

FILE NAME: Abex (ABX)

DATE: 1962 Jan

DOC#: ABX324

DOCUMENT DESCRIPTION: Popular Mechanics Article on New Metallic Brake Linings by SK Wellman Co.

AUTO ISSUE

JAN. 1962
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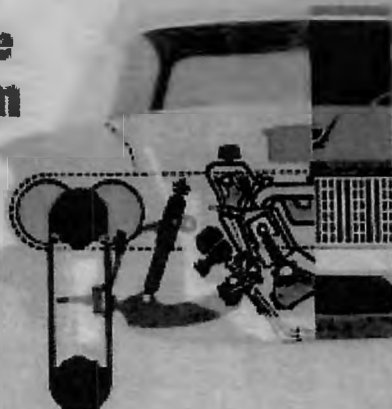
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Published by Popular Mechanics Company, RICHARD E. BERLIN, President

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Published monthly by Popular Mechanics Company, 200 E. Ontario St., Chicago 11, Ill. Richard E. Berlin, President; Richard L. Giers, Executive Vice-President; Fred Lewis, Vice-President and General Manager; Robert J. MacLeod, Vice-President; John H. Miller, Vice-President; Joseph R. Bush, Jr., Vice-President; R. W. Markham, Treasurer; L. F. McCutley, Secretary. Single copy in the United States and Canada, 35 cents; subscription rates in the United States and possessions, 1 year \$3.50; 2 years \$6.00; 3 years \$8.00. In Canada, and 50 cents per year, in countries of the Pan-American Postal Union, 1 year \$4.50; 2 years \$8.00; 3 years \$11.00. In all other countries 1 year \$5.50; 2 years \$10.00; 3 years \$14.00. If you plan to move, notify us at least 30 days in advance of your move with our name on label. Give both your old and new addresses. Second-class postage paid at Chicago, Illinois, and at additional mailing offices. Authorized as second-class mail, Post Office Department, Ottawa, Registered as second-class matter at the Post Office at Mexico, D.F., Mexico, June 20, 1960. © 1961 by Popular Mechanics Company. All rights reserved. Printed in the United States of America.

Metal Brake-Lining Test-page 117

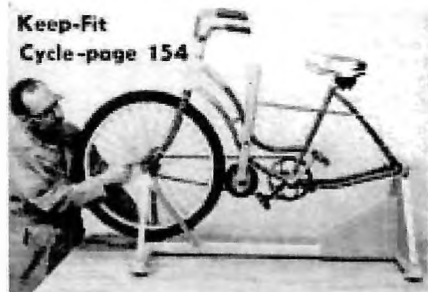


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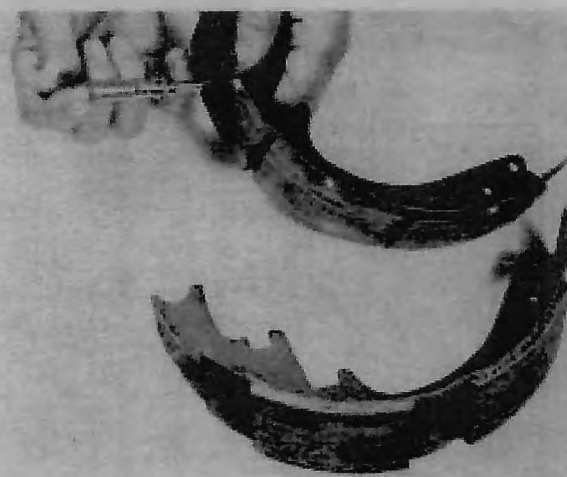
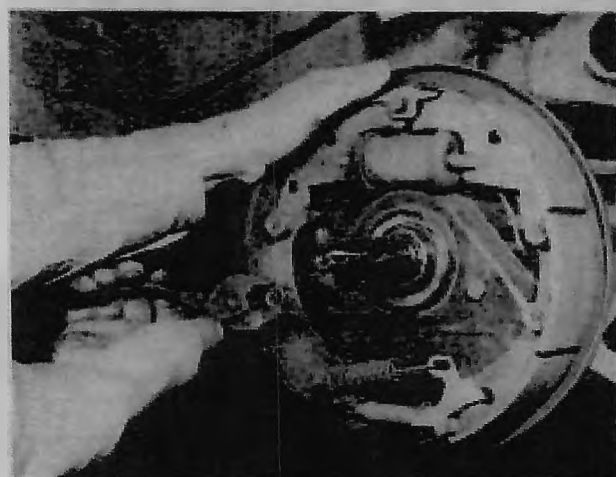




HIGH-SPEED STOPS showed sintered metallic linings nearly twice as fade-resistant as asbestos linings.

