Leibniz
Universität Hannover

Institute of Transport
and Automation Technology
Prof. Dr.-Ing. Ludger Overmeyer

Contact details:
Dipl.-Ing. Stephan von Daacke
Phone: +49 (0)511 762 18161
Fax: +49 (0)511 762 4007
e-mail: stephan.vondaacke@ita.uni-hannover.de

Produktionstechnisches Zentrum
An der Universität 2, 30823 Garbsen
Tel.: +49 (0)511 762 3524
www.ita.uni-hannover.de

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Report for the

Measurement of the indentation rolling resistance on a conveyor belt sample

Client: SHENYANG TAIFENG RUBBER BELT CO., LTD
Order No. 839a/14 [3]

Test period:
April 2015

Content

1 Introduction

By order of SHENYANG TAIFENG RUBBER BELT CO., LTD, the Institute of Transport and Automation Technology (ITA) took measurements of the indentation rolling resistance of one conveyor belt sample ST 3600. The width of the tested conveyor belt is 400 mm and the inner circumference 10.400 mm.

2 Test Rig

The measurement of the indentation rolling resistance was carried out according to the established test method where the conveyor belt is applied to the test rig with the cover to be tested turned upside down according to figure 1.

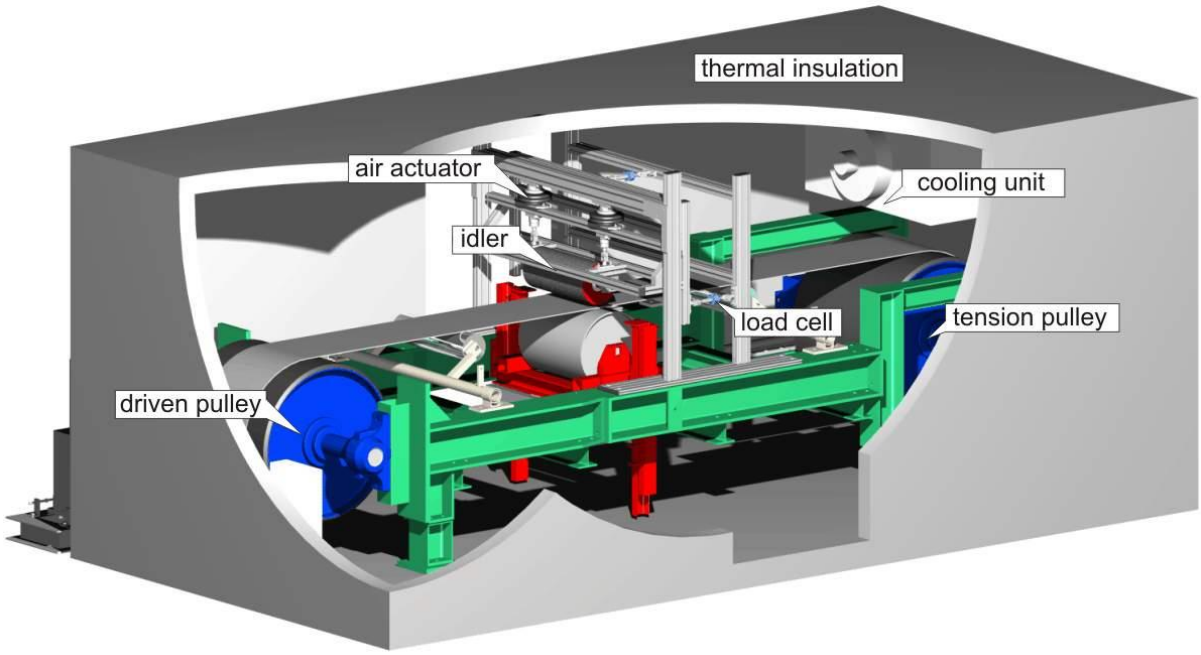

Figure 1: Test rig for measurement of the indentation rolling resistance at the ITA

For the measurement a centrically positioned idler is pressed by two pneumatic cylinders onto the belt below with a defined force. For determination of the indentation rolling resistance, the force acting in a horizontal direction on the idler and therefore on the frame of the test rig is measured by means of three force transducers. To separate the actual indentation rolling resistance from the horizontal force measured, the part of the horizontal force caused by the idler running in a horizontal direction must be subtracted. For this reason, the idler is supported on both sides by torsion transducers that measure the idler running resistance. The test rig is set up in a thermally insulated housing to enable adjustment of the ambient temperature in the range from -50 °C to 60 °C by means of a refrigerating set or two heaters.

3 Test parameters

Tested conveyor belt:

Table 1 - Conveyor belt details

Number	Circumference [mm]	Width [mm]	Belt design
1	10400 (+50, -0)	400	ST 3600

The measurement of the indentation rolling resistance was taken, in agreement with the client, with the following test parameters:

Belt speed: 1,0 m/s
Width related load: 5 kN/m, 10 kN/m, 15 kN/m, 20 kN/m
Temperature: -20 °C, -10 °C, 0 °C, 10 °C, 20 °C, 40 °C
Idler diameter: 219 mm

4 Test results

The following table 2 shows the influence of the load and the temperature on the width related indentation rolling resistance of the conveyor belt. The measurements were taken at a speed of 1,0 m/s and by an idler with a diameter of 219 mm.

