Implementing Strategies For Drying And Pressing Wood Without Emissions Controls

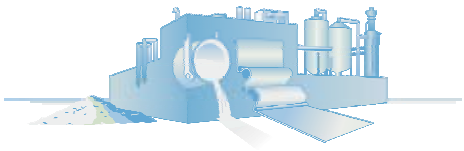
Innovative Processes for Suppressing VOC Formation

Volatile organic compounds (VOCs) are important precursors to ground-level ozone formation, and as such, are increasingly regulated at the federal- and state-level. The rules of the Maximum Achievable Control Technology Standards (MACTs) will require oriented strand board (OSB) mills to control dryer and press emissions. These emissions were previously controlled by regenerative thermal oxidizers (RTOs). Although effective, these control devices are expensive and consume large amounts of natural gas.

VOCs and hazardous air pollutants (HAPs) are formed by the thermal breakdown of wood when it is overheated. Fines smaller than 0.5mm are most susceptible to overdrying and as a result are the largest contributor to HAP formation. The project is demonstrating that separating fines from the rest of the furnish dramatically reduces HAPs emissions while minimizing fuel consumption.

Several strategies for reducing VOC formation from fines include: (1) reducing fines formation by changing flaker knife angle; (2) screening fines from larger wood pieces; and (3) adding compounds to suppress VOC formation during overheating processes. By implementing these strategies, OSB mills may ultimately be able to suppress VOC and HAP formation to levels that eliminate the need for end-of-the-pipe controls (e.g., RTOs).

Fines fractionation at Georgia-Pacific's Fordyce Plant. Fines are defined as material that falls through a 1/8" screen and are responsible for producing large amounts of HAPs.



Benefits for Our Industry and Our Nation

- Decreases VOCs emissions from lumber and wood panel drying facilities
- Reduces energy costs by eliminating the need for natural gas burning RTOs
- Lowers control costs
- Reduces wood costs in mills by up to $200,000 per year

Applications in Our Nation's Industry

VOCs and HAPs emitted from softwood drying facilities are subject to pending legislation. Existing control technologies are expensive and consume large amounts of natural gas. This technology will reduce control costs, decrease energy consumption, and lower wood consumption.

Project Description

The overall goal is to develop process changes to economically mitigate VOC and HAP formation during wood drying and pressing.

In a recent trial at an OSB mill, it was demonstrated that drying flakes to a high residual moisture at a slightly reduced inlet temperature, allowed the facility to meet HAPs limits to be met without utilizing emission controls.

In order to suppress HAP formation during drying and pressing operations, it is necessary to understand the root cause of HAPs generation on temperature, moisture, furnish type, and other parameters. The first objective of the project is to identify the subtle factors that lead to HAPs generation and to integrate them into a strategy for reducing emissions while maintaining throughput. The second objective is to determine which application (urea or resin as fine aerosols) will most effectively decrease HAPs and improve product properties.

Progress and Milestones

- Identified factors that lead to HAP generation during drying at an OSB mill trial (Completed December 2004)
- Demonstrated in a mill the reduction of fines production through changing knife angles (Completed June 2005)
- Investigate effect of reducing HAPs through the application of urea as a fine aerosol

Commercialization

The process changes developed in this project are inexpensive and simple to implement as "best practices." Knife angle changes to reduce fines production have already been implemented in some OSB mills.

Project Partners

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A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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