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Report No. 0303-06603

BALANCE TEST OF SHEAVES

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June 23, 2003

I. DESCRIPTION AND PURPOSE

Twenty-eight sheaves were received for testing. There were six sheave suppliers including Masterdrive, Browning, Maska, Dodge, TB Woods and Maurey. It was requested to determine the radial and side to side run out, and the imbalance of each sheave. This project is part of a larger program in which the strength and corrosion resistance of the sheave also will be evaluated. That work will be reported separately.

II. TEST PROCEDURE

A. Run Out

A Grade 1070 Steel high precision shaft was mounted onto pillow blocks. The pillow blocks were bolted to a one-inch thick steel plate as shown in Figure 1. The sheaves were individually mounted onto the shaft and the set screw was lightly tightened to the shaft. In cases where the bore size was larger than the shaft diameter, a sleeve was used with the shaft. In cases where a sheave did not have a key way or precision surface, the TB Woods 1-7/16 inch spacer was bolted onto the sheave.

The amount of deflection from side to side and the change in radius for a 360° rotation was recorded and defined as the run out. For the measurements, a dial indicator with an accuracy of +/-0.001 inch was placed against the sheave. It was aligned parallel with the axis of the shaft to measure side to side run out as shown in Figure 1. It was placed perpendicular to the shaft to measure radial run out as shown in Figure 2.

B. Imbalance Measurements

The sheaves were dynamically measured for imbalance at Industrial Balancing. The location and magnitude of the imbalance and the test velocity were recorded and included as Table 1. Industrial Balancing marked the angular location of the imbalance onto the sheaves as shown in Figures 3 to 9 and also determined the radial location of the imbalance and measured it from the center of the sheaves. It was measured as shown in Figure 3.

III. TEST RESULTS

A Maska, 7/8 inch bore size sheave, had the least amount of run out with a side to side and radial run out of 0.002 inches. A Maurey, 5/8 inch bore, sheave had the least amount of imbalance, 0.011 ounces. The sheave with the most run out was supplied by Dodge with a 1-7/16 inch bore. The side to side run out is 0.020” and the radial run is .007”. It also had the largest off balance of 1.690 ounces.

If you have any questions concerning the contents of this report, please contact me. It should be noted that it is our policy to retain components and sample remnants for a minimum of 30 days from June 23, 2003, after which time they may be discarded. If you would like to make alternate arrangements for disposition of the material, please let me know.

Respectfully submitted,

Electronic Document.
Original Contains Signature.

Anna Mayhew-Rozek
Mechanical Engineer

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Table 1

Summary of Measurements of Sheaves

Sample No.	Sheave Supplier	Bore Size, inch	Side to Side Run out, inch	Radial Run out, inch	Imbalance Data			
					Angular Location of Imbalance Measured from Key way, degrees	Radius Off Balance, inch	Force Off Balance, oz.	Test Velocity, rpm
1	Master Drive	3/4	0.005	0.004	200	4.3	0.052	705
2		7/8	0.004	0.006	180	2.3	0.072	696
3		7/8	0.005	0.005	8	2.3	0.080	697
4		1-3/8	0.002	0.004	148	2.3	0.204	703
5		1-3/8	0.005	0.003	4	2.3	0.132	702
6		1-3/16	0.008	0.004	15	3.7	0.605	706
7		1-3/16	0.003	0.003	12	3.7	0.676	705
8		1-7/16	0.005	0.004	8	4.2	0.708	705
9		1-7/16	0.003	0.005	0	4.2	0.561	706
10	Browning	7/8	0.004	0.003	170	2.3	0.357	702
11		1-3/16	0.005	0.004	95	3.8	0.508	704
12		1-3/8	0.005	0.004	130	2.3	0.090	701
13		1-7/16	0.012	0.005	136	3.2	0.205	705
30		1-3/8	0.010	0.006	30	4.3	0.504	705
14	Maska	7/8	0.002	0.002	0	2.0	0.046	702
15		1	0.008	0.007	235	4.7	0.252	702
16		1	0.005	0.007	85	3.7	1.540	702
17		1-3/8	0.003	0.003	10	2.3	0.341	702
19	Dodge	1-3/8	0.008	0.003	282	2.3	0.811	705
20		1-7/16*	0.020	0.007	80	4.6	1.690	704
21		1-7/16*	0.010	0.006	355	3.3	1.120	705
22	TB Woods	7/8	0.008	0.005	0	1.7	0.026	703
23		1-3/8	0.012	0.003	50	2.4	0.306	704
24		1-7/16*	0.004	0.005	350	3.2	0.099	705
25		1-7/16*	0.005	0.004	235	4.6	0.709	705
26	Maurey	5/8	0.004	0.002	30	1.7	0.011	706
27		1-3/8	0.015	0.003	90	2.2	0.351	703
29		1-7/16*	0.010	0.004	330	3.5	0.509	705

