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Technology Helps Propel U.S. Producer Into The Next Era of Particleboard Production

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Bright Wood Corporation: Cutting the Best Way



U.S. Particleboard Production Enters The 21st Century

GreCon Technology Helps Propel A U.S. Producer Into The Next Era Of Particleboard Production

By Gary Zauner

Which came first, the chicken or the egg? – It is a question that has perplexed the masses for ages. Asked less, although similarly perplexing, is the question - which is responsible for the evolution of engineered wood products? Is it the producer who creates the product and hears first-hand from customers about how a product can be improved, or the equipment manufacturer whose engineers create new ways to revolutionize the production process? Truth be told, both make equally significant contributions to an industry's progress. It is the collaboration between both the producer and equipment developer that brings about the evolution of an industry. One such collaboration took place in the particleboard industry recently. The cooperation revolutionized the US particleboard industry.

The Equipment Manufacturer: GreCon

One equipment manufacturer that has worked closely with particleboard producers in the evolution of the engineered wood products industry is GreCon. Bearing the slogan, "innovation is tradition," GreCon is known worldwide as a prominent manufacturer of quality assurance measuring equipment for the composite panel industry. The company is also the world's leader in spark detection and extinguishment systems for pneumatic conveyor and exhaust systems.

Since 1911, GreCon has created and developed technology that optimizes production, ensures safety, and upgrades product quality in production facilities around the globe.

Headquartered in Alfeld, Germany, GreCon has sales and service offices located in over 60 agencies throughout the world and boasts over 30,000 installations worldwide. Research and development and distribution capabilities are located at the company's Germany location and its North American based operations in Tigard, Oregon. North American regional sales offices are located in At-

lanta, Georgia; Dallas, Texas; Charlotte, North Carolina; Minneapolis, Minnesota; Grove City, Pennsylvania; Spokane, Washington and Surrey, British Columbia.

The Particleboard Producer: Willamette Industries (Weyerhaeuser)

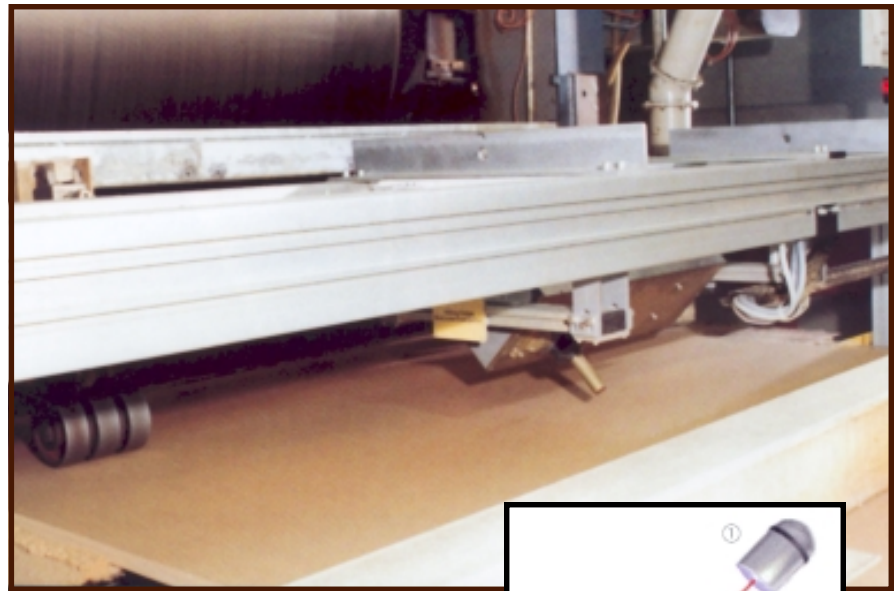
A company puts a lot of careful calculation, planning and thought into a \$95 million capital expenditure. It was no different when Willamette Industries, Inc. (now Weyerhaeuser) envisioned building

Carolina Particleboard in Bennettsville, South Carolina. Industry observers questioned the move – constructing such a plant at a time when North American particleboard production capacity and imports combined to exceed US demand and throttle prices.

Willamette Industries decided to approach the market differently. The company would invest in a future beyond the current depressed prices. The high quality of particleboard produced in this new, state-of-the-art plant would not just pick up “the scraps from the floor” of the market when the time came, it would allow the company to sit at the head of the table, with elbows extended, taking its share of the market directly from other producers making an inferior product. In its pursuit of a plant that would accomplish this goal, Willamette Industries would need the most cutting-edge manufacturing equipment and quality assurance systems available today.

The Collaboration

In pursuit of the “next generation of particleboard,” Willamette Industries was looking for characteristics in their board that would set it apart from other products in the market. A light colored board was important, as was a panel surface with the highest of qualities. The panel’s core would need to provide unsurpassed levels of machining characteristics and a uniform density throughout the panel. Willamette turned to GreCon to help ensure that the particleboard the company would call “UltraPine” had these quality characteristics.



