

SITUATION OF CHIPBOARD INDUSTRY IN PAKISTAN

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1. Intruduction

Pakistan suffers a considerable shortage of wood and wood products (Table 1). The majority of the timber consumed goes into firewood (an estimated 16.6 mio m³ per year). Of the registered annual consumption of 2.033 mio m³ timber and timber products about 50% is imported.

In some fields of timber utilization chipboard can be of help to ease the pressure on local timber resources and foreign exchange of imports especially in furniture and interior wood works. Logically already as early as in the sixties the first chipboard mills started operation. Raw materials were mainly coniferous timbers acquired from the Forest Departments or broadleaved trees (Mango etc.) acquired from the private owners. The first mills were located far away from the raw material sources (in Jhelum and in Karachi).

In early seventies, chipboard mills started to shift from wood to bagasse as source of raw material. This shift was due to various reasons:

- due to population pressure as well as inflation timber became more expensive
- transportation costs soared up
- the availability of Suigas and other fuels for thermal energy substituted bagasse in the sugarmills; suddenly bagasse became a cheap commodity.

In January 1983, 70% of the chipboard produced in Pakistan is based on bagasse.

2. Production

Pakistan has at present (1/1983) 12 chipboard plants (table 3) one of which is out of operation since 1981. Two other mills are sanctioned (at Mardan and Jaranwala), but due to the slump on the chipboard market the sugarmill owners are reluctant to go through with their construction. The total installed capacity is 387 tons per day (t/day). Assuming 200 effective working days/year this would run up to an annual capacity of 77400 t.

The actual chipboard production (Table 4) rose since 1971/72 from 14108 tons per annum (t/a) to 26009 t/a in 1972/80. This equals an overall production increase of 84%. However, after having reached the peak of 17680 t/a in 1972/73, production declined to a bottom of 10000 t/a in 1977/78. This decline might be partially due to the worldwide economic crisis in the aftermath of oil price rises, partially to internal political problems (new labour laws etc.)

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In 1978/79, production increased by 155% and still increased by another percent in 1979/80, reaching 26000 t/a. Obviously, in the years before, market was under-supplied. The stabilized political situation made the industry place new investments and increase their production. This trend lasted up to 1982. In the years 1980-1983, 6 new mills were opened, one mill (Crescent boards) enlarged their production from 30 t/day to 100 t/day by opening a new line. The overall capacity increase in these three years was 360% (1) or 78% of the present capacity.

Based on the various statements of different mill owners, overall capacity utilization in 1982 was 49%.

Based on this figure in 1981/82, 31000 t/ of chipboard would have been produced, and in 1982/83 even 37000 t.

3. Imports

During the slump years, imports of chipboard have been fairly low, ranging at about 50 t/a. 77/78 imports jumped up to 434 t/a and then stabilized at a level of about 500 t/a. In 79/80 imports lessened slightly, the difference was substituted by a slight production increase. Any how, imported chipboard in Pakistan seems to have a very special market, and is, in fact, of minor importance. It hardly matches 2% of the local production.

4. Apparent Consumption

Assessment of apparent consumption is difficult since the exports to Afghanistan (which are still going on) are nowhere reported.. Apparent consumption reached its peak in 78/79, with 26509 t/a and slightly decreased again in 79/80 due to a decline in imports. In 79/80 the apparent consumption of chipboard equalled 46% of the installed capacity.

5. Raw Materials

9 of 11 mills are located rather far from the main raw material sources (100 km and more). Transport distance not only affects the economics but also the steady raw material supply of the mills.

70% of the chipboard produced in Pakistan is made now from bagasse. However, 5 units still operate (at least partly) on the base of wood. This refers mainly to the chipboard mills running together with plywood mills, who use the plywood waste. Others are buying waste-wood or wood in round (mango in Karachi and Jhelum, conifer timber in Chakdara). One factory is operating partly with cotton stalks. Other agricultural waste (jute sticks, straw a.o.) are not in use.

