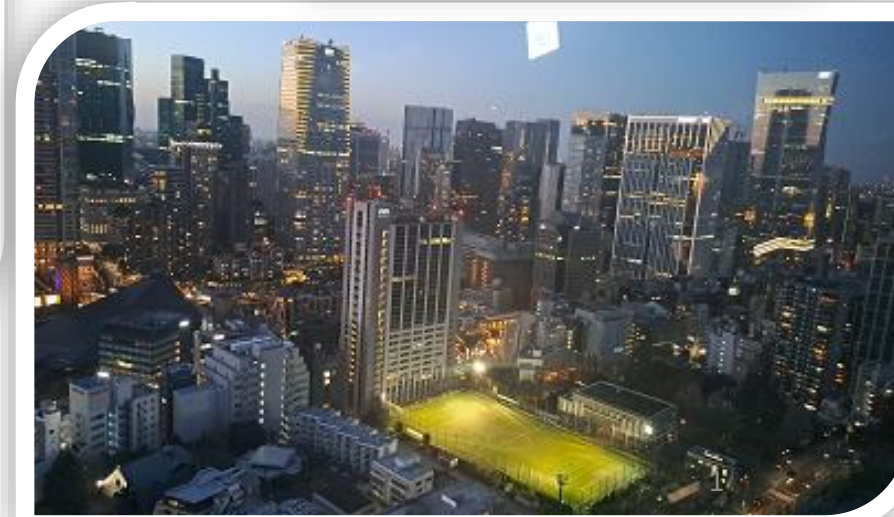
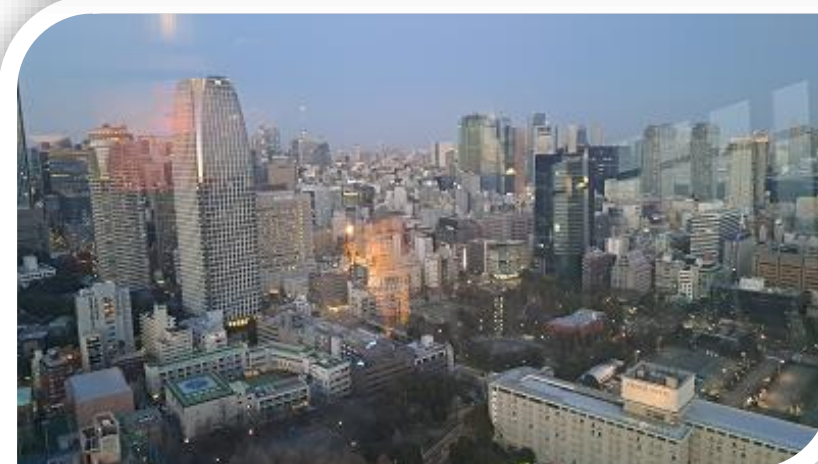




TECHNICAL REPORT

Japan Knowledge Trip
organized by IPPTA in
collaboration with
TAPPI Japan



Compiled

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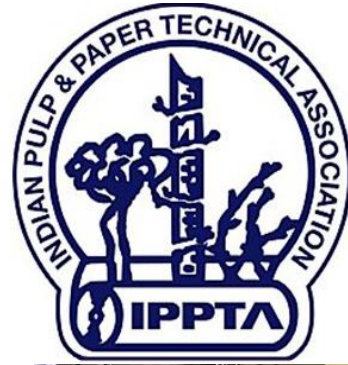
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Rengo Co., Ltd. Yashio Mill



About Rengo Mill

- Started in 1947
- Total Production Capacity : 1 million tonnes
- Pulp : Recycle Fiber
- Employee : 361
- Total Area : 1,30,000 m²
- Total Machines : 5 (3355 TPD)
 - PM#1 : Corrugating Medium , 6.65 meter width, 115-200 GSM, 1100 TPD
 - PM#2 : Tube Board , 2.4 meter width, 255-710 GSM, 85 TPD
 - PM#3 : Chip Board , 1.93 meter width, 350-850 GSM, 70 TPD
 - PM#5 : Liner Board , 5.24 meter width, 120-210 GSM, 1000 TPD
 - PM#7: Corrugating Medium , 1100 MPM, 7.83 meter, 90-125 GSM , 1100 TPD

Product & Quality

- Corrugating Medium
- Tube Board
- Chip Board
- Liner Board
- Main Slogan : **Less is More for reduction of CO2 emission** 65000 tons/year and target is to reduce 50% by 2050.
- Sniffer Dogs are used for smell detection on arrival of each OCC Container.** This is one of the counter measure used to control odor in final finished material.

