

TECHNICAL NOTE NUMBER 132
FOREST PRODUCTS LABORATORY - U. S. FOREST SERVICE - MADISON, WISCONSIN

EFFECT OF VARYING THE NUMBER OF PLYS IN PLYWOOD

In making up plywood for a particular use the question frequently arises, Should three plies or more than three be used to obtain the required thickness? Some data from tests by the U. S. Forest Products Laboratory may be of assistance in answering this question.

An increase in the number of plies results in a decrease in the tensile and bending strength parallel to the grain of the faces and an increase in the corresponding strength at right angles to the grain of the faces.

If the same bending or tensile strength is desired in two directions, parallel and perpendicular to the grain of the faces, the greater the number of plies the more nearly the desired result is obtained. It must be borne in mind, however, that plywood with a large number of plies, while stronger at right angles to the grain of the faces, can not be so strong parallel to the grain of the faces as three-ply wood, and hence a three-ply panel is preferable where greater strength is desired in one direction than in the other.

Where great resistance to splitting is necessary, as in plywood that is fastened along the edges with screws and bolts and is subjected to forces through the fastenings, a large number of plies affords a better fastening.

It is common experience that a glued joint is more likely to fail when thick laminations are glued with the grain crossed than when thin laminations are glued. The same weakness exists in plywood when thick plies are glued together. When plywood is subject to moisture changes, stresses in the glued joint due to shrinkage are greater for the thick plies than for the thin plies. Hence in plywood constructed with many thin plies the glued joints will not be so likely to fail as in plywood constructed with a smaller number of thick plies.