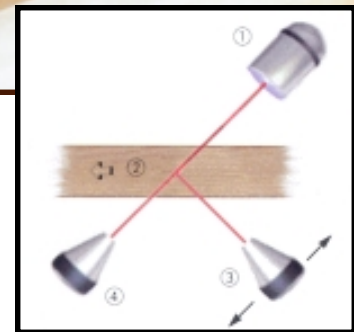
A StenOgraph

The Evolution of An Industry Raw Density Measuring System

According to T.J. Rosengarth, Carolina Particleboard Project and Plant Manager, “Density uniformity is the single most important aspect of board quality. As density varies, so do the physical properties of the finished panel.”

To measure density variations in its particleboard, Willamette chose GreCon’s StenOgraph. This system is unique in the industry, providing a continuous, on-line density profile measurement. Before the StenOgraph was developed, particleboard samples were taken to a plant’s laboratory to be measured. Not only did this create extra man-hours, it slowed the production process. Because the StenOgraph is designed to determine the density profile of a moving panel directly at the outlet of the continuous press, the production process can be rectified immediately, without taking samples of particleboard to the laboratory.

In the process of taking density measurements, a focused x-ray beam penetrates the cross section of the moving panel at a 45-degree angle.



Measuring principle of the StenOgraph

An x-ray beam (1) penetrates the cross section of the panel (2). A scanning detector (3) records the scattered radiation, while a stationary detector records the transmitted radiation. The combination of the two signals is calculated to determine the panel’s density.

On the other side of the panel, a stationary detector records the transmitted radiation. At the same time, a moving detector scans and records any scattered radiation. Combining both signals, the density of any part of the product’s cross-section can be directly calculated, independent of the surrounding structure. These profiles are then presented on a monitor, allowing producers to take corrective steps if necessary to ensure the desired density profile.

Different density profiles are required for different types and widths of panels. A “changeover” from one type of panel to another requires a certain “run-in” time, where produc-



Weight per unit area gauge detector

tion of one type of panel ceases and another begins. The StenOgraph allows this process to occur within a shorter period of time, again, decreasing the volume of substandard particleboard produced. Because particleboard can be produced with higher density profiles than those required, the StenOgraph can also optimize the raw density of the product, thereby cutting back the amount of raw material it takes to produce the product.

Traversing Weight Per Unit Area Gauge

GreCon also manufactures the BWQ X-Ray Weight Per Unit Area Gauge that Willamette purchased for Carolina Particleboard. The gauge measures the quantity of material used to produce the particleboard and measures the panel density. With this equipment, profiles are scanned across the direction of production and continuously monitored

as the particleboard passes the measuring gap. Part of the radiation emitted by the source is absorbed by the particleboard, while the remaining radiation reaches the detector. The detector then measures the attenuation rate of radiation and indicates the weight per unit area.

Air nozzles clean the x-ray source, allowing the process to continue in severe industrial conditions. After a certain number of measuring courses, the measuring system automatically shifts to a calibration

point before measurements are again taken. Readings and graphs are displayed clearly on a large color monitor, allowing for easy interpretation of the weight per unit area measurement.

Stationary Weight Per Unit Area Gauge

GreCon also manufactures the BW4 X-Ray Weight Per Unit Area



GreCon Thickness Gauge

Gauge used at Carolina Particleboard. This gauge uses the same process as the BWQ, but it does not traverse the panel. Instead, a stationary gauge takes measurements of the board as it passes through the gauge.

Thickness Gauge

The GreCon DMR Thickness Gauges purchased by Willamette measure panels both after the press and after the sander, searching for variances in thickness that cause rejected panels and customer dissatisfaction. Adjustments in the production process can be made immediately whenever deviations from the desired thickness occur. These deviations often occur during production start-ups or when product specifications are changed.

Precision rollers in contact with the panel convert thickness variations into vertical motion within the system's transducer. The measuring heads are arranged in pairs opposite each other above and below the panel to ensure accurate measurement even during bending or vertical movement of the panel. The Thickness Gauge utilizes a computer system for thickness measurement.

Bond Analyzer

Vapor caused by excessive moisture or excessive material can create blisters or "blows" in particleboard. Defects can also occur when insufficient amounts of material reduce thermal conductivity, creating zones that cannot be heated adequately in the press cycle. The UPU 2000 Bond Analyzer is a qual-



GreCon's On-line bond analyzer

ity control system that reads each panel and records a trend analysis of these “blows” and unbonded areas. On-line adjustments can also be made to reduce the amount of defects during production, keeping the defects in panels within an acceptable tolerance.

The UPU 2000 scans the panel using ultrasonic transmitters/receivers. When unbonded areas appear in the panels, the ultrasonic signals are weakened, activating an alarm. The UPU 2000 can be equipped with an ink-marking system that automatically marks the panel surface behind each UPU channel and/or on the edge to identify defective areas.