Technical Strength

- Fully automation from raw material feeding to finished product.
- Ware house is fully automatic.**
- Shoe press on each machine** and after press dryness is 55%.
- Waste Wood chips based bio-mass Boiler (stoker type) and Natural Gas Boiler
- Total uptime is 95-96%.**
- Overall Efficiency is 96%.**
- Water consumption : 34000 m³/day : 11 m³/mt of product. It includes purchased / Industrial & River water.
- Power Generation : 1.1 million Kwh/day , out of which 70% is inhouse and 30% is purchased





Rengo Co., Ltd. Yashio Mill: PM#7 Technical Details



Paper Machine

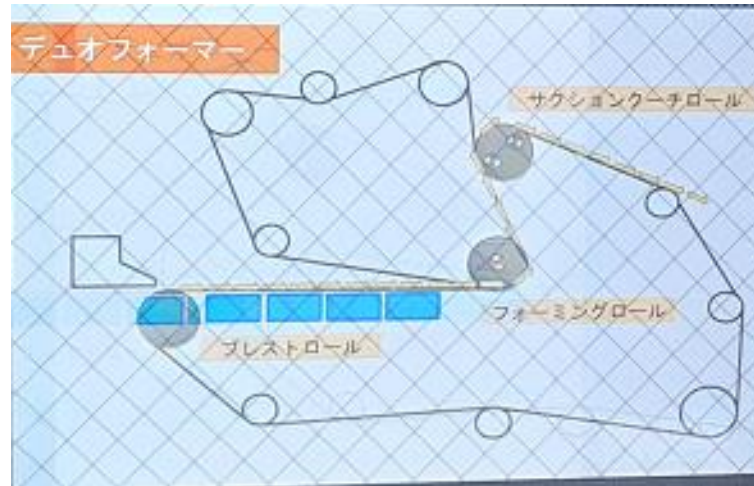
レンゴ株式会社 八潮工場 Rengo Co., Ltd. Yashio Mill	
機械名称	PM№ 7号抄紙機 PM7
網巾	Wire width 7,950 mm
紙巾	Web width at reel 7,250 mm
設計抄速	Design speed 1,200 m/min
紙質	Grade 中芯原紙 Medium board
坪量	Basis weight at reel 90~125 g/m ²

Machine Specification

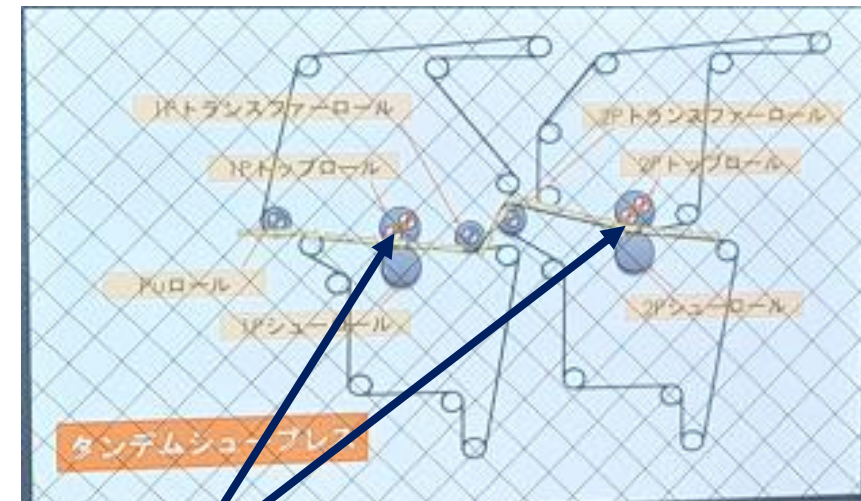


Machine DCS Room

Wire and Press Part



Wire Part



Shoe Press

Press Part



Rengo Co., Ltd. Yashio Mill: PM#7 Winder Technical Details



Winder Details

レンゴ株式会社 八潮工場 Rengo Co., Ltd. Yashio Mill	
機械名称 PMNo	7号抄紙機 PM7
リール巻取長 Max. length at reel	60,000 m (LCCX90)
最大卸数 Max. set at reel	8 卸 set
ワインダー速度 Design speed at winder	2,300 m/min
最大製品巾 Max. web width after winder	2,800 mm

