REPORT OF TEST

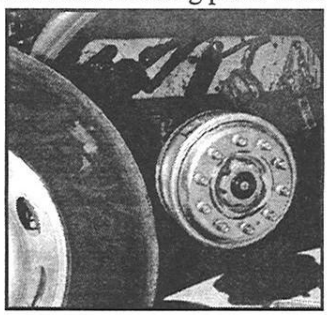
SPEED MEASUREMENT LABORATORIES, Inc.
Radar, Laser, Speed Analysis

Report Number: SML98-CBH-17
Project: Field Evaluation of Heat Dissipation of Centramatic Continuous Wheel Balancers
Measurement Equipment: Wahl Laser Sighted Infrared Thermometer, model DHS-100XL, Weis Contact Thermometer, model WC-42B
Location: Interstate 35 mile markers #34-#48, Burleson, TX
Test Dates Data Gathering and Compilation: 27-28 July 98
Conditions: Clear, High Temperature 104° F, from 13:00 hrs to 18:00 hrs, Road Conditions Dry
Report Date: 29 August 98

Speed Measurement Laboratories, Inc. (SML) was contracted by Centramatic Continuous Wheel Balancers of Fort Worth, TX 76102, 1300 E. Belknap Street, 800/523-8473, 817/332-3636 to evaluate the heat dissipation values of their behind-the-wheel mounted continuous wheel balancers. C.A.R. Transport, a large national car transporter, agreed to provide one of their empty car haulers for the field evaluation.

PRODUCT

The Centramatic Continuous Wheel Balancer consists of a 20 gauge steel galvanized mounting plate with an aluminum balancing tube attached. Shot sized balancing weights are inserted into the balancing tube lubricated by a synthetic molly oil. The balancer mounts behind the wheel and centrifugal force redistributes the balancing weights opposite of out of balance points as the wheel rotates. The Company claims the dissimilar metallic composition of the balancer, i.e. steel mounting plate and aluminum balancing ring, dissipates wheel/tire heating while in operation. This feature is called "ThermoFlow" by the Company. Basic rules of thermal physics apply as different metals have different coefficients of contraction / expansion with convection heat transfer migrating to the metallic content with the highest coefficient of expansion / contraction, i.e. rapid transfer from the wheel/ hub / tire assembly to the steel mounting plate to the aluminum tube.



The Company has been manufacturing the balancers for approximately fourteen years concentrating on the heavy duty trucking market and RV vehicle applications with over 400,000 sets on the road, according to the Company. A set of front balancers for 22.5" wheels and a set of rear balancers for 22.5" wheels were provided to SML for field evaluation.

MEASUREMENT TECHNIQUES

A KW tractor, i.e. Kenworth, and car hauler trailer was provided by C.A.R. Transport with driver to SML for field testing. The test course was a flat, straight stretch of I-35 measuring twelve miles. The driver was given instructions to maintain a constant speed of 60 MPH with little or no breaking. SML staff and the driver were in commercial radio communication. The test vehicle ran the course three (3) times without Centramatic balancers. Upon arrival at the evaluation station, both infrared and contact temperature measurements were made within thirty (30) seconds of the test vehicle coming to a complete stop. The right front steer wheel assembly was marked with an "X" as well as the rear drive axle wheel to

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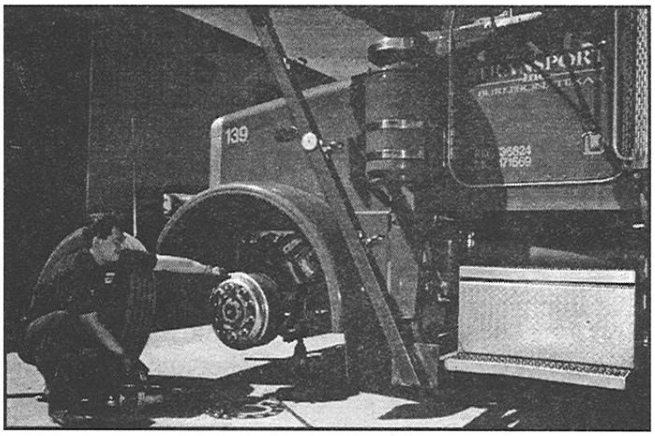
insure consistent heat measurement locations. Infrared measurements were made at a constant distance of twelve inches (12"). Outside ambient temperature was monitored continually. After baseline measurements were made without the Centramatic balancers, balancers were then installed behind the evaluation wheels. The test vehicle then replicated the three runs on the test course with temperature measurements being made in the exact manner as when the vehicle did not have the balancers installed. Before commencing each run, ample time was taken allowing wheel/tire heat to return to baseline temperatures.

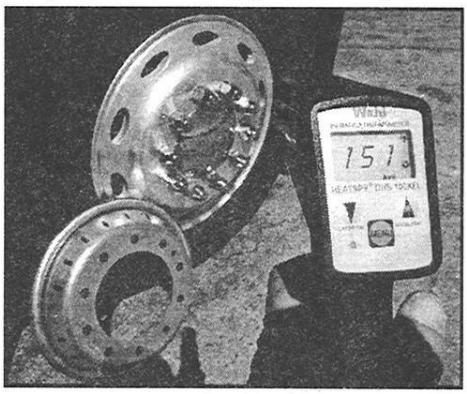


RESULTS

Run #	No Balancer Front Temp °F	With Balancer Front Temp °F	Temperature Difference Temp °F	%Difference
#1	153 °F	139 °F	14 °F	10%
#2	151 °F	134 °F	17 °F	11%
#3	154 °F	138 °F	16 °F	10%
	No Balancer Rear Temp °F	**With Balancer Rear Temp °F**	**Temperature Difference Temp °F**	**%Difference**
#1	142 °F	131 °F	11 °F	8%
#2	143 °F	133 °F	10 °F	7%
#3	146 °F	132 °F	14 °F	9%

CONCLUSIONS

The Centramatic balancers consistently reduced wheel/tire heating on average 10% for the front steer application and on average 8% for the rear drive application over the test period. The assumption of improved heat dissipation via the different metallic coefficients of expansion and contraction of the balancer's steel and aluminum content is substantiated as heat migrated from the wheel/hub/tire assembly through the balancer's steel mounting plate to the alumimum balancing tube rapidly. This rapid heat migration transfer is due to aluminum's relative high coefficient of expansion and contraction compared to steel. Observed and reported temperature reductions may vary with extreme breaking conditions, less than ideal road conditions, or condition of tires.



ATTESTED TO:

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