Final Report

Commercialization of a Residential Panel Door

By

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Prepared for:

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Introduction: The project's goal is to continue technical and business development efforts to facilitate the commercialization of a veneered residential wood door designed with an engineered substrate and an engineered veneered door skin. Specifically, to continue product performance testing. This task will be accomplished by combining business expertise of Lexington Manufacturing of Coon Rapids, Minnesota, and the product development skills of the Natural Resources Research Institute (NRRI) scientists. The successful completion of this work will posture Lexington Manufacturing closer to expanding their business with a veneered panel door product line.

Background: Stile and rail panel doors have been popular in North America since colonial times. The traditional panel door designs require manufacturing methods utilizing a number of individual components and a number of labor intensive steps. The domestic panel door market has been flooded with imports, fueled primarily by low cost labor. We believe a traditional appearing marketable six panel door can be made with the techniques developed. The proposed manufacturing process replaces a number of labor steps and joinery processes with automated processes. These processes also reduce raw material costs by replacing clear solid lumber with decorative veneer. The essential ingredient to the successful commercialization of this product concept are the specialized manufacturing knowledge of Lexington Manufacturing and a specialized door skin application developed by NRRI Center for Applied Research and Technology Development (CARTD) scientists. The project work to date has allowed Lexington Manufacturing and CARTD scientists to successfully prototype door designs. Lexington Manufacturing provided management time, manufacturing, engineering time, raw materials, and labor to produce prototypes. Also completed was market research on imported products, precisely defining competition from Mexico and Malaysia and the competitive pricing structure.

Summary of Project: A slam cycle testing device was constructed, designed according to National Wood Window and Door Association standards. This test machine allowed for evaluation of critical performance parameters on competitive products as well as our designs. In test results the imported products failed very early, and our design failed earlier than expected. Both designs fell off the test machine due to failure at the hinges. Hinge failure on the imported door appeared to be the result of the stile construction (low density hardwood). Hinge failure on our design was caused by the excessive weight of the door. The traditional construction techniques used on the imported door also showed failure in the stile and rail joint, our design showed no failure.

Results: Several redesigns were suggested but the project funding ran out and the work was stopped by the program manager.