Raw material costs of bagasse in general are half those of wood. The wood base mills have to compete with the firewood market. A maund of any wood for the chipboard mills is hardly available below the firewood prices (10-12 Rs.). Including transport and octroi it rises (dependent on transport distance) to 16-20 Rs./maund at the factory rate. i.e. 400-

500 Rs. /t wet. With an average moisture content of 50% the raw material costs per t boundry are about 1000 Rs. losses (bark etc.) not included. Additional problems for the woodbased mills are the unsteady supply, quality of the raw material and its heterogeneity, which hamper production and have a negative effect on the quality of the boards. Bagasse, in turn, occurs as waste in sugarmills. Since the major sugarmills switched to Sui gas for thermal energy generation, it was easily available. Depending on transport distance, bagasse usually is available at half the price of wood - which has quite some effect on the economics of production.

Glue

Glues used are without exception of the ureaformaldehyde - type. There are imported as well as locally manufactured glues available. The imported ones are of the solid kind, while the locally produced ones are only liquid, (65% solid contents). Producers are the same, i.e. BASF (who with its Kaurit has the largest share of the glue market for chipboard), Hoechst, Borden a.o. Liquid glues especially in the hot summer months create storage problems. Therefore the imported, solid ones are preferred. The cost about 7-7.50 Rs/Kg. Up to June 1982 an import duty of 300% had to be paid of which 210% was refunded after use. That is, the costs/Kg were around 15,-Rs/Kg, compared to 8.1 Rs/Kg and no refund was made. i.e. the imported glue costs now between 16 and 17 Rs/kg.

On an average, 9-12% of glue is added for chipboard production. At a ratio of 65% solid matter, imported glue costs per standard board of 4'x8', 19 mm, 500 kg/m³ about 30 Rs, locally produced glue about half that price, i.e. 10-20% of the sales price of the boards.

In order to reduce glue costs, chipboard manufacturers often mix locally produced with imported glue. Some start their own glue production (KDC in Jhelum), others have glue made by order in local chemical factories. However, still glue is a major cost factor in production of chipboard and besides raw material supply creates most of the problems.

6. Products and Qualities

Nominally most of the mills produce chipboard of various densities between 500 and 700 kg/m³. However, in practice mainly boards with densities around 500 kg/m³ are produced. The larger enterprises offer all thicknesses between 8-36 mm (upon order) but mostly 13 and 19 mm boards are produced.

Some of the plants produce three-layer boards. However, the smaller ones usually can only fabricate one-layer boards. The sheets generally have of 4' x 8'. The two larger companies (Crescent and Baluchistan Particle Board) produce sheets of 4' x 12'.

Qualities of the products differ considerably. No proper quality-control has been established as yet in any of the companies. Some mills tend to upgrade their low quality boards by attaching face veneer to them (veneerboards). Two of the larger companies started with melamineboards. However, to achieve a good lamination, surface quality of the chipboards has to be of high standard.

The mechanical and physical properties of bagasse boards in general are supposed to be slightly below those of wood boards:

| Property | Bend, strength | Tensile strength | Swelling (24 h) |
|------------|------------------------|----------------------|-----------------|
| Bagasse | 215 kp/cm ² | 5 kp/cm ² | 8% |
| Wood (av). | 215–250" | 5.5 – 7" | 15% |

However, the properties of bagasseboards still fall within the limits of international standards. In Pakistan, generally the woodbased panel produced are of much lower quality than the panels based on bagasse. Obviously, the proper production has much more influence on product quality than the raw material used.

7. Prices

The prices are discussed examplewise for boards of 500 kg/m³, 8' x 4', 19mm. One and a half year ago the board was sold to the retailers for Rs.208 /board. Now (April 82) prices vary between 150 R/board and 178 R/board. In spite of its high price, one company holds about 60% of the market. This shows that consumers become more quality minded, since they produce one of the best board—qualities in Pakistan. On the other hand, even the worst qualities are still being sold, if the price is low. This shows that even roadside carpenters now shift to chipboard.

