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PREVIEW

RESONANCE MEASUREMENT OF
LONGITUDINAL VELOCITY
IN ALUNDUM CORES

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RESONANCE MEASUREMENT OF
LONGITUDINAL VELOCITY
IN ALUNDUM CORES

by
Randal E. Gibson

THESIS

Presented to the Faculty of the Graduate School of
The University of Texas at El Paso
in Partial Fulfillment
of the Requirements
for the Degree of
Master of Science

THE UNIVERSITY OF TEXAS AT EL PASO
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PREFACE

The current work being done on measurements of the acoustic and elastic properties of rocks at The University of Texas at El Paso was begun by Dr. J. E. White (Geology department) in 1974 before his departure for Colorado School of Mines in 1976. Dr. G. R. Keller took up where Dr. White left off, and wisely involved Dr. E. A. Dean (Physics department) in these studies. Since then, there has been a general spirit of cooperation between the two departments, which has proven beneficial to both departments, the graduate students involved and the work itself. The fact that the disciplines of Physics, Geology and Geophysics overlap and enhance one another to a large extent has finally been recognized in a positive way at UTEP. It is the author's hope that the interaction between these departments will continue to grow and prosper in the coming years.

The author would like to thank Dr. E. A. Dean for his extensive help in both the experimental and theoretical aspects of this work. Thanks goes to Dr. G. R. Keller, who introduced the author to graduate studies in Geophysics at UTEP, and graciously relinquished the care of his graduate student to Dr. Dean. Thanks also goes to Dr. J. M. Hoffer for the generous use of his rock lab for the preparation of the alundum samples, and to his student, Peter Muela, for teaching the author how

to use the equipment. The author would like to express his gratitude to Becky Villa for a great job of typing the first draft of this thesis from barely legible notes, and to Cynthia Renteria for her beautiful job of drafting the figures appearing in this paper. The author would like to recognize the resonant bar studies of Jim Lance, David Russell, Sid Tschirhart, and E. W. Butler at UTEP; these workers made this paper possible. A very special thanks goes to Judy Gibson for her patience and encouragement during this work and to Al Morales, who was a good friend and advisor.

ABSTRACT

An improved method for calculating longitudinal velocities by measuring the resonant frequencies of a core is developed. This method is tested on three different alundum cores, yielding velocities precise to $\pm 0.3\%$.

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