The size and position of the defects are displayed on a color monitor, and data can be stored to provide historical information.

Spark Detection/Extinguishment System

Perhaps the most important equipment manufactured by GreCon is their spark detection/extinguishment system. Sparks or embers,

caused when combustible materials are dried or created by other production processes, can result in a fire or explosion when the glowing particles come in contact with oxygen. Not only can these events cause property damage and interrupt production, they also endanger lives.

Today's high velocity milling equipment can generate heavy showers of sparks instantly when metal or stones enter the mill, or, when mechanical parts are damaged. With GreCon's system, sensors mounted in the exhaust ducts detect infrared radiation emitted by sparks and count each instance.

Immediately upon the detection of sparks, a water mist spray is released from a device consisting of a high-speed solenoid valve with one or more spray nozzles. These are

mounted in the duct about 18' to 30' downstream of the sensors, depending on the conveying velocity. The amount of water released is sufficient to extinguish the sparks in a split second, but does not adversely affect the media.

The system can be pre-programmed to extinguish individual sparks without interrupting production or shut down machinery upon counting a preset number or shower of sparks. This feature protects machinery from further damage due to mechanical failure or foreign materials entering the mill. A control console displays and records each individual occurrence of sparks, time the sparks occurred, the exact number of sparks, duration of extinguishments and location of the spark occurrence. Events can be stored and then displayed or printed out for later review.

The Results

At 9:12 a.m. on July 27, 2001, the first particleboard panel rolled off Carolina Particleboard's press. It



Testing a GreCon spark detection/extinguishment system

marked the beginning of production at the most technologically advanced particleboard plant in the US. "The Carolina particleboard facility demonstrates the partnership commitment to optimize energy and resources within the production process to provide products of the highest quality," declared Hermann Staats, CEO, GreCon, Inc. This cooperative effort between GreCon and Willamette Industries (Weyerhaeuser) is a prime example of how equipment manufacturer and panel producer together can thrust an industry into the next phase of its evolution.



Additional Equipment Manufactured By GreCon

Twin Station (thickness gauge and bond analyzer).

This combination ensures the panel quality and consistency and reduces raw material waste.

Moisture Analyzer

Measures moisture content of chips after the dryer or in the area of the blender.

Laboratory Density Analyzer

Analyzes the density profile of board samples by means of x-radiation.

Plug Up Detector

Detects plugging of material in cyclones and chutes.

GreCon History

In 1911, a German named Carl Benscheidt established a factory that used beech wood to manufacture shoe molds. He named the company *Fagus*. With several ideas to improve on the molds, Benscheidt added a machinery division to Fagus in the 1920s. From the division, machinery was developed and sold worldwide.

In 1974, the great-grandchildren of Benscheidt, Gerd and Ernst Greten, took over Fagus and established the GreCon Division, which stood for Greten Consulting. This aspect of the business assisted in plant layouts and designs for factory processes. It was at this time that the company began producing measuring equipment for the wood products industry.

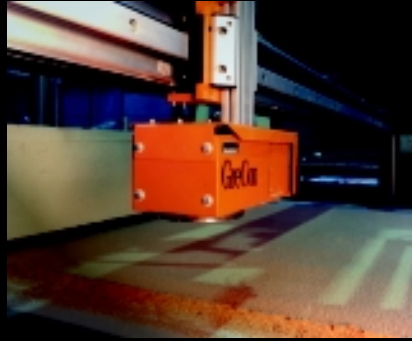
The GreCon Spark Detection and Extinguishment System was introduced to the North American market in 1979 with Factory Mutual Approved certification. In 1985, GreCon Electronics, Inc. was established to promote measuring systems and extend the spark extinguishing systems market in North America. In 1992, the name of the company was changed to GreCon, Inc. The next year, GreCon, Inc. started manufacturing measuring systems in Beaverton, Oregon.

GreCon received ISO 9001 certification in March of 1995. New technology and an increase in demand prompted the company to move its North American facilities to a new 10,000 square foot building in Tigard, Oregon.

Get it right the first time . . .



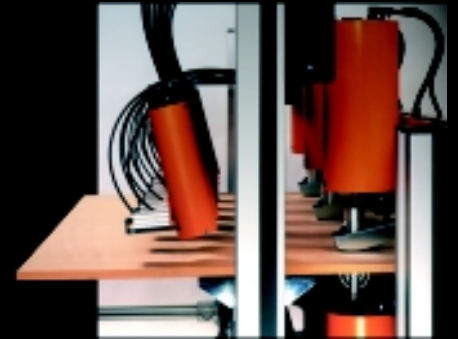
Moisture Meter



Weight-Per Unit Area



Raw Density Profile



Bond and Thickness

On-Line Systems

- Optimize energy and resources
- Protect employees and equipment
- Maximize production and profits



Spark Detection and Extinguishment

GreCon

Equipment that improves your bottom line

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