It should be realized that in the last two years, the Rupee went down and most of the consumer goods became more expensive. Chipboard, on the other hand, is one of the rare commodities which became cheaper (by 28%). This decline in price might be due to heavy competition on one hand and the saturation of the market on the other hand. But it shows as well what profit margins are in chipboard production.

Table 1. Origin of Timber Consumption 1979/80

| Source | Volume (1000m ³) | % |
|--|------------------------------|------|
| Forests | 384 | 19.1 |
| Imports | | |
| — timber round + sawn 622 | 622 | 30.5 |
| — wood based panels | 353 | 17.3 |
| paper + panel prod. (roundwood equivalents) | | |
| Farmlands + wastelands (by difference) | 678 | 33.1 |
| Total | 2057 | 100 |

Source: PFI, The State of Forestry in Pakistan, 6/1982. Estimation

Table 2. Imports of Wood and Woodproducts

| Item | Unit | Quantity | |
|--|----------------|----------|---------|
| | | 1978/79 | 1979/80 |
| Timber round and sawn | m ³ | 352964 | 621947 |
| Veneer, plywood, wood manufactures, reconstit. wood | t | 3392 | 2974 |
| Pulp and paper | t | 109449 | 109329 |

Table 3. Production of Chipboard in Pakistan

| Year | Production (t) |
|---------|----------------|
| 1971/72 | 14108 |
| 1972/73 | 17680 |
| 1973/74 | 14388 |
| 1974/75 | 13199 |
| 1975/76 | 11355 |
| 1976/77 | 11568 |
| 1977/78 | 10216 |
| 1978/79 | 25921 |
| 1979/80 | 26009 |

Source: Pakistan Statistical Yearbook, 1980

Table 4. Capacity and Capacity Utilization of Pakistan Chipboard Mills

| Company | Place | Raw material | Year of operation | Capacity (t/day) | Shifts off/eff | Eff. Cap (t/day) | Cap. Util. (%) | Percentage of capacity | Production |
|-----------------------------|-------------------|---|-------------------|------------------|----------------|------------------|----------------|------------------------|------------|
| Baluchistan Particle Boards | 30 m West Karachi | Bagasse dep. | 1/82 | 50 | 3/3 | 40 | 80 | 13 | 22 |
| Anchor Boards | Korangi, Kar. | Mangowood, Plywood offcuts | 1/81 | 25 | 3/1 | 8 | 32 | 6 | 4 |
| Hercules Boards | Korangi, Kar. | Wastewood, bagasse undep. cotton stalks | 6/81 | 15 | 3/2 | 10 | 67 | 4 | 5 |
| Partico | SITE, Kar. | bagasse, dep. | 1972 | 12 | 3/3 | 7.25 | 60 | 3 | 4 |
| Partica | SITE, Kar. | Kikarwood, bagasse dep. | 1964-81 | 10 | 3/0 | 0 | 0 | 3 | 0 |
| Sindh Particle boards | Kotri/Sindh | bagasse, dep. | 1982/83 | 30 | 3/2 | 12.5 | 42 | 8 | 7 |
| Crescent Boards | Faisalabad | bagasse, undep. bagasse, undep. | 1970-81 6/81 | 30 80 | 3/0 3/3 | 0 60 | 0 75 | 8 21 | 32 |
| Saddique Plywood | Kala Shah Kaku | bagasse, dep. | 1981 | 15 | 3/1 | 3.3 | 22 | 4 | 2 |
| KDC | Jhelum | Plywood offcuts, other wood | 1968 | 15 | 3/1 | 5 | 33 | 4 | 3 |
| Pakistan Chipboard | Jhelum | Mango and other wood | 1964 | 15 | 3/2 | 9 | 60 | 4 | 4 |
| Bombay Plywood | Rawalpindi | Plywood offcuts Poplar wood | 1/83 | 50 | 3/1 | 30 | 60 (est.) | 13 | 16 |
| Dir - Complex | Chakdara | Coniferous timber | 1/83 | 40 | 3/0.5 | trial run | 60 (planned) | 10 | 0 |
| Total | | | | 387 | | 185 | 49 | 100 | 100 |
| Hussein Sugarmill Jaranwala | | bagasse | ? | 50 | sanctioned | | | | |
| Premier Sugarmill Mardan | | bagasse | ? | 50 | sanctioned | | | | |

