The First Unconventional Duplex Board Plant in India

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It all happened during a journey to the Tirupati temple in late December, via Kurnool, where SRPM is situated. I questioned myself :

> in the No. 2 paper machine (1st floor machine), having one 4.5-dia M.G. and one stack calender with 3.5 paper trim width, why should we not try to laminate another layer somehow with the Fourdrinier Web under the Suction Press ? The answer came, and a suggestion and a plan, with engineering estimates were given.

The SRPM management accepted the plan. This was the turning point in the history of board-making in India as well as in the world of paper making, as far as we are aware.

The author was a consultant with SRPM for fabricating two modified Dry Vats, the installation and commissioning of the entire thing, mostly while the paper machine was running.

Making a success of the idea was a tremendous task. It was the success of Indian technologists and engineers who proved themselves equal to the task and this "knowhow" is more eoonomical than and superior to the prevailing technology in board-making in the world market,

Here in this system, the Fourdrinier wire part makes the backliner of Duplex Board, which means that 70 percent of the total mass are made on the wire part ; at this stage of manufacturing the 150 to 250 G.S.M. ply of backliner on the wire, the paper-maker can adjust the formation and close up the MD and CD tensile ratio by working with the wire-shake and Jet adjustment, and also the substance across the Deckle is adjusted. All these adjusutments help make a "dimensionally stable" Duplex Board, and functional properties of the Board do not fluctuate in ageing and underfluctuating relative bumidity conditions in India.

Texture design

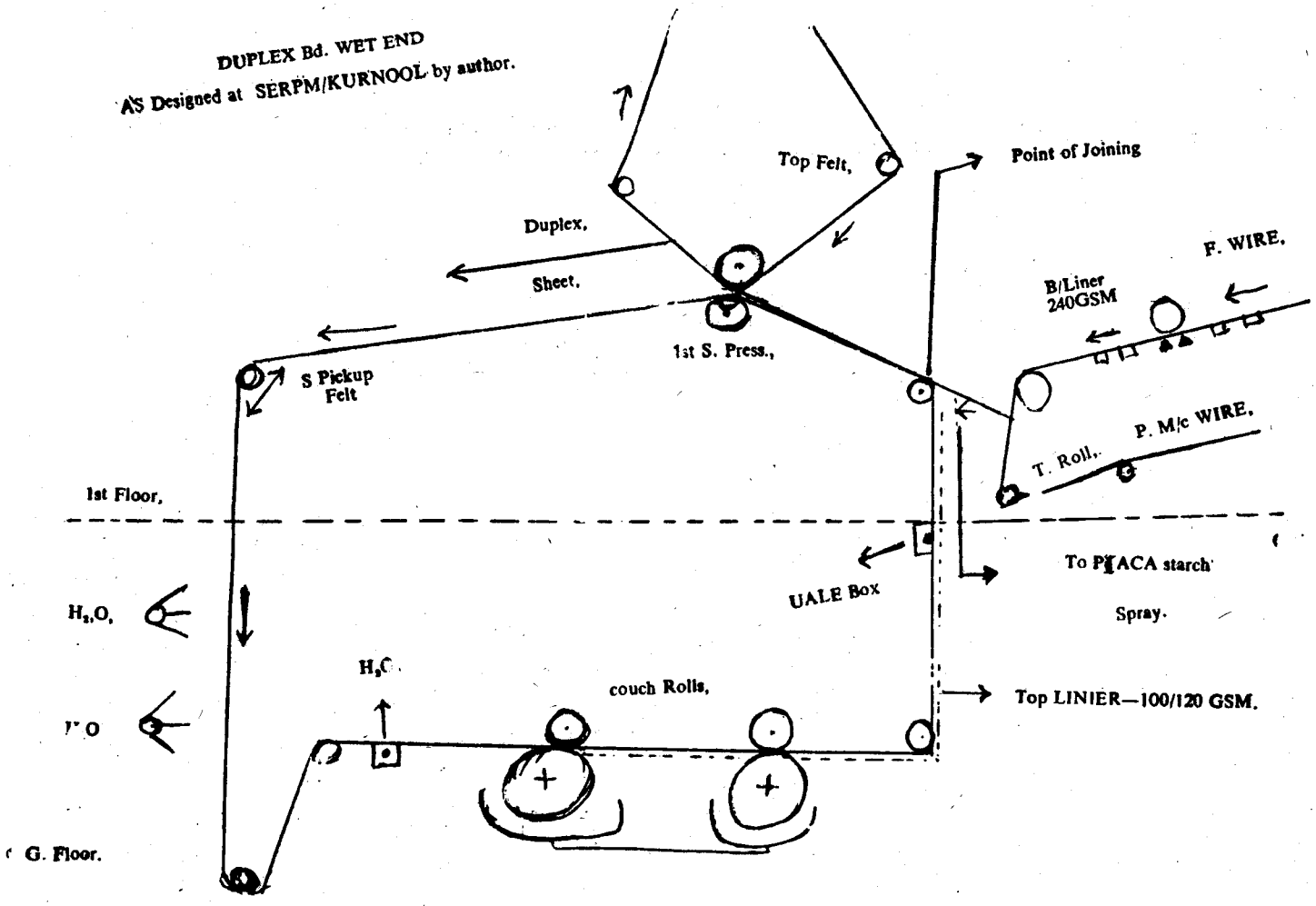
The suction press felt was increasd by 70 percent in length once for all, with a specific texture design and G.S.M. to suit normal running or to pick up front layers from the cylinder molds. Then, the required UHLE boxes, with vacuum, were installed in the felt circuit with high pressure shower and to clean the felt on its return journey.

