

MoistScan® Online Moisture Analyser Case Study Fibreboard Plant –LA, USA

Introduction

Recently, a large fibreboard manufacturer purchased the MoistScan® MA-600 Microwave Moisture Meter following a comparative competitor trial conducted at their fibreboard manufacturing facility in LA, USA.

Fibreboard is used for a variety of purposes including roofing insulation, expansion joints for concreting and sound proofing. The board can be produced in a number of thicknesses, usually varying between 10 – 14mm. The plant uses mainly bagasse to make the board but also significant quantities of waste paper and low grade corn starch is used. For purely cosmetic reasons some of the fibreboard is coated both top and bottom with a black colouring which consists of bentonite and carbon black.

Why moisture is important

The first stage of producing the fibreboard is the pressing and rolling out of “wet board”. The wetboard is rolled out in a continuous sheet. The wetboard varies in moisture due to a number of factors, most notably because of the variations in the moisture of the feedstock. The moisture of the fibreboard varies from 50% – 60% when uncoated, however the coating increases the moisture to 65% – 72%.

To achieve optimum quality and plant efficiently the coated fibreboard should be manufactured at a moisture percentage of 65%. Wetter than this and large amounts of energy are required to dry the board. Drier than 65% and board consistency and shape suffers.

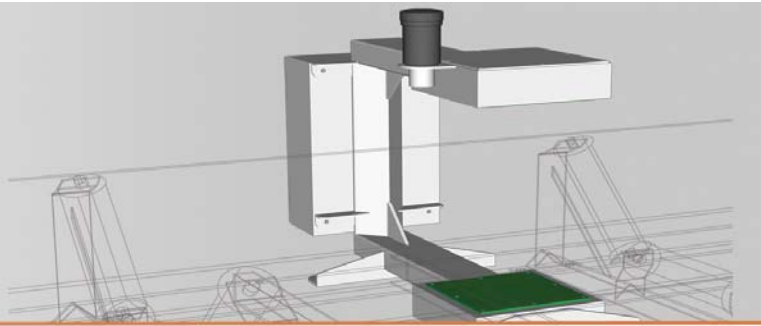
According to the Plant Process Engineer a 3% over-specification in moisture typically requires an additional 15% of gas to fire the dryers. Consequently, the cost of inadequate moisture measurement and control is very significant.

Microwave versus Near Infrared (NIR)

A NIR analyser provided by another company was trialled by the fibreboard manufacturer along side the MoistScan® MA-600.

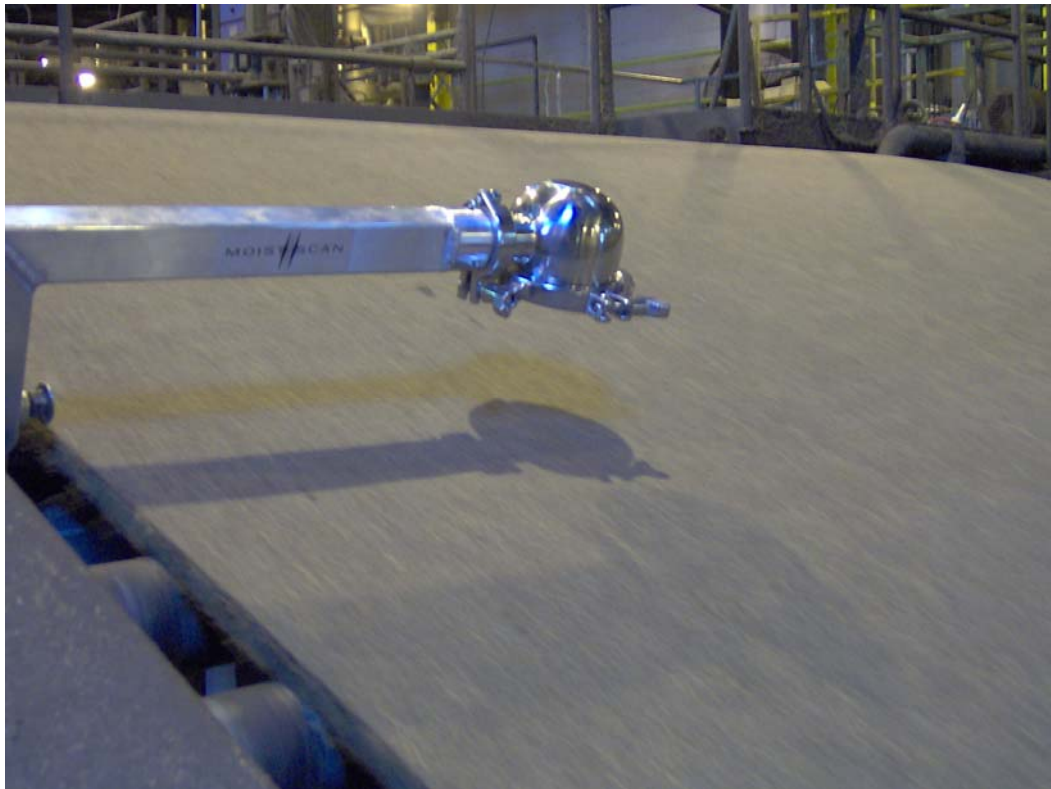
According to the client the NIR analyser proved inadequate for this particular application. Weighing against NIR in particular were a number of limitations inherent in the technology. NIR is significantly affected by colour and hence the NIR gauge was unable to accurately measure the moisture of the board after the black coating had been applied. Also NIR is only a surface analysis technique and gives a poor assessment of the total moisture within the board, particularly when moisture profile variations occur over the thickness of the board.