Winder Specification

Ware House Details



Showing automatic reel lifting in ware house

Warehouse

Space	2,375 m ² (excluding truck berth)
Capacity	3,600 ton
Start Up	October 1991
Max. Height of Stacked Roll Stock	10 m
No. of Cranes	7
Crane Features	Transform roll weight into horizontal grasping force Oil-less link mechanism No power source for grasp-and-release motion

Ware House Automation



Ichikawa Co., Ltd. Kashiwa



About Ichikawa

- Ichikawa Company was founded in 1949.
- Kashiwa mill started in 1964 and Mainly Needling & Finishing operation are carried at this mill location.
- Weaving , Shoe Press Belt and R&D Centre at Iwama mill which opened in 1996.
- Press felt manufacturer and expertise in Shoe press felt
- 513 Shoe press felt installation in Europe , 385 in China , 184 in Asia and 39 installation in India.

Product & Quality

- Press Felt
- Speciality in Shoe Press Belt and almost 60% market share in Shoe press belts.
- Transfer Belt
- Systematic QA process check at each step.

Technical Strength

- A state of art technology of making Press felt/Shoe press belt to have highest life with excellent paper & board quality.
- Engaged in giving comprehensive solution for the press section.

NIPPON PAPER CRECIA Co., Ltd. Koyo Mill



About KOYO Mill

- Started in 1943 and mill is merged with NIPPON in 2012.
- Five mills in Japan
- Site Area : 138000 m²
- Total Machine : 3
 - PM#1: 7 layer mould machine , 2.06 meter width , 40 TPD
 - PM#2 : Cast coated , 2.032 meter width , 30 TPD
 - Tissue Machine: Beloit Crescent former started in 1993. Fully Automatic Toilet Tissue line, 3.360 meter width , 100 TPD
- Pulp : Recycle Fiber in packaging board and Virgin Imported Pulp (HW & SW) in Tissue

Product & Quality

- TT Rolls in 16 GSM (Kleenex brand)
- Value addition by changing product length from 25 to 75 meter. Dia is kept same , 18 cm. It helped in reduction of CO2 Emission and lower logistics cost.
- Reusable non-woven paper towel which is highly absorbent.
- Coated Board
- Castcoated Board

Technical Strength

- Fully automation from raw material feeding to finished product supplied by Orion Kawauoe Pelini , Italy.
- Jumbo roll conversion directly to 18 cm dia and 3.325 meter width roll. This roll is again being converted online in small 10 cm width roll.
- Small rolls are being online packed first with poly pack and then in carton.
- Robo is putting Carton on pallet and after that complete pallet is being stretch packed to ship to customer in packed container vehicle. Packing is also inserted in-between pallets.



OJI MATERIAL Co. Ltd. Fuji Mill



About OJI Mill

- Started in 1908 and merged with Oji in 1933.
- Site Area : 280000 m²
- Pulp : Virgin pulp (5%) on top layer and other layers are having OCC and high quality waste paper (OCC and Deinked white pulp) i.e 95% Recycle fiber.
- Two Paper Machine , 1310 TPD
 - PM#1 : Twin Wire , 4.51 meter width , 1000 MPM Speed and 560 TPD production (Oct-1990)
 - PM#2 : Five layer , 4.70 meter width , 800 MPM Speed and 750 TPD having four online coater , 120-450 GSM (Oct-2001) , Two Soft-nip Calendar
- Five Synchro sheeter (2.4 meter deckle) placed parallel to each other and three ream packing (80% Sheet order).
- Separate company OJI Material is providing Raw Material.