During erection time, a few foreigners vistited this work, and they expressed doubt, saying that the F/L ply higher did not climb vertically 5-meter high. But, that was not true. It does climb, and this plant makes 80/90 tons of Duplex Board per day now, and will give much higher production because of the margin in drying capacity, with this paper machine. SRPM has furher upgraded the machine by incoraporating the doule felting system.

The frontliner comes from two Nos. of Dry Vats modified locally at the factory. This gives excellent formation (Bond formation) only at 40/45 SR°, even at a speed of 95 to 100 m/m. This means a great deal for board-making e.g. high opacity, less show through much less consumption of frontliner stock (with no show through), high tear and less sensitive to the stress/strain effect at dryers.

If the normal 1.2-dia-meter cylinder mold by uniflow type is compared to this Dry Vat, it is found that a uniflow mold (Voith & Dorris or Bruder Haus) of 1.2-dia-meter at 90-meter speed will require 55 to 60° SR for the stock (highly beaten stock) to give this identical formatiom ; but, due to the high degree of beating, transperancy is developed, for which an extra quantity of frontliner stock is to be added or an extra quantity of soap-stone powder or extra tinting are to be added, which result in a 'Unbalance Circle'.

Ex-Paper Consultant, Sree Rayalaseema Paper Mills, Kurnool. Ex-Chief Paper Maker, Orient Paper Mills, Orissa, Ex-Production Manager, Rohtas Industries Paper Mills, At preaent Freelance Paper Consultant.



In the case of Duplex Board plant, a C.P.C. starch spray beam system has been utilised, through which the starch or tamarind seed powder at 20 G.P.L. is being cooked at 80°C and applied on the F/L which is ascending up with the felt. This chemical works in two ways : (1) Binds the B/L and F/L under the suction press roll (2) The chemical gets migrated from the applied side to the printing side of the F/L during its journey over the suction box of the press sealing the pores permanently, which means the F/L becomes varnishable (High SOA value) and the wax pick value goes up to 10A/11A and mind it inspite of the F/L pulp beaten to only 40° SR.

This process does not experience 'blowing' problem such as at the M.G. because there are only three layers, viz., one backliner and the two of frontliners 'producing' up to 340 G.S.M., at the upper range. The more the plies (layers of web), the more sensitive these are to Blowing problems at the M.G. Any Fourdrinier paper machine, with M.G. or without M.G. situated at the 1st floor can go for me the Duplex Board quality with very little capital investment.

If there is no M G. it does not matter, with the existing calender stack, water doctor may be installed to give the F/L finish or smoothness, which is mostly wanted for printing, and not the gloss : glaze is given by the M.G., which compels the running of the machine under capacity because of keeping the steam throttled at the top series of dryers just ahead of the M.G for Glaze and to avoid burn marks at the M.G. surface. Sirpur Duplex Board plant does not have M.G., The smoothness is done with water finish process at the calender. This board is one of the country's prized products. The plant (Sirpur, No. 6 machine) came from abroad in a half-clad condition ; a lot of valuable work has been done by Indian technologists and engineers on this plant and, now, it is in the top line.

Likewise, Orient. No. 7 Duplex Board Plant, had to be upgraded to the present status ; the same story is being repeated in most paper mills.

Common Duplex Board plant problems and remedies :

Cylinder Blows

Vat section blow, appears like 1" to 2½"-wide entrapped air, often called Rail Roads.

Remedy : Water from the couch nip should not be allowed to flow back, couch slice lip sucker to be checked, or the cylinder mold which has gone dirty must be cleaned.

A blugged shower hole may cause this ; it should be cleaned. The couch loading should be equal on both sides. The Vat felt seam should be made straight ; and the felt should run square.

The first cylinder should be of little suction head difference The position of the couch roll should be operated with approximatey one quarter-diameter of the Mold offset.

If the stock on the last cylinder is formed too close and dry, point of contact, the suction head is to be reduced.

Kerosene oil should not be used to kill foam ; this will create 'rairading' foam, hitting the sheet after it leaves cylinders.

Stock freeness is very important; If the liner stock freeness is reduced or it goes down, there will be blowing, or if the difference of stock freeness of both liner and filler suddenly widens, there will be blowing.

There are the following defects found in Duplex Board, and they are treated or dealt with accordingly—defects like checking, curshing, drop-off cylinder wrap, felt picking, wet streaks. dirty calender molds, weak ply bonding, cockles, fluff, calender punch marks, calender custs, curling.

The plant, designed by the author, does not experience many of the above major problems because of the in–built machine configuration and the running style adopted.