VELVETOUCH metallic linings are bonded to shoes in separate segments; brakes are otherwise unchanged.

METALLIC LINING wear after tests was .003 inch, which means an expected life of about 25,000 miles.



Those New Metallic Brake Linings —

How good—or bad? PM makes its own exclusive tests for you

RECENTLY A Bedford, Ohio firm began marketing a new type of brake lining called Velvetouch Metallic.

The new lining is made of sintered iron powder and graphitic carbon, along with other "inorganic friction-modifying additives," according to the manufacturer, the S. K. Wellman Co.

Molded to brake shoes, these linings are sold in sizes to fit all popular passenger cars, including imports. The primary shoes have two bonded segments; the secondary shoes have three bonded segments.

In general, these linings are similar to the metallic linings offered as a regular production option on Chevrolet's Corvette and the hot new sports Impala.

The Wellman Company makes six major claims for their Velvetouch linings, which,

if true would make them a desirable replacement for conventional asbestos composition linings.

Here are their major claims: (1) no high-speed fade; (2) no heat fade; (3) no down-hill fade; (4) no water fade; (5) no squeak or squeal; and (6) superior life.

A modern miracle? Perhaps not, but certainly a genuinely worthwhile improvement in driving safety if the claims are true.

In order to prove (or disprove) these claims PM ran a set of Velvetouch linings through a grueling series of tests to determine if the brakes (and the claims) would fade.

Most of us know brake fade as the loss of braking action experienced after we use our brakes rapidly and repeatedly in steep



WET-BRAKE-STOPPING power test was made by driving car into nearby lake to soak the drum and linings

mountain driving, or try to use them after running through water. Technically, brake fade is the reduction of the coefficient of friction between lining and drum caused by heat or introduction of an antifriction agent or lubricant, such as water.

Fade is measured by recording the pedal pressure necessary to apply the linings to the drums with sufficient force to obtain a deceleration rate of 0.2 Gs recorded on a Tapley accelerometer. A rise in pressure would indicate a positive loss of stopping effectiveness of the linings.

PM comparison tests were run on a 1960 Ford Fairlane sedan (V8, automatic transmission) with unassisted brakes in three series: (1) with Velvetouch Metalik linings; (2) with the standard asbestos linings on the car, which had been driven approximately 12,000 miles; and (3) with a new set of replacement asbestos linings obtained from a Ford dealer.

The linings were purchased to fit standard drums and checked to determine whether radius grinding was necessary to size them. The shoes fit, so were installed as purchased. Velvetouch installation instructions specified .004 to .010-inch toe-and-heel clearance and PM's set had .006.

The old standard linings were adjusted for drum clearance and run "as is." New asbestos and metallic linings were run in by driving through across-town traffic and then making approximately fifty decelerations in the 70 to 40 m.p.h. range. Drum clearances were then rechecked and the tests were started.

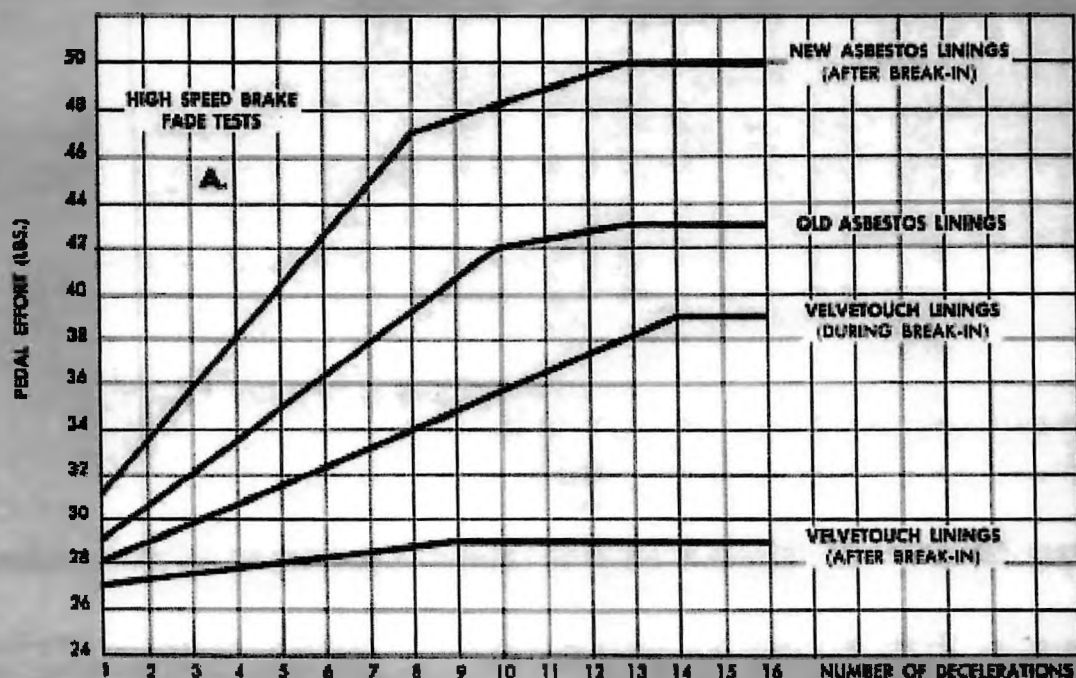
Fade-inducing conditions were created by subjecting the car to a series of rapid

