

Pisticci Revisited. Pete Starkey. March 2006

I last visited Pisticci, in the Basilicata region of southern Italy, over 15 years ago when I was Technical Director of a leading UK printed circuit fabricator. My mission was to vendor-assess what was then the most modern laminating plant in Europe. The company was Lamitel, which later merged with Austrian laminator Multicon.

The wheel goes full circle! Here I am in spring 2006, back in Pisticci to review the most modern laminating plant in Europe. The company is Panasonic, who took over the Italian and Austrian facilities in 2000, and have made substantial investment since that time. With the exception of the resin storage and varnish mixing areas, the whole factory has been re-equipped. The treaters are Swiss, the rest of the hardware is Japanese.

First impression was of immaculate cleanliness and tidiness. All the equipment was white (which shows the dirt much more effectively than traditional green – not that there was any dirt to be seen!). Workers were dressed, Japanese style, in smart uniform jackets and fashionable safety shoes. Pride was evident in their whole approach to the job. Whatever challenges might have been encountered in encouraging a long-established Italian culture to adopt Japanese-style working practices, the effort was justified and the success was there to be seen. A Total Productive Maintenance regime had been introduced two years previously, after a handful of key workers had been to Japan to study the principles then returned to set the example to their colleagues. Everyone was involved; everywhere the target was to achieve highest quality and highest yield. Continuous-improvement and cost-saving projects, objectives and milestones were clearly defined, with plainly visible indication of where problems had been identified, who had ownership, what corrective actions had been introduced and what were the results to date.

Factory Manager Francesco Schiavone explained that the original pre-preg lines had been shut down in September 2004, replaced by two new Cavitec treaters with six-storey ovens. Very much attention had been paid to optimising the impregnation operation (incidentally, this was the first time I had ever seen pre-dipping working properly!). One treater was fitted with Panasonic's proprietary system to enable the production of "void-less" pre-preg, rapidly gaining popularity with PCB manufacturers looking to maximise utilisation of their pressed panel area by eliminating white edges.

Although the lines were producing at a rate of 500,000 square metres per month, the emphasis was clearly upon quality rather than high-volume throughput: web speeds relatively low at between 10 and 12 metres per minute and continuous on-line thickness monitoring and automated optical inspection. About 30% of output was customer pre-preg, shipped as rolls to Austria for panelling and distribution, the remainder cut to double-sheet size and transferred to an automated store from which it could be called as required for ply-up.

Four main resin-systems were in regular production: standard FR4, Tg140, Tg150 and the low z-expansion R1755-C. A new varnish-mixing area was under construction to facilitate the manufacture of halogen-free in production quantities.

Ply-up was a manual operation, quite deliberately from the point of view of human-eye in-process inspection, accurate counting and neat book-building. The benefit of this meticulous book-alignment was obvious both when the pre-preg arrived in the fully-automated lay-up

area, where the equipment operated with monotonous reliability, and at final sheet-trimming, in the minimisation of off-cut waste.

In the fully-automated press area were two high-pressure-hot-water-heated vacuum presses and one cold press, each of 15 daylights (although double-sheet-size lamination, typically 1255 mm x 2180 mm, effectively gave 30 daylights-worth of capacity). As a further illustration of Panasonic's "quality-before-quantity" principle, the press cycle was a generous 3 hours, with a combination of a very slow heat-up, cushion-board and dummy outer laminate to control instantaneous temperature differential within a daylight to less than 25 degrees C. From the breakdown station, press plates were returned by conveyor directly to the lay-up area via a wet-brush plate cleaner, and laminate was on-line pre-trimmed, and cut to single sheet size before on-line automatic gauging of thickness. To my eye, surface quality was remarkably good, an acknowledgement of the cleanliness of the lay-up area and the standard of press-plate maintenance.

After full laboratory characterisation of representative samples from every press load, laminate was shipped as pre-trimmed sheet to Panasonic's Austrian factory for finishing, with the added assurance that all material would be subject to inspection, test and certification before final despatch.

Of a total establishment of 95 people, 86 were involved, either directly or indirectly, in a manufacturing operation working three shifts, five days per week, producing 150,000 square metres of laminate each month.

Managing Directors Dr Gaetano Tarantini and Mr Toshiyuki Hatazawa, who share responsibility for both of Panasonic's European laminate plants, Pisticci in Italy and Enns in Austria, explained that Panasonic is a brand name of Matsushita Electric Works, whose parent company was originally founded in 1918 and now has an annual turnover exceeding €10 billion. One of many divisions is Electronic and Plastic Materials, which includes PCB materials, semiconductor encapsulation and thermoset moulding materials, and represents about 8% of group turnover.

As well as the European facilities, Panasonic have three laminate factories in Japan, two in China, one in Taiwan, and one in Thailand. North American production, formerly in Oregon USA, has been transferred to China "to follow the customer", although a technical and marketing centre remains.

Annual laminate sales are €600 million, broken down: Japan 60%, China 12%, Taiwan 10%, Europe 10%, Thailand 4%, and USA 4%, together representing 14% of the estimated global market of approximately €4 billion (based on Prismark's 2004 figures), and ranking Panasonic as world number one. In Japan they claim 45% share of the laminate market.

In response to my inevitable question: "Why Pisticci? In fact why invest in Europe at all, when everyone else seems to be closing-down their capacity?" Dr Tarantini and Mr Hatazawa make it clear that they are under no illusions: volume manufacture has moved away from Europe and will not return, although Panasonic's global presence and well-placed manufacturing plants will ensure that their group can continue to support the laminate requirements of the industry whatever its geography. But they believe that in Europe there remains a significant and strategically important market whose culture and needs they understand through long experience.

Specifically, the European industry demands high quality, high reliability laminates and pre-pregs, with efficient local distribution backed by strong, locally based technical service. Panasonic offer a very broad product range, although they have no intention to manufacture the whole of that range in Europe. All of the facility to produce special products such as flexible and high-frequency, low-loss laminates already exists in Japan, and the European operation can easily source and distribute such materials from elsewhere within the group. Furthermore, the group has a comprehensive research and development programme with clearly defined roadmaps for automotive, high-speed IT and digital home-appliance applications, and some revolutionary ideas in the fields of embedded components and optoelectronics. And there are many opportunities to interchange knowledge between different core technologies both within the Electronic and Plastic Materials business unit and with other business units in the group.

European manufacturing policy is to concentrate on the production of high quality FR4 materials and their variants. Panasonic are leaders in the utilisation of active fillers in their resin systems to improve resistance to thermal cycling by reducing z-axis expansion. Alternative curing systems have enabled a range of thermally stable laminates suitable for lead-free assembly processes (although many challenges remain in the education of designers to properly specify materials based on an understanding of their actual properties). Particularly successful has been the introduction of Panasonic's halogen-free laminates. As well as their environmental acceptability, these materials have particular performance characteristics which make them ideal for automotive applications.

It can be argued that Panasonic's Pisticci factory is the most efficient and cost-effective laminate manufacturing plant in Europe, with the benefit of a very loyal and stable workforce. Clearly not best-placed geographically as a distribution centre, it does not need to be since all of the necessary facilities for panelling, finishing, packaging, shipping and technical support already exist, a truck-ride away, at Panasonic's Enns plant in Austria.

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