In contrast, microwave is unaffected by colour variations. Being a transmission technique, microwave measures moisture over the entire thickness of the material.



Installation

The picture below shows the MoistScan[®] MA-600 installed upon the production line.

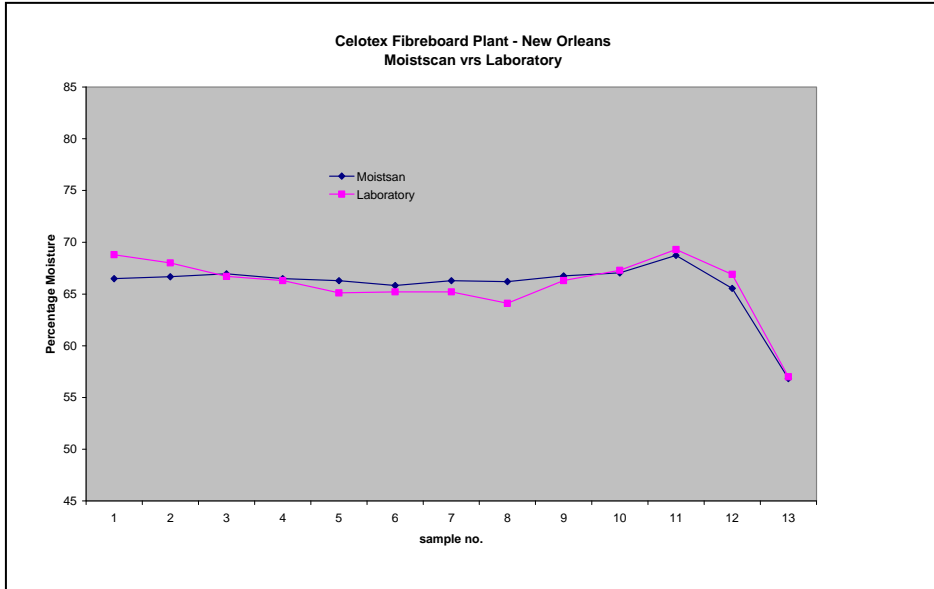
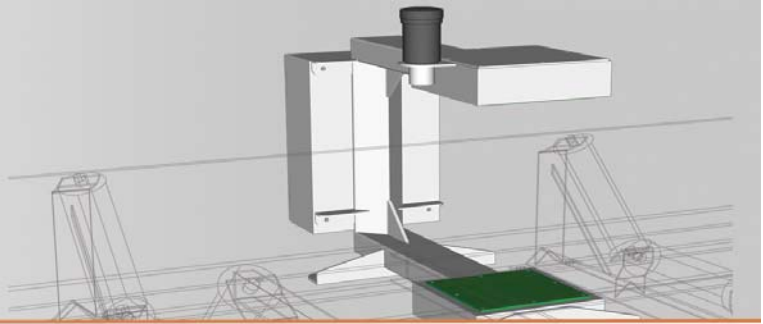


This picture only shows the top sensor (receive antenna), the bottom sensor is located approx 20mm from the underside of the board.

