

On-Line Bond Analyzing for Quality Panel Production

Delaminations and blows are serious detriments to quality panel production; resulting in excessive raw material use and waste, panel rejects, poor customer satisfaction, and ultimately loss in profits. Use of an on-line bond analyzer provides quality production assurance and significantly reduces the production of defective panels. In order to fully optimize production, it is important to completely understand why panel defects occur and the various options available to manage them.

Why do delaminations and blows occur?

Several factors contribute to defects in panel production. The two most common defects occurring in all types of panels, including Particleboard, MDF, OSB, LVL, and Plywood, are delaminations and blows. Delaminations occur when glued laminate or board material doesn't bond properly. Blows are small air pockets or voids, resulting primarily from vapor development caused by excessive moisture or excessive material.

Delaminations and blows also occur when the amount of material is insufficient and the reduced thermal conductivity in the press cannot adequately heat zones. An inaccurate application of glue or resin, a change of glue formulation, or a poor glue batch, can also greatly increase the risk of defects. Variations in wood, inadequate drying or pressing time, or even a simple equipment malfunction can all result in defective panels as well.

How can delaminations and blows be prevented?

Defects in production are an unfortunate, but common problem in the industry. While it is not possible to completely prevent all defects from occurring, it *is* possible to eliminate a vast majority of them by analyzing defect trends and optimizing the production process on-line.

Trend Analysis and Production Optimization:

An on-line bond analyzer, placed after the continuous, multi- or single-opening press, scans panels as they pass for any production delaminations or blows. The analyzer provides precise monitoring of the location, size, and duration of any defects, and records them in a history log. This log can then be used to



determine any trends in production so adjustments can be made on-line to rectify any ongoing errors in production. For example, if the bond analyzer records a blow or a series of blows in a specific area on every panel, then by correcting the press or gluing process in that area future blows can be eliminated.

Although too short of press time increases defects, if press time is prolonged the manufacturer must also accept reduced productivity – and higher production costs. If, after a relatively long period of time, no defects are detected, the operator may elect to shorten the press time in order to optimize production.

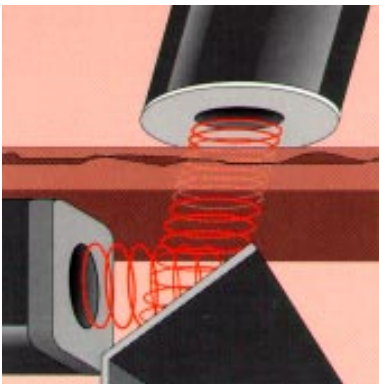
Not every defect in a panel results in unacceptable quality production. Depending on the type of panel being produced, the specific customer and the end-product, certain quantities and sizes of blows may be admissible. A bond analyzer can be programmed according to the manufacturer's specifications, and predetermined tolerances can be adjusted for any production run. Small defects can normally be ignored, however, if the defects begin to increase in number or size, this may indicate the development of a problem in the production process.

Defect Marking:

Even the most rigid trend analysis monitoring cannot prevent all defects; however, the remaining small percentage of panels produced with blows or delams can be surface or edge-marked in the defective areas for easy identification after stockpiling. The portion of the panel without defects can then be salvaged, or the entire panel sold for products with less stringent quality requirements. Whichever the manufacturer determines, the resulting waste elimination assures an increase in profits and customer satisfaction.

How does a bond analyzer work?

A non-contact analyzer like the GreCon UPU Bond Analyzer uses ultrasonic transmissions to scan the panel. When a blow or delam appears, the ultrasonic waves are weakened considerably, and an alarm is activated based on predetermined tolerance levels for acceptable defects.



UPU Measuring Principle

The analysis of each panel is recorded in the SPC (Statistical Process Control) and can be stored and recalled at any time. Besides allowing for detailed panel inspection and trend analysis, this feature is also valuable to the manufacturer as verifiable quality documentation for the customer.

New advances in software technology, such as GreCon's UPU Windows NT® software, provide visual representations of panels and defects through 3-D charts and graphs, user-friendly window displays for parameter inputs, and searchable production statistics, as well as networking capabilities for integration with other on-line production systems.

What else should I look for when purchasing a bond analyzer?

There are several other features to consider before purchasing a bond analyzer. It's important to be sure the equipment you purchase will meet your individual manufacturing needs not only at present, but in the future as well.

- What width of panels do you produce, and can the analyzer accommodate that width?
- How thick are the panels to be measured, and can the analyzer accommodate that thickness?
- Is it modular so it can expand with your production?
- Can it be customized for your specific production needs?
- What type of operating system and software does it use?
 - Is there a limit to the number of panel measurements that can be stored?
 - Is the software programmable for changes in production specifications?
 - Can you determine the size or frequency of defects that activate alarms?
- What is its construction and durability?
- What does the maintenance entail?
 - Is it self-calibrating?
 - Does it have automatic cleaning?
 - Does it have programmable testing?
- What technical support and warranties are included?

Of course, these are just a few of the many other factors to consider. As with any equipment purchase, the determining factor is your ROI (return on investment.) Exactly how much a bond analyzer will reduce waste and increase profits is, of course, different for every manufacturer. However, with shortened press times, on-line determination of defect trends allowing for immediate adjustments to production, defect-marking to salvage panel portions and reduce waste, verifiable quality documentation and reduced customer claims, and overall optimized production – a bond analyzer is guaranteed to improve the bottom line of any manufacturer.

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