Abstracts

K. NISHIMOTO: **The actual condition and the view of wood insecticides,** Bokin Bobai (J. Antibact. Antifung. Agents), **4** (5), 23 (1976) (in Japanese)

K. NISHIMOTO: **Deterioration and its protection of chip in outdoor storage,** Mokuzai kogyo (Wood Ind.), **31** (5), 7; (6), 6 (1976). (in Japanese)

The fundamental information on chip deterioration and its protection is summarized, with special emphasis on recent contributions.

S. HAYASHI, K. TSUNODA and K. NISHIMOTO: **Anatomy and Properties of Tropical Woods. Manual 1—Anatomy of 30 Brazilian Wood Species,** Mokuzaikenkyushiryo (Wood Research Review), No. 10, 42 (1976). (in Japanese)

The first report of a series of the research on anatomy and properties of tropical woods to supply the basic informations for reasonable utilization of woods.

Thirty Brazilian wood species are briefly mentioned on their distribution, uses, characters (color, hardness, specific gravity, grain, and figure), and anatomical features with color pictures of appearance and microscopic pictures of cross-, radial-, and tangential sections (40×).

S. ISHIHARA, H. SASAKI and T. MAKU: **Concentration of Formaldehyde Released from Plywoods under Dry-Heat Exposure,** Mokuzaikenkyushiryo (Wood Research Review), No. 10, 100 (1976). (in Japanese)

Tests on formaldehyde liberation from lauan plywood made with each six type typical wood adhesives were carried out at 20°, 50°, and 70°C for 300 days.

The amount of the liberated formaldehyde in air was quantitatively determined by a gas detector (Gastec No. 91, GASTEC CORPORATION, TOKYO, JAPAN) at selected intervals. The effects of duration of storage, temperature of dry-heat exposure, and kind of adhesive on formaldehyde liberation were determined. The factors that have the greatest effect on formaldehyde liberation from the lauan plywoods were kind of resin adhesive and temperature of dry-heat exposure. The amount of liberated formaldehyde from the resin adhesives was found to increase in the order of resorcinol-formaldehyde, <phenol-formaldehyde, <phenol-resorcinol-formaldehyde, <polyvinyl acetate cross-linked, <melamine-urea-formaldehyde, <and urea-formaldehyde resin. The large amounts of released formaldehyde vapours from the plywood made with urea-formaldehyde resin adhesive in dry-heated air are injurious to health.

The amount of liberated formaldehyde from the lauan plywoods can be reduced by prolonged storage and elevated temperature of dry-heat exposure.

Gas-liquid chromatgraphic analysis of 2, 4-dinitrophenylhydrazones of the

released formaldehyde and carbonyl compounds from the plywoods were also investigated.

H. KANEDA and T. MAKU: **Studies on the Weatherability of Composite Wood V.—Weatherability and Durability of Adhesive Joint of Plywood under Loaded Condition,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22,** 173 (1976). (in Japanese)

The durability and weatherability of adhesive joint of 4.2 mm thickness lauan plywood were tested under loaded condition in bending and tension. In bending the specimen was fixed in the supporting frame and the deflection of mid span was given 0 (contral), 2.1 mm and 4.2 mm respectively. This supporting frame was installed in the weather-meter and exposed to irradiation time of 250, 500 and 750 hr.

In tension, five specimens were connected with steel plate. One-tenth and one-fifth of breaking load were applied in comparison with no load in cyclic test. Cycle of soaking in water for 4 hr and drying in oven at temperature 60°C for 20 hr was applied to 3, 6 and 9 cycles respectively. After treatment in bending and tension, glue joint shear strength and wood failure, were measured.

M. MASUDA and T. MAKU: **Analysis of Buckling of the Plywood with the Distribution of the Elastic Constants and the Initial Imperfection IV.—The Post-Buckling Behavior and the Failure under the Axial Compressive Load,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22,** 269 (1976). (in Japanese)

To make clear the buckling behavior of plywood, the analysis of the finite deformation were carried out with consideration of the geometrical imperfections and/or the distribution of the elastic constants. In this paper, the distribution of the bending moments and the membrane stresses after the buckling were computed, and also the cause of the failure and the ultimate buckling strength in compression were estimated. In the case of the examples in this paper, that is, when the ratio of thickness/span is near or less than 5 mm/45 cm, the buckling behavior occurs elastically and the ultimate strength is well above the LEBB (load at entering the buckling behavior). In the case of 90° (face grain angle), the failure occurs by the compression at center of the edges. And in the case of 45°, the failure occurs by the bending moment near the corners.