accelerations and decelerations from 70 down to 40 m.p.h. The car was braked uniformly at 0.2 Gs measured by the Tapley meter, and accelerations were made at wide-open throttle. The results are plotted graphically on page 119. The fade test results speak for themselves. Velvetouch Metalik linings exhibited slightly lower initial pedal effort requirement. Even more interesting, pedal effort requirement had only increased by 7 percent after 16 decelerations, compared to a 53 percent increase in effort for the average of old and new asbestos linings! During break-in, the Velvetouch linings had about 50 percent pedal effort increase, which still resulted in lower pedal effort than for the asbestos shoes. (While we might expect a small decrease in fade for the new asbestos linings after a much longer running period, the fade performance of the old linings will serve to illustrate about the best condition we'd expect. The old linings were well seated and only slightly glazed.)

Water Tests

PM decided that the best type of test for water-fade susceptibility was to immerse the brakes in water, so that's just what was done. The car was driven into a lake until water was up to the door sills, run slowly for about 200 feet, and immediately accelerated down the lakeside road.

Four successive test stops were then made from 30 m.p.h. Then, back in the water. After about an hour of this, it was decided that wet-brake stopping distances are largely unpredictable. Testing was continued, however, on the theory that while



SUPERIOR FADE-RESISTANCE of Velvetouch linings was proven (see above) when, after 10 successive stops, 50 percent more pedal pressure was required to achieve equal deceleration on car with asbestos linings. Meter (see right) assured uniform .2-G stops.

stopping distances could not be reproduced exactly each time, a range of stopping distances would certainly be an indicator of the brake's capabilities. Here again, the results were interesting indeed!

Maximum distance for the first stop with wet asbestos linings was 163 feet, while the maximum distance for the Velvetouch linings was 65 feet. Probably just as significant was the difference in "pulling" tendencies as the brakes dried. The Velvetouch linings did not grab or pull appreciably, while the asbestos liners would suddenly get a bite on one wheel only and man—you'd best have an iron grip on the steering wheel.

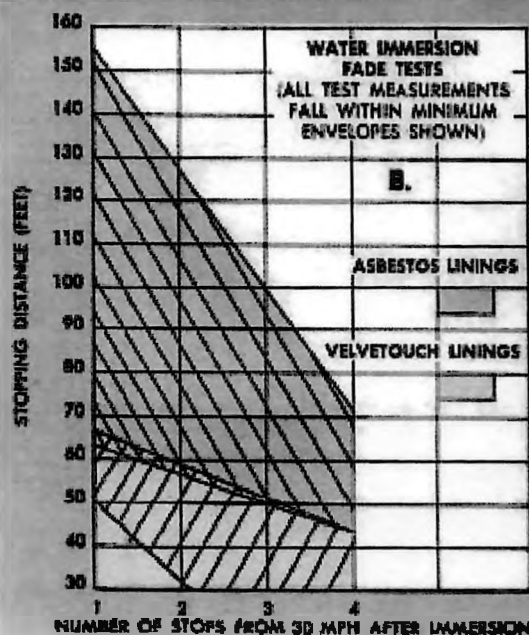
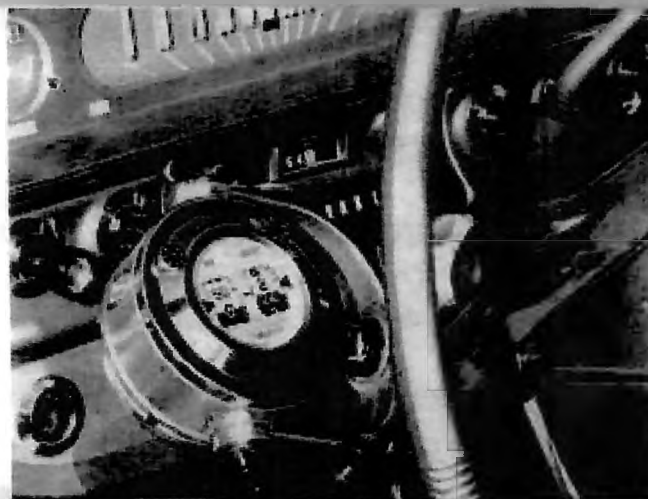
These sudden pulls occurred in the second to fourth test stops. (Perhaps part of the fade resistance of the Velvetouch Metalik linings is due to the segmented, square-edged configuration, which would tend to give a better wiping action.)

