
R. Bruce Thompson
Iowa State University

T. A. Gray
Iowa State University

Follow this and additional works at: http://lib.dr.iastate.edu/ameslab_pubs
Part of the Engineering Mechanics Commons, Materials Science and Engineering Commons, and the Structures and Materials Commons

The complete bibliographic information for this item can be found at http://lib.dr.iastate.edu/ameslab_pubs/10. For information on how to cite this item, please visit http://lib.dr.iastate.edu/howtocite.html.

Disciplines

Comments
Equations (28) and (32) show the flaw signal, $\delta F_v$, to be proportional to the factor $T_a T_p A^* \rho_1 v_b / k_o \rho_0 v_0 = T_a T_p A^* v_b^2 / k_o \rho_0 v_0$, where $T_a$ and $T_p$ are the liquid-solid transmission coefficients for particle velocity of the waves coupled to transducers "a" and "b," $A^*$ is the scattering amplitude, $v_b$ is the ultrasonic velocity of the mode in the solid detected by transducer "b," and $k_o$ and $\rho_0$ are the wave vector and ultrasonic velocity in the fluid. In a previous analysis cited as Ref. 42, heuristic arguments had suggested that this factor had the form $T_{ol} T_{lo} A^*/k_o$, where $T_{ol}$ and $T_{lo}$ are, respectively, the liquid-solid and solid-liquid transmission coefficients for the indicated transducers. At normal incidence, the two forms are equal, but they diverge as the incidence angle grows. The comparisons of theory and experiment presented in the paper were inadvertently plotted using a computer program of the heuristically derived model and thus, for non-normal incidence, were in error. The corrected figures are shown below. Since no change in the phase plots occurs, they are not repeated. Table II should also be modified to include $|T_a| \times |T_p|$ rather than $|T_{ol}| \times |T_{lo}|$ for the flaw. This is straightforward and has not been reproduced in this erratum, although it is implicit in the figures presented.

As would be expected, use of the corrected program improves the agreement between theory and experiment. This is most clearly seen in the sequence of Figs. 10–13, in which $L$-wave illumination was normal to the surface and $L$-wave scattering was at 15°, 30°, 45°, and 60°, respectively, in
the solid. The previously noted observation that "there is a fairly systematic deviation between theoretical and experimental magnitudes, that increases with greater angle" remains true, with smaller errors. The origins of the deviation will be the subject of further study.

It should finally be noted that reciprocity requires that the expression for $\delta I_p$ in Eqs. (28) and (32) must be unaltered by interchange of the roles of transducers "a" and "b." This does not initially appear to be true because the expressions have a factor $v_a^2$ but no similar $v_b^2$ factor. However, the reported reciprocity relations for the scattering amplitude show that, when mode conversion is considered, $A^* v_a^2$ rather than $A^*$ is the unaltered quantity during interchange of illuminating and scattered waves.

3J. M. Richardson, "Unitarity and reciprocity in the scattering of elastic waves," unpublished manuscript.