*** TB Woods 1-7/16 inch Spacer Was Used**

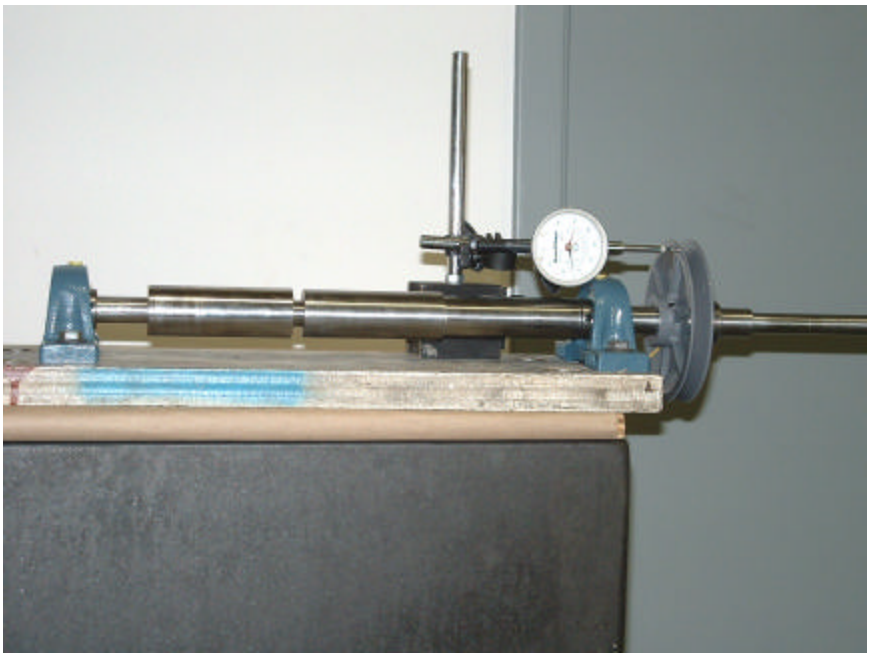

Fig. 1 - The high precision shaft and pillow blocks were mounted onto a steel plate. The dial indicator is set up to measure side to side run out.

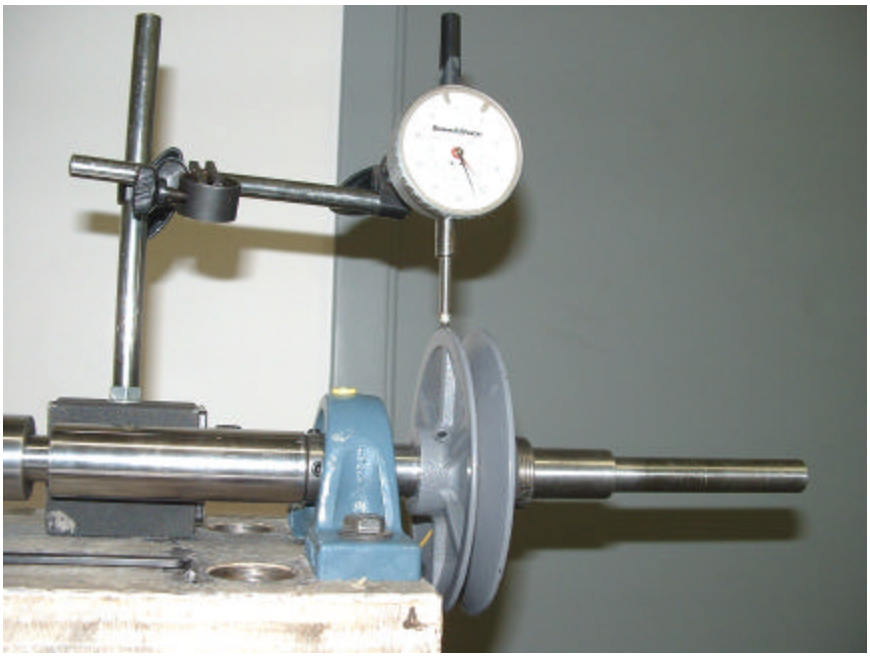

Fig. 2 - The dial indicator is set up to measure radial run out.