No noticeable chatter occurred during any of the tests. Both the new asbestos and the Velvetouch linings squeaked after the high-speed fade tests. The asbestos lining squeak was slightly more pronounced, but disappeared upon readjustment of the shoes.

The Velvetouch liners retained a slight

(Continued to page 218)

BRAKING CAR with thoroughly wetted linings (see chart at right) showed asbestos linings required 2½ times greater stopping distance on the average than metallic linings with the same pedal pressure.





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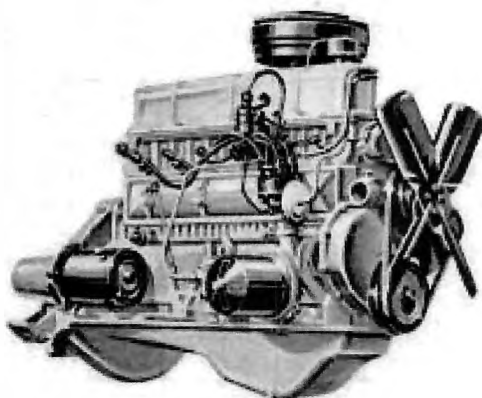
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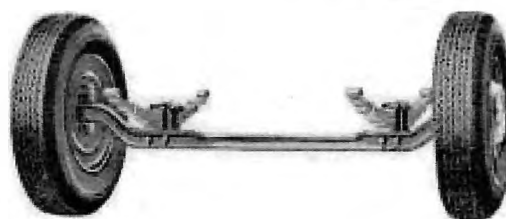


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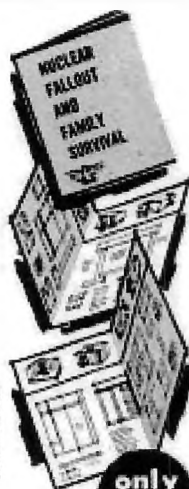
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Metallic Brake Linings

(Continued from page 119)

squeak immediately before coming to a dead stop, which although barely noticeable, was still there. None of the linings exhibited squeal during braking.

Out of curiosity, PM sprayed hydraulic brake fluid in one drum and shoe set each of the Velvetouch and old Ford linings. The Velvetouch brakes did not grab and would lock evenly. The asbestos linings showed intermittent grab and chatter. Both sets showed evidence of having been well sprayed when they were removed. This would indicate another bonus factor for the sintered metallic linings.

Lining Life

The Velvetouch linings showed .003 wear (average of twenty readings taken around the shoes). This .003 wear was the result of approximately 200 miles of driving, including two sets of 16 fairly rugged and consecutive decelerations from 70 to 40 m.p.h. and 50 decelerations in the 70 to 40 range, plus the slower water-fade tests, plus the normal braking requirements for the 200 miles of driving.

PM's estimate is that the normal driving equivalent of this amount of driving would be in excess of 600 miles, and based on the 1/4-inch of lining thickness being only partially used, that puts lining life in excess of 25,000 miles.

Velvetouch Metallic linings showed much less tendency toward high-speed fade than did the conventional asbestos linings, and after break-in they showed almost no tendency to fade in our test.

Water immersion caused much less fade on the average than it did with conventional linings, and braking was even at all four wheels. The Velvetouch linings squeaked very slightly after the high-speed fade tests, but did not chatter.

While PM did not prove or disprove that the Velvetouch linings have superior life, a long, if not superior life is indicated. The price for a '60 Ford is \$15.86 per set (two wheels) compared to \$12.50 for stock Ford replacement linings. ★ ★ ★

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