Letters to the Editor

Seventeenth International Particleboard/Composite Materials Series Symposium held at Washington State University *

Structural materials, binders and other additives, and special considerations

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Over 350 delegates attended the 17th International Particleboard/Composite Symposium held at Washington State University in Pullman, Washington on March 29–31, 1983. Over all the years of its existence the Symposium has covered all types of particleboards and composite materials made of comminuted wood. However, many misunderstood this title thinking of it as covering only the conventional shavings type particleboard manufactured in the United States. Thus, the expansion of the name to the new title was felt appropriate to more properly reflect the content of the material presented in this symposia.

The 17th meeting was organized to cover special considerations, structural materials, and binders and other additives. There was particular interest at this Symposium in the announcements and impending announcements of many new structural flakeboard plants in the United States. The difficulty in assessing how many new board plants would be needed was a highlight of the Symposium.

The many unknown factors governing a decision to move into a new product line were of great concern, particularly because of the severe impact the recent economic recession had upon the wood industry. While, in general, the existing capacity in plywood, waferboard, oriented strand board, and medium density fiberboard appeared to be sufficient in the United States and Canada to meet the average demand foreseen in the 1980s, the aforementioned new plants were about to be constructed.

The thrust behind the building of new plants was the availability of appropriate wood raw materials near large urban markets, particularly in the Midwest and Northeastern United States. However, other plants are also going to be built in the Southeastern part of the United States, the Rocky Mountain area, and on the Pacific Coast.

Due to higher interest rates, financing the construction or remodeling of plants has slowed the expansion of the industry. However, many new for such financing are being explored by smaller or medium sized corporations which do not have ready access to conventional banking resources. Many of the government sources within the United States who helped in the financing of plants are no longer available. This does not preclude the smaller companies from moving forward in obtaining financing – however, they will have to work the financing differently than in the past.

Much discussion has been going on throughout the medium density fiberboard industry over the last several years on the subject of precompressing the mats before hot pressing. There are several methods now being or possible to practice: the conventional belt prepress as used for many years, a change in the conventional system to a higher pressure at the opening of the prepress followed with a longer holding section, prepressing more than once to help

* All previous symposia have been reviewed in this journal, from the beginning in 1967 (Vol. 1) up till now
compact the mat, and platen prepressing to a much higher prepressing pressure than can be performed by the belt prepresses.

It is known that prepressing is extremely important and if done properly, no matter which system is used, the amount of pre-cure on the medium density fiberboard surfaces can be dramatically reduced and that the density gradients through the thickness of the board can be minimized. Changes in the press closing and pressing schedule when hot pressing the mat into a board are also necessary.

Continuous board pressing has been in the industry since the early 1950s. Large-scale use of continuous board pressing, however, has been limited to thin boards produced by the large calendar-roll type of press. For the most part other continuous pressing systems have not been successful in the board industry. Newer designs have become available in the last few years offering a potential for continuous board lines producing thicker boards. This is of particular interest to smaller plants and those interested in minimizing surface pre-cure in the panels.

The entire wood industry has paid close attention to energy costs since the dramatic increase in energy prices starting in 1974. Many plants have started using sander dust as fuel for their dryers and wood waste as fuel for their boilers. Most of the plants in the United States and Canada depend upon steam for their hot presses. However, new technology has been developed for small gasifiers which utilize wood waste residues or coal for fuel. These gasifiers can supply the energy for hot oil heat transfer medium systems. Thus, the hot oil heating systems for hot pressing are becoming more attractive for use. The gasifiers are coupled to hot oil heat transfer medium systems retrofitted to steam or hot water heated board presses. Such gasifiers can also be used on standard hot oil types of hot presses. There are indications that such a system can reduce energy costs while at the same time improving board quality.

It has been well known for a number of years that the electrical orientation system for aligning wood particles has great potential in the composition board industry. Recent pilot plant work using an electrostatic former to produce fully aligned flakeboard for COM-PLY joist and truss lumber provided fresh, new information on this process. This extensive pilot plant run produced a large quantity of material for use in the U.S. Forest Service program on COM-PLY lumber material.

COM-PLY, by definition, has an oriented particleboard core and veneer either on the faces or edges of the material. The advantage of the electrical orientation is that it can align any size particle or fiber as long as the particle or fiber has a slenderness ratio which allows it to be aligned. In this particular pilot run strands were cut from peeler cores at a maximum length of 1-1/2 in. Much of the material, however, was much shorter in length because of the typical flaking operation. It was possible to use 98% of the prepared material in the board furnish which well exceeds the percentage usually found when employing mechanical orientation. The core material produced in this pilot run exceeded the minimum specifications established for its production.

The use of a composition board type material in truss lumber is an important advance for the industry. At the present time between five and six billion board ft of 2 by 4 in. lumber is used in the U.S. truss industry. It is becoming very difficult to obtain sufficient amounts of higher quality lumber which is needed for trusses. The research, to date, is showing that the COM-PLY lumber is meeting the necessary strength specifications and it also appears that it will be economical to manufacture this material.

Research has been going on for a number of years on producing high strength composition materials with a combination of properties better than the individual properties of similar solid wood materials. This emphasis, so far, has been on electrical power poles and cross arms although other product lines are also being developed. The design constraints for this work have been the product dimensions, strength, durability, weight, and cost. The products are made of aligned flakes using about 8% of isocyanate binder.

As mentioned previously, there are large resources of wood materials available throughout the Midwest and Northeast United States for use in composition board plants. Much of this material is higher density hardwood. The waferboard and oriented strand board industry, as developed so far, has concentrated on the use of aspen and other such low density species. Research has been working with these other hardwoods.

A particular product that has been developed is industrial/commercial roof decking made of higher density species such as northern red oak. Laboratory panels which meet design