Product & Quality

- Five layer coated white board.
- Corrugating Medium
- White waste is stored inside the shed to avoid quality deterioration.
- Procuring good quality of waste paper so as to have very rare segregation of contaminants.
 - White paper waste: 17%
 - Magzines:38%
 - OCC: 40%
 - Rest 5% is imported SW pulp
- Sister concern of Oji material is providing raw material.
- DIP Brightness : 80%



Technical Strength

- Waste wood chips/RPF/Waste tires based Bio-mass boiler started in 2015. Coal is used partially and qty is very small.
- 50000 m³/day water (River/Ground/Industrial), consumption , 38 m³/mt.
- Shoe Press on both machines
- 300 MPM Pasaban Synchro sheeter with online automatic pallet packing and marking. Pallet shift from Pasaban sheeter to packing machine through Robo.



Hokuetsu Corporation , Niigata Mill



About Hokuetsu Mill

- Started in 1914 and re-modified in 1964 after Niigata earthquake.
- Production : 1.1 million MT/Annum, Largest mill in Japan
- Site Area : 617000 m²
- Pulp : Own HW Bleached pulp 2550 TPD , Recycled Fiber and Deinked pulp
- Two continuous digester having 4 hrs retention time , Bleaching sequence: Two stage ODL+D₀E_{OP}D , R8 ClO₂ process
- 100% Imported Chips , 50% from Chilli , 40% from South Africa, 10% from Australia. Chips are stored 20 km away from plant. 30000 MT chip storage capacity.
- Paper Machine , Total Seven , 3710 TPD
 - PM#3 : 3.8 meter width , 170 TPD
 - PM#4 : 2.90 meter width ,160 TPD , on-machine coater
 - PM#5 : 6.25 meter width ,460 TPD , 50-125 GSM, 93% Efficiency , 14-18% Ash , Equipped with Tri-Nip Calendar
 - PM#6 : 5.89 meter width ,350 TPD
 - PM#7 : 5.88 meter width ,510 TPD , on-machine coater
 - PM#8 : 8.05 meter width ,980 TPD , on-machine coater
 - PM#9 : 10.7 meter width Twin Wire ,1080 TPD , on-machine coater , 1600 MPM, equipped with Two Shoe Press (1050 kN/m load) and four soft-nip calendaring, Lightweight coated paper, 48-50 GSM , 96% Efficiency, supplied by M/s Metso : SymRun

Product & Quality

- Uncoated Fine Paper
- Coated Paper , C2S
- Lightweight Coated Paper , C2S
- Coated Board
- Corrugating Medium
- Majorly export to North America.
- 85% Hard wood pulp brightness
- COD Carry over : 5 kg/mt
- Blown Kappa no : 17 with 18% Active Alkali.
- After ODL Kappa no. : 9
- 6% Moisture before size press and 5.5% moisture at pope reel.
- Very Smooth Paper less than 60 ml/min Bendtsen

Technical Strength

- Low CO₂ Emission : 560 kg/mt
- Renewable Energy : 70%
- 53% Bleached pulp yield and Technical team shared that this is coming as per installed technology , chip quality and reduction of losses.
- Black liquor Solids : 1.5 t/t of pulp
- DD Washer , Compact Press and Twin roll presses in pulp mill.
- Low ClO₂ consumption 8 kg/mt.
- Automatic unloading of chips in hopper and feeding to digester.
- NO odor even at higher 28% Sulphidity.
- WBL total solids 18% which is being concentrated up to 73% for firing in Recovery Boiler.



Hokuetsu Corporation , Niigata Mill



Unloading of Chips



Steel structure at Core Pipe end



PM#9 Machine Floor





JAPAN TAPPI : Overview of Japan Pulp & Paper Industry & Initiatives



1. Japan's Paper and Paperboard consumption is decreased from 32 million tons in 2000 to 21.6 million tons in 2023 i.e. 10 million tons market is lost in last 23 years. It was due to decline in newsprint and graphic paper (printing media) by looking into shift information tool from paper to electronic media , especially multifunctional smartphones.
2. Annual per capita consumption is 186 kg compared to India 20 kg and world avg 57 kg.
3. To regain volume , Japan pulp and paper industries are now looking into the product restructuring by focusing on Packaging (liner and corrugating medium) & tissue as well as enhancing new value creation by
 - a. developing new material from wood which will lead to prevent climate change such as CNF (Cellulose Nano Fiber). Bioethanol and biochemical production from construction waste wood.
 - b. Developing paper products against plastic
4. Focus to increase Recovered paper utilization rate for Circular economy. It is increased from 51.6% in 1990 to 65.9% in 2021 and accordingly recovered paper recovery rate is increased from 49.8% in 1990 to 80% in 2021.