1 Differences due to round ups

Table 5. Comparison of Chipboard Production Capacity in various Countries

| Country | Population (Mio) | GNP/Head ² (US) | No. Plants | Capacity 1000 m ³ /ann | Year |
|--|---------------------|-------------------------------|------------|--------------------------------------|------|
| Argentina ¹ | 27 | 2280 | 14 | 190 | 1979 |
| Brazil ¹ | 123 | 1687 | 18 | 600 | 1979 |
| Indonesia ¹ | 148 | 375 | 2 | 100 | 1980 |
| Mexico ¹ | 72 | 1590 | 11 | 450 | 1980 |
| Pakistan ³ | 82 | 270 | 12 | 126 | 1983 |
| Turkey ¹ | 45 | 1330 | 18 | 800 | 1980 |
| People's Rep. ¹ of China | 982 | 230 | 2 | 60 | 1980 |

1. H. J. Deppe and K. Ernst, Taschenbuch der Spanplattentechnik, 2nd ed. Leinfelden, 1982.
2. Worldbank data, 1978
3. 11 mills are existing, of which one has two plants (Crescent). One Crescent plant (30t/day) and 1 of the other plants are lying idle. The annual installed capacity (all plants) is 7,400 t taken into account 200 working days. With an average density of 600 kg/m³, the annual capacity runs up to 126 000 m³.

8. Outlook

With a consumption of 0.3 kg/ head in 1978/79 Pakistan showed a comparatively low chipboard consumption, compared with the world average (70 kg/head). However, this statistical figure does not have much relevance, since it is mainly influenced by the high consumption in industrialized countries and it is difficult to build an average of the different economies involved.

In Pakistan consumption since 1971/72 increased by 84% in absolute terms, but per capita consumption only by 50% (0.1 kg/head). In the same time the population of Pakistan increased by 28%, reaching in March 1982/81,84 mio people. As shown in table 6, on the other hand, Pakistan has a fairly high chipboard capacity, measured on base of the GNP/head. However, capacity utilization is low being below 50% as compared with the capacity utilization of European plants, which is about 90%. ¹ Majority of the plants in Pakistan are of small capacity. Mexico with less mills can produce three times as much chipboard as Pakistan.

1. Deppe, e., 1982: Taschenbuch der Spenplattentechnik, 2nd. e. Unfelden p. 396.

One of the reasons for low capacity utilization is the comparably low demand on the local market. This has various reasons.

1. While in the industrialized countries as well as in many other large producer countries 50% of the production is used for construction, the Pakistan Production nearly exclusively enters the furniture production. Reasons are the local construction traditions as well as the often insufficient quality of the boards.
2. Majority of the furniture producers are small scale enterprises. They traditionally stick to solid wood. Additionally they lack the proper tools for working chipboard (tungsten - carbide tipped saws).

Wood, as can be seen in table 2, is in short supply and expensive. However, bagasse has proved to be a cheap raw material, and it is available in big amount. 1979/80 about 5.8 mio t bagasse was available. After drying, depithing and removing the fines about 1.2 mio t of bonedry raw material are left. On the other side, Sui gas fields are depleting and the sugar-mills will have to provide part of the thermal energy again by combustion of bagasse. Still it is assumed that an exemption from this rule will be given to be chipboard already existing to ensure their raw material supply.

With increasing depletion of the local timber resources, increasing demand for wood products and the construction of larger woodworking and furniture-manufacturing units the demand for chipboard in Pakistan will increase. However on the short run establishment of further chipboard seems inadvisable. Two mills are lying idle. Some of others have a low capacity utilization. So even two sugarmills, which have easy to cheap raw material (bagasse) and whose plants were already sanctioned, shelved the construction due to the market constraints. Even if the market expands, what definitely will happen on the long run, will be a better capacity utilization of the existing mills to cover the additional demand.

