PLAINTIFF'S EXHIBIT

FD-713

Ford Motor Company

Intra-Company Communication February 16, 1965

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FROM: S. Gratch and T. H. Risk

SUBJECT: Brake Lining Program — January 1965

Evaluation of Current Materials

The screening rig is being used to evaluate three primary and three secondary drum brake lining materials which were used on the 1963 Lincoln. Significant differences were observed among the three secondary linings. Various chemical techniques are being applied to the same materials. Although these studies are not yet completed, the chemical results obtained so far are consistent with the friction data from the screening rig.

Friction Studies

A simple test procedure for evaluating brake linings on the screening rig was devised. This procedure will be applied to a variety of known brake lining materials in order to determine the correlation of the test results with the observed vehicle performance.

Formulation and Process Studies

A large hydraulic press has been instrumented to allow the recording of pressure during constant rate extrusion of brake lining materials. It appears that this pressure can be used to determine adequacy of mixing and overall processability.

Chemical and Physico-Chemical Analysis

Results obtained to date by pyrolysis chromatography indicate that this technique will be a powerful tool for detecting differences in resins. Differential thermal analyses to date has shown interesting differences among different brake lining materials, but the interpretation of these differences is still uncertain.

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Application Studies

The attack by M2C57 hypoid gear lubricant on copper, zinc and crysotile asbestos in no-slip differential friction materials has been confirmed. A sample of crocidolite asbestos will be evaluated as an acid resistant substitute for crysotile.

Dry Clutch Friction

The screening rig has been modified to allow the evaluation of dry clutch materials by fitting it with a DC tach-generator to supply a sliding velocity signal. The test is carried out by first operating the rig at constant normal load until the desired disc temperature is reached. The drive motor is then turned off and a record is taken of friction as a function of sliding velocity while the disc comes to rest. The time of the engagement can be varied by selection of the normal load. Twenty-two organic and two metallic clutch facings have been ~~tested~~ procured and will be tested by this procedure. The tests results will be turned over to Dr. P. C. Bertelson to support his study of clutch design procedures.

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