M. MASUDA and T. MAKU: **Analysis of Buckling of the Plywood with the Distribution of the Elastic Constants and the Initial Imperfection. V.—The Post-Buckling Behavior and the Failure under Shearing Load,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22,** 278 (1976). (in Japanese)

In this paper the postbuckling behavior and the failure of plywood under uniform shear load is reported. When the (span)/(thickness) ratio is near 90, the

ultimate strength is 1.5～2 times as much as the buckling load (LEBB). In the case of 0° or 90° (the face grain angle), the plywood fails by the shear-failure. And in the case of −45°, the bending moment parallel to the face grain is the main cause of the failure. However, in the case of 45°, the plywood fails by the bending moment perpendicular to the face grain or the tensile membrane stress parallel to the face grain. The comparison with the theoretical (or computed) results and the experimental results by Takami shows that good agreement between them is observed.

T. YAMADA: **A Property of Space Made of Wooden Building Element,** Mokuzaikenkyushiryo (Wood Research Review), No. 10, 15 (1976). (in Japanese)

A scientific essay on feeling and moisture control by wooden building element.

T. YAMADA et al.: **Short Manual on Wood Mechanics XII,** Mokuzaikenkyushiruo (Wood Research Review), No. 10, 112 (1976). (in Japanese)

T. HIGUCHI: **Bamboo Shoot,** Kagaku, **31**, 362 (1976). (in Japanese)

A scientific essay on bamboo.

F. NAKATSUBO and T. HIGUCHI: **Synthesis of 1, 2-Diarylpropane-1, 3-Diols and Determination of their Configurations,** Holzforschung, **29**, 193 (1975).

1-(4-Hydroxy-3, 5-dimethoxyphenyl)-2-(4-hydroxy-3-methoxyphenyl)-propane-1, 3-diol (1), one of the main structural units in hardwood lignin was synthesized. The key step of this synthetic method is the condensation reaction between methyl benzylhomovanillate (3) and benzyl syringaldehyde (4). At this step, lithium diisopropyl amide was used as base, and threo and erythro isomers of β-hydroxy ester (5) whose ratio was about 3: 1 were obtained as crystal, respectively. These β-hydroxy esters (5) were converted to the final compounds (1) by hydrogenation with Pd-C and hydrogen, and subsequent acetylation and reduction with lithium aluminum hydride. The configurations of these 1, 2-diarylpropane-1, 3-diols were established by NMR analysis of their phenyl boronates. The coupling constants between α- and β-protons were 10 cps (threo) and 4.3 cps (erythro), respectively, and the values supported these configurations.

F. NAKATSUBO, K. SATO and T. HIGUCHI: **Enzymic Dehydrogenation of p-Coumaryl Alcohol. IV. Reactivity of Quinonemethide,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22**, 29 (1976).

It was found that the rate of the reactions between quinonemethide and various nucleophiles (aliphatic carfloxylic acids, water and alcohols) depend on the acidity and the steric factor of nucleophiles. That is, a nucleophile with stronger acidity reacts faster than that with lesser acidity, and a bulky nucleophile reacts slower than a smaller one. *Erythro* isomers are produced more than *threo* ones in chloroform

solution, whereas in water *threo* isomers tend to be produced more than *erythro* ones. The ratio of *erythro* to *threo* isomers (0.5) in the reaction of quinonemethide with water in dioxane/water (1 : 9) was similar to that of the isomers obtained by enzymic dehydrogenation of *p*-hydroxycinnamyl alcohols. These results suggest that water attacks predominantly from the same side with β-phenoxy group of quinonemethide by forming a hydrogen bond between water and oxygen atom of β-phenoxy group, resulting in predominant *threo* isomer.

E. MAEKAWA: **Isolation and Fractionation of Water-soluble Polysaccharides from Bamboo Shoot,** Agr. Biol. Chem., **39**, 2281 (1975).

It was established that the water-soluble polysaccharides of bamboo shoot other than starch consisted of a water-soluble xylan, an arabinogalactan and an α-glucan by isolation and fractionation of the water-soluble polysaccharides extracted with dimethyl sulfoxide from a preparative meal of bamboo shoot. On the basis of the examination of several properties of these polysaccharides, the presence of a galactan first isolated from bamboo shoot was discussed from points of plant biogenesis.

E. MAEKAWA: **The Structures of Water-soluble Polysaccharides Isolated from Bamboo Shoot,** Agr. Biol. Chem., **39**, 2291 (1975).

The structures of two polysaccharides reported in the previous paper were studied by means of methylation analysis and the Smith degradation. As a result, it was concluded that the water-soluble xylan consisted essentially of a (1→4)-linked β-D-xylopyranosyl chain and contained L-arabinofuranosyl residues linked through the C-1 as terminal side units. Unambiguous information concerning the residues of D-galactose and D-glucuronic acid as the constituents of the xylan has not been obtained. For the arabinogalactan, evidence was obtained for an interesting structure having a backbone chain of (1→3)-linked β-D-galactopyranosyl residues to which the terminal arabinose residues were attached at the C-6 position as the most prevalent side chains.