3F 会議室 Ginza PHOENIX PLAZA	一般社団法人中小企業診断協会	2F ホール Ginza PHOENIX PLAZA	IPPTA and Japan TAPPI Technical Meeting
	山王スペース&レンタル株式会社 特定非営利活動法人 全国無洗米協会		
		5F セントラルミュージアム銀座	





JAPAN TAPPI : Overview of Japan Pulp & Paper Industry & Initiatives



5. Research have shown that combination of both paper and digital media improved the learning efficiency compared to digital media. So, Paper industries should communicate the message to society and JPA is organizing education in school and society for emphasizing how paper industry is driving forestation .
6. Japan pulp and paper industries are taking target of becoming carbon neutral by 2050 through
 - a. Energy saving equipment's and technologies for pulp and paper making.
 - b. Increasing the ratio of renewable energy from 43% (Fy22) to 74% in 2050.
 - c. Social implementation of CNF which is expected to increase from current 100 kg/day to 250 TPD by 2030
 - d. Use of paper material products as an alternative to fossil-based plastic packaging material.
 - e. Conversion fossil based product to bioplastic and biochemical.
 - f. Promotion of sustainable forest management.
 - g. Promotion of fast growing forest tree breeding for expanding CO2 absorption volume through sustainable forest management.
7. Japan's Pulp and Paper industry is using 73% imported wood and only 27% domestic wood. 66% is forest cover area. Most of the mills are having plantation forest abroad like Daio, Oji , Hokuetsu. Now , Japan paper association is working on conversion of non-forest land into plantation forest and running a drive in school and society to break the myths of consuming paper causes deforestation.
8. Restructuring of Japan pulp and Paper Industry by Strengthening of existing business thru cost reduction, Export expansion to growth countries and New Business development thru Creation of new opportunities.



Learning from Japan Pulp and Paper Industry to explore opportunities



1. Machine and Converting plant is completely closed and double door system is used in order to avoid entry of any Insects and atmospheric contamination in manufacturing process. Fully automatic Toilet roll line from jumbo to final pallet.
2. Less manpower such as 360 manpower for 1 million tonne production through automation in different part of process , especially converting section. All the mills were having full automation in order to avoid manual intervention even from chips unloading from truck to final product. Safety , Quality , TPM and five S culture is visible in all the plants.
3. Installation of recordable monitoring cameras at 24 break points. It helped out to tracing the videos to find out root cause of unidentified sheet break. It helped a lot for sheet break reduction from 32 breaks in six month to 7. It also helped to took the measures for other defect by linking cameras with defect detector.
4. Automation of Grade change through analyzing operation data and factors of variation. Used feed forward control system which do multiple task at once for the target. Approx 50% time (23.5 min to 10.7 min) reduction achieved in Grade change.
5. Installation of on-line freeness control to fine tune the refiners. It helped in maintaining stable quality and energy saving up to 20%.
6. Use of AI for proper storage of rolls in ware house and set three sections for loading preparation before arrival of truck.



Learning from Japan Pulp and Paper Industry to explore opportunities



7. Loading trucks are having completely enclosed container and complete body is dust free.
8. Housekeeping is excellent in all mills and follow Safety first , then Quality and productivity. Very Disciplined to follow each SOP.
9. Minimum Complete Wire length checking for Physical defect identification. Only latest machine at Hokuetsu Mill on high speed 1600 MPM was having on-line camera.
10. Wastepaper quality is excellent with negligible contamination , therefor very limited segregation.
11. Indian pulp and paper industries also needs to work together to increase plantation as JPA is doing.
12. Pulp Yield is 53% , black liquor solids 1.5 t/t of pulp , WBL total solids 18% which is being concentrated up to 73% for firing in Recovery Boiler and 8-9 Kg/t of ClO_2 consumption
13. Paper machine efficiency is 93%-96% with shoe press on all machines. 300 MPM Pasaban Synchro sheeter with online automatic pallet packing and marking. Pallet shift from Pasaban sheeter to packing machine through Robo.
14. NO odor even at higher 28% Sulphidity and main focus on sustainability.

THANK YOU