

Table 3. Plywood Production in Taiwan, 1985~1994

Year	Production (x 10 ³ m ³)	Quantity				
		Sales total (x 10 ³ m ³)	Export (x 10 ³ m ³)	(%)	Domestic (x 10 ³ m ³)	(%)
1985	850	952	552	58.0	400	42.0
1986	900	937	505	53.9	432	46.1
1987	950	1,001	544	54.4	457	45.6
1988	1,050	1,179	499	42.3	680	57.7
1989	1,250	1,254	344	27.5	910	72.5
1990	1,200	1,109	259	23.3	850	76.7
1991	1,230	1,234	204	16.6	1,030	83.4
1992	1,200	1,220	160	13.1	1,060	86.9
1993	850	859	109	12.7	750	87.3
1994	870	878	128	14.6	750	85.4

Source: Divisions of Statistics, Economic Dept., Bureau of Customs; The Society of Plywood Manufacture and Export Industry in Taiwan¹⁹.

levels are temperature and relative humidity. Godish and Rouch¹⁸ indicated that when room temperature increased by 6 °C, the formaldehyde concentration doubled. Puhakka and Karkkainen¹⁵ showed that an increase of the relative humidity of air from 34% to 70% over 24 hours caused the formaldehyde level to increase by a factor of 2.5. As Taiwan is located in the subtropical zone, the annual average temperature and relative humidity are always higher than 20 °C and 70%, respectively. Therefore, the effect of climatic conditions on formaldehyde levels should be considered as important as poor ventilation.

Recent reviews suggest that formaldehyde exposure should be treated as though it poses a carcinogenic risk to humans and should be reduced to the lowest feasible level. In view of its mucous-irritating properties and potential carcinogenicity, low-formaldehyde-emission pressed-wood products have become part of the mainstream.

Taiwan was once a leading manufacturer and exporter of pressed-wood products in the world. With shortages of raw materials (The Lieu-An log wood once imported from Indonesia and Malaysia is now limited.), and higher labor costs, this once glamorous industry has dwindled, and many manufacturers have moved their factories to south east Asian countries such as Sarawak and Indonesia. The total production of plywood in Taiwan has declined since 1993, and the quantity for export has de-

creased by more than 40% within 10 years¹⁹ (Table 3). The manufacturers of Taiwan have seriously considered developing low-formaldehyde-emission glue to provide low-formaldehyde-emission pressed-wood products. However, with low concern about the current health issues with formaldehyde, no rigid enforcement through the related legislative authorities, and market price orientation, etc., the better-quality products are now only distributed in foreign countries concerned about formaldehyde exposure.

CONCLUSIONS

The results of this survey indicate that sample timing (i.e., from interior construction for a period of several months) and ventilation conditions are important determinants of indoor formaldehyde concentrations in residences. Moreover, because of high temperatures and humidities, we should be concerned about the formaldehyde emissions from pressed-wood products in Taiwan. The findings of this study recommend that the regulatory authorities set formaldehyde emission standards for pressed-wood products. In addition, the public should be educated about proper air exchange and the availability of low-formaldehyde-emission products.