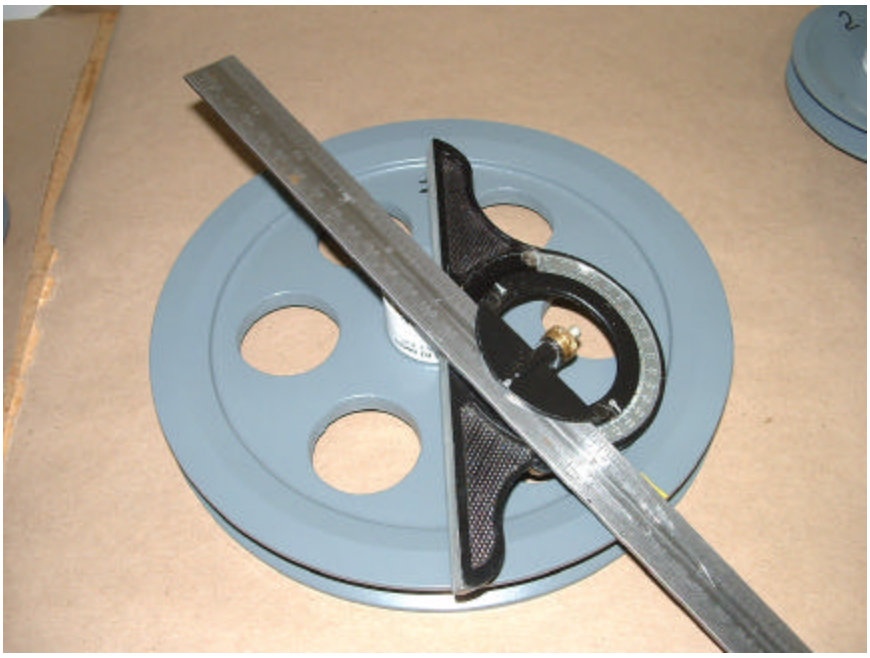

Fig. 3 - The angle of the marking with respect to the key way axis was measured.

Fig. 4 - The Masterdrive sheaves are shown.

Fig. 5 - The Browning sheaves are shown.

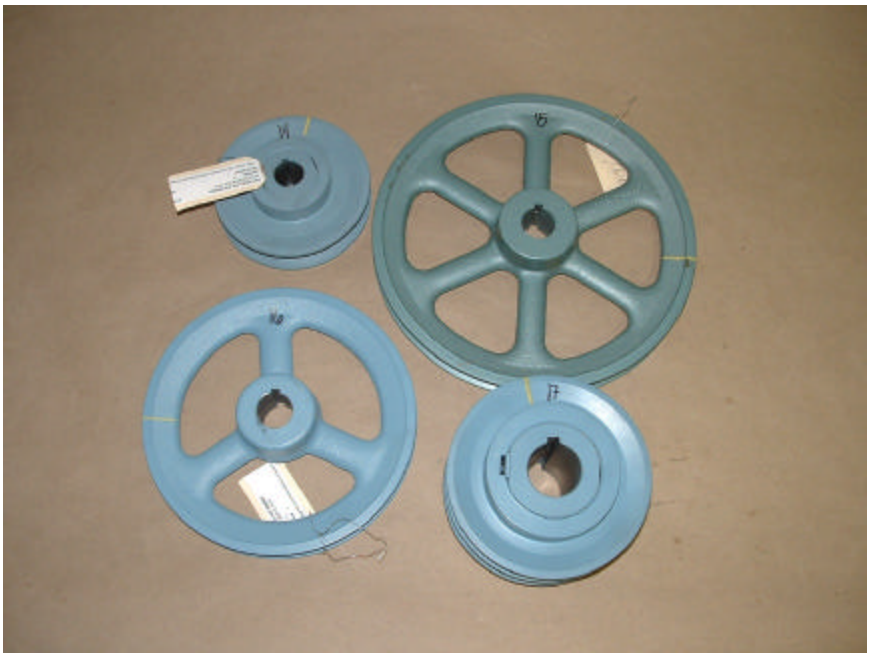

Fig. 6 - The Maska sheaves are shown.

Fig. 7 - The Dodge sheaves are shown.

Fig. 8 - The TB Woods sheaves are shown.

Fig. 9 - The Maurey sheaves are shown.