Gypsum Board Production Line

TAI’AN JIEPU GYPSUM TECHNOLOGY CO. LTD
JUNE, 2010
Our gypsum board production line adopts advanced technologies including automatic batching system, board molding system, hard-surface mixer, auto edging, fixed-length cutting, traverse conveyor, cross air dryer, pile proof device, auto tracking device, humidity auto control system, auto booking machine as well as auto packing machine. The batching system can mix 0 kinds of powder and slurry, and this production line can automatically weigh and add materials as per the processing speed. In order to keep up with international almost advanced technology, we introduce hard-surface mixer and cross air dryer, and make them being used for board line built in USA and MEXICO. In addition, we successfully use Natural Gas Direct Dry Technology for 15 million sqm/yr gypsum board line for ITALY Gessi del Lagod 'lseo Spa Company. In order to improve the heat efficiency of dryer, we complete use waste heat recovery technology from the year 2006, which has a good effect for environmental protection.
Production Flow Chart—flow sheet and monitoring picture
Production Line — batching section

- All hopper and tanks are redesigned with max. and min. material level alarming devices to avoid overloading or null loading.

- The qualified modified starch, accelerator, and glass fibre first are conveyed to the top of the hopper by electrical hoist, and then are conveyed to the respective hopper manually. All hoppers have min. material level alarm device. All materials in the hoppers are conveyed to the belt conveyor after being metered respectively.

- The water will be conveyed to a high-position water tank by an electrical water valve. After the high-position water tank overflows, the water will go to low-position water tank, and then conveyed to a vertical mixer after being metered by a metering pump. When power off, by opening a valve, the water in high-position water tank will wash the vertical mixer. The quantified foaming agent will be added to the storage tank. When using, the foaming agent and water will be sent to the foaming device separately. Then, compressed air is conducted to produce stable foam, which will also be conveyed to the vertical mixer, metering by metering pump in the foaming station. The waste paper and water, with certain proportion, will be crushed into pulp in the hydropulper. The pulp will be conveyed into a pulp storage tank via a pump, and then sent to the vertical mixer through metering pump.

- Water reducer, water-proof agent, and water will be added to a preparation tank and after mixing, the slurry will be sent to a storage tank and then conveyed to the vertical mixer by a pump. The plaster is supplied to the belt by a frequency control feeder, and the belts control the dosage, then conveyed to a screw conveyor after metering. All powder additives are conveyed to the mixing screw conveyor after metering, mixed in the conveyor, and conveyed continuously to the vertical mixer.
The glue coat device will make edge glue be evenly spread on the connection part between upper paper and lower paper to make them firmly bond together.

The upper paper and lower paper are conveyed to the paper-move-back standby electric hoist. The lower paper goes through paper-receiving table, alignment device and indentation device, and then conveyed to the forming station via a vibrating platform. While the plaster slurry of certain consistency, which is formed in the vertical mixer from various kinds of solid powder materials and liquid materials, flows out onto the lower paper at the forming station. Meanwhile, the upper paper goes through paper-receiving table, alignment device and edge glue coating device, and then to the forming station. The upper paper and lower paper together pack the plaster slurry to form board with specified shape and thickness. After going through the setting belt conveyor, the formed gypsum board is hardened with certain hardness. There are water spray device, squeegee wiper and washing device on setting belt conveyor.

Then the board goes through the setting belt to roller conveyor, which is a special equipment for gypsum board production line and is mainly used for further setting and conveying of board. The speed of roller conveyor should be synchronized with that of the setting belt. The speed could be controlled by adjusting the frequency of the converter motor. A length measuring device is equipped on the cutting unit of the roller conveyor. The setting belt conveyor and roller conveyor are set with the emergency stop switch.

AC converter is adopted for the motor drives system of setting belt conveyor, roller conveyor, and accelerating rollers. According to the preset production speed, ON/OFF and synchronous running of the equipments is controlled by PLC through the communication interface of the converter.
Production Line —— cutting and drying section

- The cutter can fix and cut the gypsum boards conveyed from roller conveyor, and the cut length can be set as per production requirements. The cutting error is within ±1 mm. The cutter is controlled by Mitsubishi Servo control system. The length can be sent to PLC, and the PLC system can control the servomotor of cutter according to the set length.

- The accelerating rollers consist of several sections of independent rollers. If the board is not cut, the accelerating rollers will run at a low speed, which is the same as that of the conveying roller. If the board is cut, the motor turns to high-speed running. It turns to low-speed running again when the end of the board leaves this section.

- If the operator finds out that the board quality is not good and needs to be rejected, push the corresponding button, and the rejected board will be discharged. At this time, the conveying roller for the rejected board is under working status.

- Action of 1# transverse conveyor and various driving devices are controlled by the photoelectric switch and approach switch. When the first board reaches the set position at the end of the feeding roller, the motor of the feeding roller will stop, and the roller frame will drop. The board moves transversely, turns over, and is conveyed to the discharging roller, turn-over device, and transverse belt conveyor. When the second board turns over, the transverse belt conveyor starts again. In this way, two pieces of board collected into two rows.

- The boards conveyed by 1# cross discharging roller will go into the distributor, then they will be transported to the different layer of dryer by the distributor according to certain rule.

