

ACOUSTICS2008/977
Bonding quality evaluation of layered materials by guided wave dispersion

Young H. Kim, Minseok Bae, Sunhee Choi, Jisu Kim and Seokchan Hong
Korea Science Academy, 111 Backyangkwanmoonro, Busanjin-ku, 614-822 Busan, Republic of Korea

Multi-layered materials have been widely used for high performance materials with advanced properties required for the critical parts of structures. The characteristics of bonding quality in multi-layered materials have been hot issue for a long time. The bonding quality was evaluated by using dispersion of guided wave. Broadband guided waves were generated at oblique incidence angle, and waves reflected at the edge of the specimen were detected by using a pulse-echo setup. The dispersion curves were obtained from edge-reflected leaky guided wave for various plates: Single layered plates of aluminum, copper and stainless steel, and double layered plates of aluminum-stainless steel cladding, epoxy-bonded aluminum-stainless and epoxy-bonded aluminum-copper. The aluminum-stainless steel cladding specimen showed similar dispersion for both sides, whereas epoxy-bonded specimens showed different dispersions which are similar to that of upper layer only. These results imply that the cladding specimen used in the present work is well bonded, whereas epoxy-bonded specimens are acoustically isolated. The dispersion curve of guided wave has high potential to evaluate bonding quality of layered materials.