Table 2 - Width related indentation rolling resistance over variation of width related load and temperature

Test parameters			STRB
Measurement-No.:	Temperature	width related load	width related indentation rolling resistance
021	40,0 °C	5 kN/m	32,4 N/m
022	40,0 °C	10 kN/m	102,4 N/m
023	40,0 °C	15 kN/m	191,3 N/m
024	40,0 °C	20 kN/m	315,9 N/m
001	20,0 °C	5 kN/m	30,6 N/m
002	20,0 °C	10 kN/m	102,5 N/m
003	20,0 °C	15 kN/m	190,0 N/m
004	20,0 °C	20 kN/m	302,6 N/m
005	10,0 °C	5 kN/m	32,0 N/m
006	10,0 °C	10 kN/m	101,9 N/m
007	10,0 °C	15 kN/m	196,0 N/m
008	10,0 °C	20 kN/m	304,4 N/m
009	0,0 °C	5 kN/m	37,3 N/m
010	0,0 °C	10 kN/m	115,8 N/m
011	0,0 °C	15 kN/m	209,2 N/m
012	0,0 °C	20 kN/m	317,5 N/m

Test parameters			STRB
Measurement-No.:	Temperature	width related load	width related indentation rolling resistance
013	-10,0 °C	5 kN/m	48,6 N/m
014	-10,0 °C	10 kN/m	127,8 N/m
015	-10,0 °C	15 kN/m	229,2 N/m
016	-10,0 °C	20 kN/m	355,5 N/m
017	-20,0 °C	5 kN/m	57,0 N/m
018	-20,0 °C	10 kN/m	155,8 N/m
019	-20,0 °C	15 kN/m	273,5 N/m
020	-20,0 °C	20 kN/m	397,8 N/m

Figure 2 shows the influence of the temperature and the load on the indentation rolling resistance with tested parameters according to table 2.

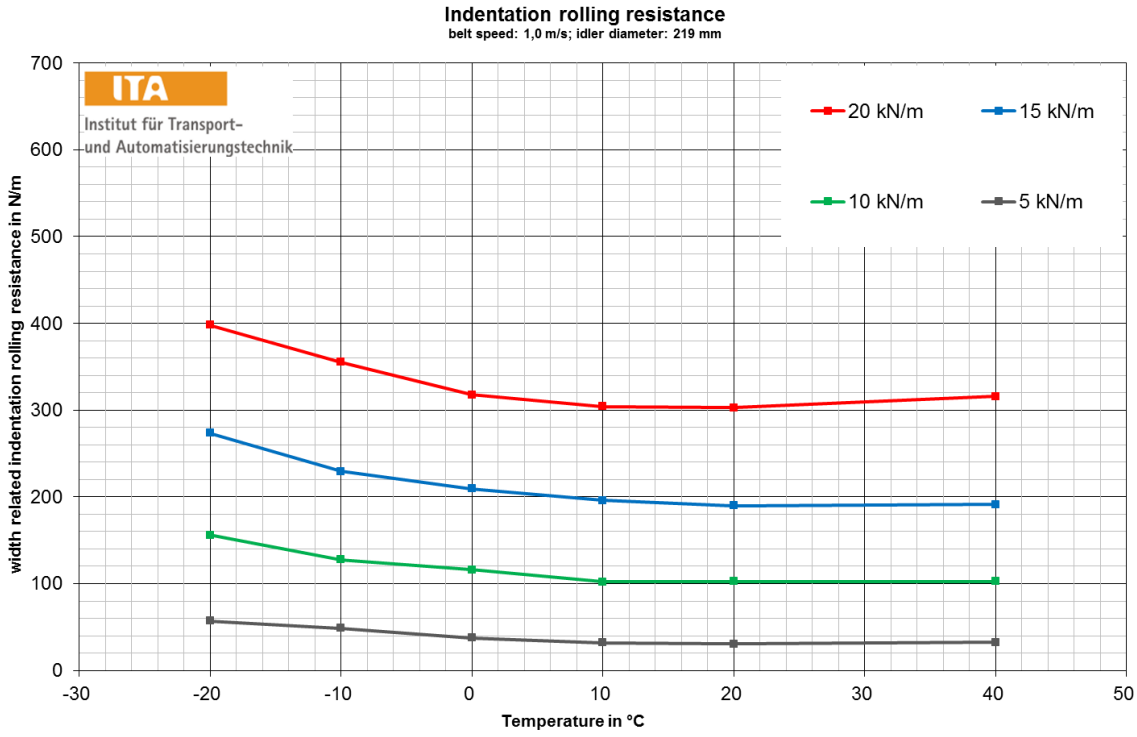

Figure 2: Results for the width related indentation rolling resistance of the tested conveyor belt sample

5 Summary

By order of SHENYANG TAIFENG RUBBER BELT CO., LTD, the Institute of Transport and Automation Technology (ITA) took measurements of the indentation rolling resistance of one conveyor belt sample ST 3600. The width of the tested conveyor belt is 400 mm and the inner circumference 10.400 mm.
The results for the indentation rolling resistance, measured under the indicated conditions, show known dependences. In the examined parameter range the influence of load is clearly larger than the influence of the temperature.

Dr. A. Stock

Dipl.-Ing. S. von Daacke