

Semi Annual Project Report - 1
**NDIC Grant Project: Commercial Application of Soybean Stalk as a New
Alternative Fiber in Particle Boards**

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This report summarizes the project activities for the period of April 2014 to September 2014. The matching funds for this project were provided by NDIC and Masonite PrimeBoard Company located in Wahpeton, ND to initiate the project. ***The goal of this project is to explore and demonstrate the feasibility of using soybean stalks as an alternate material for manufacturing particle boards.*** The various tasks set to achieve the project goal include (1) understanding the material collection and transportation logistics, (2) equipment and machinery changes required to efficiently process soybean stalks, and (3) optimization of the formulations for manufacturing soy stalk based variable density particle boards.

The investigators from NDSU (Dilpreet Bajwa & Sreekala Bajwa) met with their collaborators from Masonite PrimeBoard (John Robinson and Andrew Sutherland) in person or by phone on a bimonthly basis to discuss and develop a comprehensive plan that can lead to successful completion of this project. Further communication between all collaborators, students and funding agency was carried out seamlessly via emails.

Described below are some of the major highlights achieved in the first six months of the project followed by additional detail specifically discussing the contributions made by each party.

NDSU (D. Bajwa and S. Bajwa) – The PIs ordered primary equipment required for sizing and processing of raw materials, and testing of finished product. The PIs were able to leverage some equipment funds from the Agricultural Experiment Station for the equipment purchase. For material sizing and processing, a new hammer mill with multiple screens was purchased from Schutte Buffalo. The hammer mill will enable us to optimize the processing conditions required to size soy stalks with minimal material loss as fines. The information generated from these tests will help the team to identify the equipment modifications or changes that will be required at the Masonite PrimeBoard facility. The second piece of equipment purchased is a Universal Testing Machine from Test Resources. It will be used to test the physical and mechanical properties of soybean straw based particle boards and compare against wheat straw based boards. The graduate and undergraduate students and other supporting staff were trained by the manufacturer on the proper usage of this equipment. The raw materials, wheat straw and soybean stalks needed for this research were procured by Masonite PrimeBoard at their plant site. The next step will be to process these materials at NDSU using the hammer mill by varying processing conditions and to identify critical factors that influence the particle size and the amount of fines. Also, a graduate student and an undergraduate student were hired to work on the project.

Masonite PrimeBoard (J. Robinson and A. Sutherland) – The Masonite PrimeBoard plant has already initiated the purchase of soybean stalks for the production year 2014-15. To date they have purchased ~ 2000 tons of soy straw for the preliminary trials. They are currently evaluating and refining the

procedures involved with collection, bailing, transportation and storage of the soybean stalks for extended period.