



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com



Fabrication of Slip Measurement Apparatus in Belt Drive

Asmit Ghogale¹, Santosh Jadhav², Anant Sail³, Siddesh Kanekar⁴,

Head of Mechanical Department: Abhishek Rane⁵

U.G. Student, Department of Mechanical Engineering, Yashwantrao Bhonsale Polytechnic, Sawantwadi,

Maharashtra, India¹

Associate Professor, Department of Mechanical Engineering, Yashwantrao Bhonsale Polytechnic, Sawantwadi,

Maharashtra, India²

ABSTRACT: The presented paper provides the alternative options for determining the condition of belt gear based on the testing and monitoring. In order to carry out experimental measurements, a newly developed device for testing, monitoring and diagnostics of belt drives was designed, as well as the possibility of determination of limit states by extreme loads. The designed measuring stand allows to determine the point of destruction of the belt for an extreme load. The main objective of the experimental measurement was to determine the slip of the wedge-shaped belt. The slip was evaluated by the coefficient of belt creeping and the specific belt slip by means of the measuring stand. The measurements on the proposed device can be made when the input speed from the electric motor and the transmitted torque of the belt gear are constant while the tensioning force of the belt drive is changing or the measurements can be made when the tensioning force and input speed of the belt drive are constant and the torsional moment changes. The monitoring of specified parameters for determining the belt gear slip is made by means of sensors located at predetermined locations from which data is processed by a PC. In the paper, the analytical calculation is processed, from which the values are compared with the values measured on the proposed device.

KEYWORDS: Slip, belt, pulley

I. INTRODUCTION

This apparatus is useful for measurement of power transmitted for various input power conditions with varied belt tension. Belt slip measured. The apparatus consists of a variable speed motor, driving pulley and driven pulley of equal diameters. The pulleys are mounted on input shaft (motor shaft) and output shaft. The driven pulley can slide on the base only with bearing block to change the initial tension in belt. Brake drum is mounted on the output shaft, which helps to measure power output. The motor speed is varied by variable speed drive. A double channel digital speed indicator indicates driving and driven pulley speeds. With the help of Stroboscope (optional) it is possible to demonstrate the slip of belt on driving and driven pulley.

II. LITERATURE REVIEW

Jozef Mascenik: The presented paper provides the alternative options for determining the condition of belt gear based on the testing and monitoring. In order to carry out experimental measurements, a newly developed device for testing, monitoring and diagnostics of belt drives was designed, as well as the possibility of determination of limit states by extreme loads. The designed measuring stand allows to determine the point of destruction of the belt for an extreme load. The main objective of the experimental measurement was to determine the slip of the wedge-shaped belt. The slip was evaluated by the coefficient of belt creeping and the specific belt slip by means of the measuring stand. The measurements on the proposed device can be made when the input speed from the electric motor and the transmitted torque of the belt gear are constant while the tensioning force of the belt drive is changing or the measurements can be made when the tensioning force and input speed of the belt drive are constant and the torsional moment changes. The monitoring of specified parameters for determining the belt gear slip is made by means of sensors located at

predetermined locations from which data is processed by a PC. In the paper, the analytical calculation is processed, from which the values are compared with the values measured on the proposed device.

Lionel Manin :Serpentine belt drives are often used in front end accessory drive of automotive engine. The accessories resistant torques are getting higher within new technological innovations as starter-alternator, and belt transmissions are always asked for higher capacity. Two kind of tensioners are used to maintain minimum tension that insure power transmission and minimize slip: dry friction or hydraulic tensioners. An experimental device and a specific transmission error measurement method have been used to evaluate the performances of a generic transmission by determining the pulley–belt slip for these two kinds of tensioner. Transmission error between pulleys, pulley/belt slip are deduced from pulley rotation angle measurements. Results obtained show that: the use of tensioner limits belt slip on pulleys, pulley–belt slip is reachable from transmission error measurement, and belt non uniform characteristics are responsible of low frequency modulations of transmission error.

Christian Berger:To investigate and optimize the operational behaviour of automobile belt drives, it is important to detect unfavourable operating conditions, such as excessive slippage. To measure slippage, the speed of the belt is compared to the peripheral velocities of pulleys in the belt drive. The velocity of the belt is obtained by a contactless optical sensor, whose signals are processed employing correlation techniques. The paper proposes adequate designs of the optical as well as of the signal processing components of the system to ensure high accuracy of the measured values.

III. METHODOLOGY

1. Lab survey
2. Litere Survey
3. Conceptual Design
4. Power Calculation Slip Analysis
5. Final Component
6. Manufacturing Component
7. Manufacturing Component
8. Assembly
9. Trial Testing

IV. WORKING PRINCIPLE

To measure co-efficient of friction between pulley material and different belt materials. To measure power transmitted with varied belt tension. To measure percentage slip at fixed belt tension by varying load on the brake drum and plot the graph of (T_1-T_2) v/s percentage slip i.e. “Slip Characteristics”. To measure belt slip speed and observe the limiting value of load at constant speed when the slip just starts.

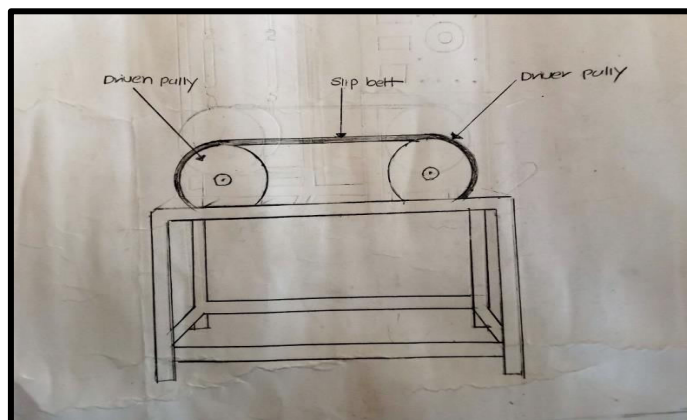


Fig. 1 Conceptual design



|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204294 |

V. CONCLUSION

This study has presented an original way to determine pulley–belt slip from the transmission error measurement in a serpentine belt drive. The measurement process is based on the use of optical encoders, its application to a non synchronous transmissions is novel. The transmission error in such system can be decomposed in two components: The pulley–belt-slip observed in the studied multi ribbed belt serpentine drive is shown to be largely influenced by the presence of a tensioner that reduces it, it also increases with the transmitted torque. Large differences have been observed experimentally between the used of a tensioner instead of an idler. No significant difference is observed between the uses of dry friction or hydraulic tensioners regarding the slip rate.

REFERENCES

1. AASHTO (2012), AASHTO LRFD Bridge Design Specifications, 6th Edition, Washington, DC.
2. RCSC (2009), Specification for Structural Joints Using High-Strength Bolts—2009 Edition, Chicago, IL.
3. SSPC (2004), Surface Preparation Specification No. 1, Solvent Cleaning (SSPC-SP 1), Pittsburgh, PA.
4. SSPC (2007), Joint Surface Preparation Standard—SSPC-SP 5/NACE No. 1—White Metal Blast Cleaning, Pittsburgh, PA.
5. SSPC (2004), Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning—SSPC-VIS 1, Pittsburgh, PA.
6. ASTM International (2011), ASTM D4417-11— Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel, West Conshohocken, PA.
7. SSPC (2003), SSPC-CS 23.00/AWS C2.23M/NACE No. 12 Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminium, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel, Pittsburgh, PA.
8. ASTM International (2011), ASTM Standard D4541-09e1—Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers, West Conshohocken, PA.



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.423



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

9940 572 462 **6381 907 438** **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details