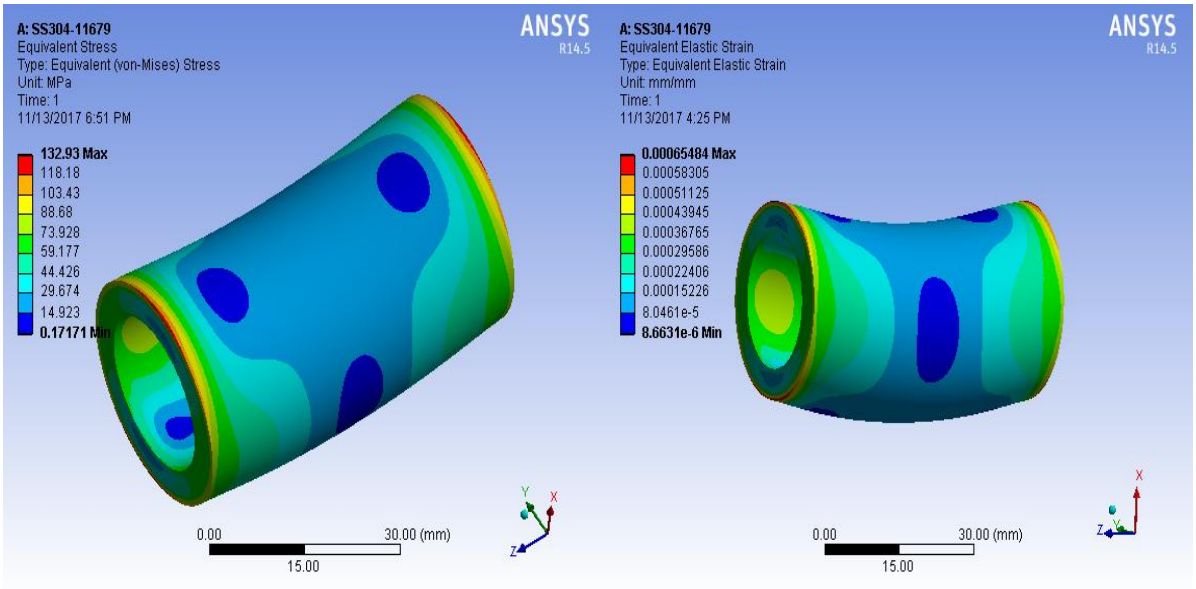

Figure 8: Stresses in SS 304 bush **Figure 9: Strain in SS 304 bush**

MATERIAL	STRESS	STRAIN
EN 36	213.02	0.00031326
EN48	162.43	0.00023886
EN353	159.76	0.00079903
SS304	132.93	0.00065484

Table 1: Stress and Strain in material

III. EXPERIMENTAL ANALYSIS

For Experimental testing of bush of dimensions 58mm x 32mm x 5mm of EN 48, EN353 and SS 304 materials were taken to study the working stress of the bush. For this testing we are using a Universal Testing Machine of 10tonne capacity. The Experimental test setup for this experiment is shown in Figure 10.

Figure 10: Testing of bush

As shown in above Figure 10 the bush was clamped on the Universal Testing Machine with the help of fixture. The load was given by the application of the hydraulic pressure.

MATERIAL	ANSYS STRESS	PRACTICAL STRESS
EN 36	213.02	230
EN48	162.43	178
EN353	159.76	165
SS304	132.93	148

Table 2: Ansys and Practical Stress

IV. CONCLUSION

From experimental andansys study of material EN 48, EN 353 and SS 304 of bush of cane carrier chain under different loading conditions I conclude that EN 48,EN 353and SS304 materials bush can work for long time and reduce unexpected failure and maintains cost in same working as compare to EN36.

V. REFERENCES

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