- The heat source of dryer is hot oil conveyed from thermal oil furnace or hot air of natural gas. The circulating air first heats by heat exchanger and then conveyed to each layer of dryer evenly. The dryer consists of board inlet, sealing section, board outlet, heat exchanger, hot air conveying channel and fan system.
Production Line — edging and stacking section

- The two rows of boards move to the transverse conveyor after coming out of the belt conveyor. When the board enters the lift-up roller, and the front edge meets the photo-switch, the rollers will speed up. When the front edge of the board is at a certain distance from the baffle plate, the rollers are converted from the high speed to the low speed, and the board goes forward at a low speed and stops in front of the baffle plate. At this moment, the lifted rollers will lower down, and the board drops down to the belt conveyor. At the same time, the belt conveyor immediately starts to run and conveys transversely the board for the second time. When the back edge of the board goes away from the belt conveyor, the belt conveyor stops, and the baffle plate lowers down, the roller lifts up again. The baffle plate can move automatically forward and backward along the roller conveying, and can be adjusted to the corresponding position as per the length of the plasterboard. The baffle plate is usually adjusted to the set position by shortening the distance. During operation, the brake device always works to avoid displacing of the baffle plate.

- The booker mainly consists of the belt conveyor and booking equipment. When the board enters the booking machine, the first photo-switch will start working. If there is only one board on the conveying belt, the booker will not work and the board will be conveyed away by the belt directly. If there are two boards on the belt, the booker starts working. When booking completed, the turn-over arm will lower down to touch the approach switch, the motor stops, and the conveying belts send the two-booked boards to edge trimming and packing machine.

- When boards go into the conveyor roller, a positioner begins to align crosswise, and then longitudinal alignment by a support device. After finishing alignment for 2 boards, they are conveyed to the saw cuttings system.
Production Line — edging and stacking section

- The sawcutting system consists of pre-cutsaw and main cutsaw. When cutting, first pre-saw cuts the board from the bottom, and then the main saw will be used. The main cutsaw cuts the waste edge, meanwhile, the crusher knife on the main saw will crush the waste edge, which will be collected by the de-dustings system.

- The packing system is associated with the edgetrimming machine. It is installed on both sides of the board edge. One is fixed, and the other is movable with the moving arm. It mainly consists of paper unloading, gluing, pressing and cutting. Unloading of the paper roll is driven by moving the board. The edge packing belt conveyor should keep synchronous speed with the movement speed of the trimming machine. The isolation block on the non-driving belt ensures a certain gap between boards. When the board stops moving, the gap is just on the location of the cutter. In this case, the continuous paper band can be cut.

- The finished product will be sent to the finished product push roller (I) and ready to be stacked. The aligning cylinder will align the board on the width direction. Another aligning cylinder on the stacking system will align the board on the length direction. When stacker No. 1 is full, stacker No. 2 will start working under computer control. Stacking platforms No. 1 and No. 2 work in turn to finish stacking the finished products. Finally, the finished products will be transported to the warehouse by the forklift.
Tosatisfyprocessrequirementsformodernizationofgypsumpowder productionline,guaranteehighlyqualifiedproductsandareliablerunningofthe procesosequipment,stabletheprocessparameters,saveetheenergyandto improvetherunningrateofproductionline,weadoptanadvancedandreliable DCScontrolsystemfortheproductionlineintotakeanintensivemonitoring, operatingandascattercontrol. Thisnotonlyimprovesthereliabilityand maintainabilityofelectriccontrolequipments, but also achieves the modernizationofcontrolling,monitoringandoperatingsection. Becauseanopen internetprotocolisadopted,themanagementinformationsystem(MIS)canbe easilyconnectedtoDCS,whichcanprovidetheproductioninformationtothe administrativepersonnelatanytime.
Machine Picture — Italy board plant
Machine Picture ---board workshop
Machine Picture -- Liquid batching section
Machine Picture — powder batching section
Machine Picture — paper system section
Machine Picture -- forming section
Machine Picture —setting belt conveyor
Machine Picture — 1# cross and cutting section
Machine Picture — Board Distributor
Machine Picture -- Board Dryer
Machine Picture --2# cross conveyer
Machine Picture — natural gas direct heating technology
Machine Picture — stacking section

02/27/2004

TAI’AN JIEPU GYPSUM TECHNOLOGY CO., LTD
Machine Picture — electric control cabinet
Machine Picture — monitoring picture
The first board produced by Italy Client
OUR SERVICE

- We can provide our customers package of services from engineering design, equipment manufacturing, equipment installation, commissioning, personnel training till to operation. We can provide the turn-key project.

- With a strong design team as the basis, we can also supply equipments and production line with different configuration which are tailored to customers’ requirements. We guarantee whole-life service for our equipments.

- We have a well-equipped laboratory which can assay raw material for our customers, and according to the test results, we can realize the commissioning which reduced the cost for commissioning.
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## PARTS CUSTOMERS

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CONTACT US

TAIAN JIEPU GYPSUM TECHNOLOGY CO., LTD
Headquarter Add: B19, TaishanScience & Tech City, TaianCity, Shandong Province, China
Factory Add: Road 2#, Gypsum Industrial Park, Dawenkou, TaianCity, Shandong Province, China
Tel: +86-538-6962666
Fax: +86-538-6962555
Mobile: +86-1395-383-7267
Web: www.tasingle.com; www.gypequip.com
Mailbox China): 2004single@163.com
Mailbox (Abroad): tasingle@gmail.com