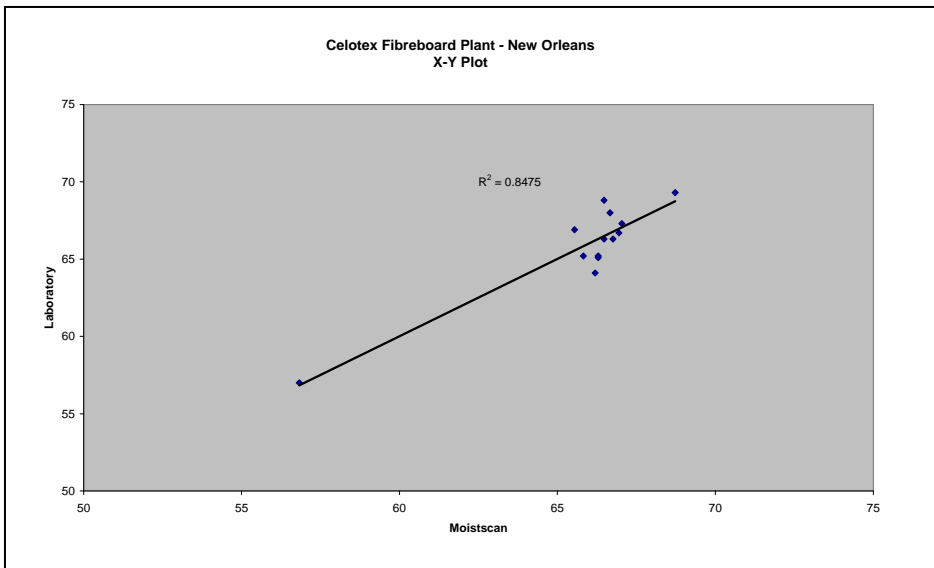
Results

During the two-day trial a variety of tests were carried out. Once the MoistScan[®] MA-600 was installed a dynamic test was carried out by merely spraying a mist of water on the surface of the fibre board. Both the NIR and Moistscan analysers responded correctly to the addition of moisture.

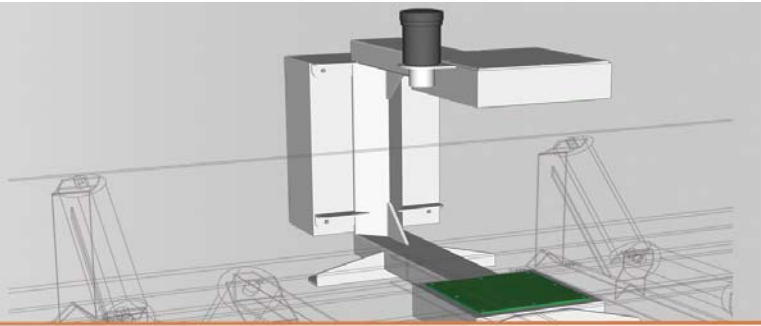
After confirming that the MoistScan[®] was operating correctly, 13 samples were taken to confirm the calibration. This was a difficult task as each sample taken meant wasting a considerable amount of fibreboard and interrupting the production process.



The results of this exercise were encouraging with a correlation of 0.85 and a standard error of approx 1.2% being obtained.



A dynamic trial was also carried out; done by adjusting the last roller in the process to alter the moisture. Increasing the roller spacer created less pressure on the board and resulted in the moisture increasing. Decreasing the roller spacing created greater pressure on the board and resulted in the moisture decreasing. Lastly the coating was turned off to provide an extremely low moisture result. The results of this are shown on the trend screen below.



Conclusion & Outcome

The MoistScan[®] MA-600 accurately measured the moisture content in fibreboard, overcoming for the client limitations inherent in alternative moisture analysis technologies.

The client was particularly pleased with the ease of operation, ease of installation, accuracy and repeatability of results.

The client subsequently purchased Callidan Instruments MoistScan[®] MA-600 Microwave Moisture Meter in preference to NIR technology.

For more information contact visit www.callidan.com