STP 583

SURFACE TEXTURE VERSUS SKIDDING:

Measurements, Frictional Aspects, and Safety Features of Tire-Pavement Interactions

J. G. Rose

ASTM

AMERICAN SOCIETY FOR TESTING AND MATERIALS

SURFACE TEXTURE VERSUS SKIDDING: Measurements, Frictional Aspects, and Safety Features of Tire-Pavement Interactions

A symposium
presented at the
Seventy-seventh Annual Meeting
AMERICAN SOCIETY FOR
TESTING AND MATERIALS
Washington, D. C., 23-28 June 1974

ASTM SPECIAL TECHNICAL PUBLICATION 583
J. G. Rose, editor

List price $12.00
04-583000-37

AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 Race Street, Philadelphia, Pa. 19103

©by AMERICAN SOCIETY FOR TESTING AND MATERIALS
Library of Congress Catalog Card Number: 75-3829

NOTE

The Society is not responsible, as a body,
for the statements and opinions
advanced in this publication.

Printed in Tallahassee, Fla.
July 1975

Foreword

The Symposium on Surface Texture and Standard Surfaces was presented at the Seventy-seventh Annual Meeting of the American Society for Testing and Materials held in Washington, D.C., 23-28 June 1974. Committee E-17 on Skid Resistance sponsored the symposium. Jerry G. Rose, University of Kentucky, presided as symposium chairman.

The papers contained herein were presented at the symposium, with one exception, that being the paper by A. L. Browne, which was presented at the Fifth Kummer Memorial Lecture to ASTM Committee E-17 at their mid-year meeting in Bal Harbour, Fla., 6 Dec. 1973. The subject matter is considered relevant to the symposium topic and therefore included with the symposium papers.

Committee E-17 expresses its appreciation to the staff members of ASTM who assisted in presentation of the symposium and the preparation of this special technical publication. Miss Jane Wheeler is especially acknowledged for her help. Special acknowledgments are also extended to K. C. Ludema, University of Michigan, for sharing the session chairman duties with the symposium chairman and to J. W. Guinnee, Transportation Research Board, for serving as the ASTM Standing Committee on Publications representative.

Related ASTM Publications

Skid Resistance of Highway Pavements, STP 530 (1973), $12.25, 04-531000-37

An Analysis of the Literature on Tire-Road Skid Resistance, STP 541 (1973), $5.50, 04-541000-37

A Note of Appreciation to Reviewers

This publication is made possible by the authors and, also, the unheralded efforts of the reviewers. This body of technical experts whose dedication, sacrifice of time and effort, and collective wisdom in reviewing the papers must be acknowledged. The quality level of ASTM publications is a direct function of their respected opinions. On behalf of ASTM we acknowledge with appreciation their contribution.

ASTM Committee on Publications

Editorial Staff

Jane B. Wheeler, *Managing Editor*
Helen M. Hoersch, *Associate Editor*
Charlotte E. Wilson, *Senior Assistant Editor*
Ellen J. McGlinchey, *Assistant Editor*

Contents

Introduction 1

Measurement

Pavement Texture Measurement and Evaluation — J. J. HENRY AND R. R. HEGMON 3
Use of Tire Noise as a Measure of Pavement Macrotexture — R. E. VERES, J. J. HENRY, AND J. M. LAWTHER 18
Discussion 27
Pavement Texture Measurement by Laser: A Feasibility Study — SHERMAN GEE, W. L. KING, JR., AND R. R. HEGMON 29
Discussion 41
Study of the Sand Patch and Outflow Meter Methods of Pavement Surface Texture Measurement — R. N. DOTY 42
Discussion 60

Frictional Aspects

Design of Texture in Standard Surfaces — D. F. MOORE 62
Discussion 73
Mathematical Analysis for Pneumatic Tire Hydroplaning — A. L. BROWNE 75
Interactive Tire Designs — S. K. CLARK 95
Estimation of Skid Numbers from Surface Texture Parameters in the Rational Design of Standard Reference Pavements for Test Equipment Calibration — S. C. BRITTON, W. B. LEDBETTER, AND B. M. GALLAWAY 112

Safety Features

Pavement Surface Information Needs in Accident Investigation — J. W. HUTCHINSON, N. G. TSONGOS, R. C. BENNETT, AND W. J. FOGARTY 116
Texture, Skid Resistance, and the Stability of Automobiles in Limit Maneuvers — G. G. HAYES AND D. L. IVEY 127

Closing Remarks

Summary 141
Index 143