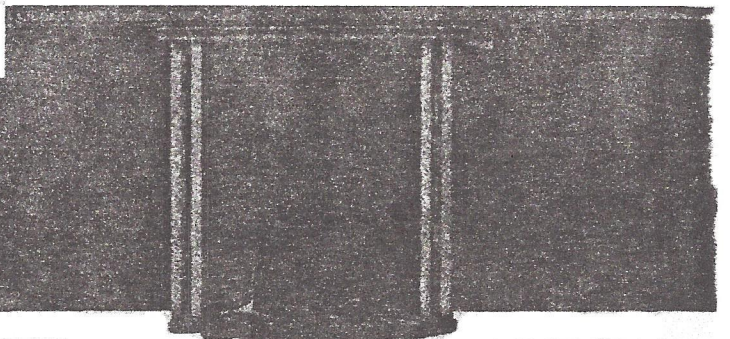
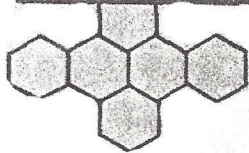
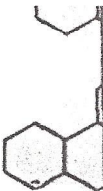
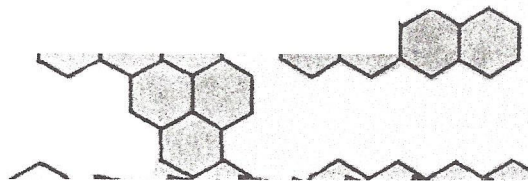


PERFORMANCE OF  
*SANDWICH PANELS*

IN FPL  
EXPERIMENTAL  
UNIT



**U. S. DEPARTMENT OF AGRICULTURE. FOREST SERVICE**  
**FOREST PRODUCTS LABORATORY • MADISON. WIS.**

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## SUMMARY OF OBSERVATIONS

The experimental and developmental work on sandwich panel construction, particularly with honeycomb cores, has furnished information for the basic engineering design and fabrication techniques. The numerous tests have shown that sandwich panels of the nominal thicknesses and constructions, that can be satisfactorily used for housing construction, have much more than the minimum strength and stiffness necessary to meet the general requirements usually applied to such construction. Corrugated-paper cores provide minimum insulation requirements for many areas of the United States. Nevertheless, commercially produced expanded core is potentially lower in cost and has been used in all of the wall panels recently erected. However, this type is lacking in insulating properties, and there appears to be a need for development of a foaming adhesive or similar means of reducing the U value of the panel.

With the advent of synthetic resins, the tests have demonstrated the techniques of adhesive bonding that will afford adequate strength and insure freedom from moisture problems at the bond. Furthermore, the incorporation of synthetic resins in the honeycomb material affords a degree of moisture resistance that insures adequate stability and strength, even when completely immersed. Development of improved contact adhesives shows signs of opening the way to rapid fabrication of core to facing materials. One such adhesive has been

used in several wall panels recently placed in the experimental unit. It is likely that others will be added as further improvements are made.

It is evident from wall panels removed after 13 to 15 years of service, that the plywood-faced panels have demonstrated excellent performance, based on retention of stiffness and strength and a minimum of movement due to temperature and moisture changes. The use of mechanical fasteners in the assembly of a panel house sometimes governs the thickness of the facings. However, the use of adhesives would permit thinner facings to be used, and strength and stability would then become the governing factors. Thinner prefinished plywood with a nonmarring plastic surface for interior facings and paper-overlaid plywood for exterior facings would probably provide good acceptance and satisfactory performance. Combination materials, such as metal with wood veneer-laminated facings, might also be considered.

The experiments with floor radiant heating have shown the feasibility of this type of heating with sandwich panel construction.

The sandwich panels in the experimental unit exhibited varying amounts of bowing during the coldest periods of the season. This was caused mainly by the absence of fasteners to adjoining panels to allow for unrestricted movement. When panels are fastened together, as in normal construction, little panel deflec-

## SUMMARY

Numerous Laboratory and exposure tests have shown that sandwich wall panels of nominal thicknesses and constructions can be satisfactorily used for housing construction. In addition to initial strength tests, exposure of test panels for 15 years in the Forest Products Laboratory's experimental unit have indicated that loss in stiffness and strength is insignificant for certain combinations of materials.

The wall panels made of resin-impregnated paper cores and plywood facings have demonstrated excellent performance, based on retention of stiffness and strength. However, other combinations of facings and paper cores have resulted in only fair to moderate performance.