

BAB 7

KESIMPULAN DAN SARAN

Penelitian ini menggunakan metode *central composite design* serta analisis respons permukaan untuk membuat model dan menentukan komposisi optimum dari papan partikel berbahan dasar serat serabut kelapa. Setelah menentukan komposisi optimum maka selanjutnya dikembangkan dengan menggunakan metode *business analytics* dengan metode analisis *activity based costing*, analisis SWOT, serta analisis *triple layered business model canvas*.

7.1. Kesimpulan

Berdasarkan hasil penelitian dapat ditarik kesimpulan sebagai berikut:

- a. Menggunakan metode *central composite design* dan analisis respons permukaan papan partikel serat sabut kelapa optimal adalah Spesimen X. Spesimen X dengan komposisi serat kasar 100%, perekat 50%, dan suhu *hot press* 170⁰ C dengan kerapatan 0,53 gr/cm³; keteguhan lentur 99,53 kgf/cm²; keteguhan tarik 3,02 kgf/cm²; modulus elastisitas lentur 1,34x10⁴ kgf/cm²; kadar air 7,49%; dan pengembangan tebal sebesar 25,68%. Spesimen ini berhasil memenuhi tiga dari enam pengujian yang dilakukan berdasarkan standar SNI dan JIS. Hasil analisis menggunakan plot kontur dan kurva permukaan menunjukkan bahwa spesimen memiliki titik kritis yang tinggi, sehingga hasil penelitian ini dapat digunakan lebih lanjut lagi untuk menentukan variabel bebas selanjutnya yaitu mempersempit rentang nilai antar variabel.
- b. Berdasarkan percobaan yang dilakukan dengan metode *one factor at time* (OFAT) menghasilkan komposisi perekat sintesa yang digunakan dalam penelitian ini yaitu: 20% *Urea Formaldehyde*, 10% *Biosilica*, 10% Lateks Alam, dan 60% H₂O Murni.
- c. Berdasarkan analisis *activity based costing* untuk mendapatkan harga pokok produksi didapatkan HPP senilai Rp393.556.76 atau terbilang tiga ratus sembilan puluh tiga ribu lima ratus lima puluh enam koma tujuh puluh enam rupiah. Hasil tersebut memiliki selisih sebesar 160.64% lebih tinggi jika dibandingkan produk sejenis yang berada di pasaran. Jika sudah mencapai produksi massal maka harga dapat direduksi dengan optimalisasi rantai pasok serta pemilihan material yang disesuaikan dengan kebutuhan.

7.2. Saran

Pengembangan selanjutnya dari penelitian ini adalah penggunaan teknologi yang lebih mutakhir serta meninjau ulang variabel-variabel yang telah digunakan untuk menciptakan material papan partikel yang optimal dan memiliki nilai fungsional bagi penggunaannya.



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LAMPIRAN

Lampiran 1 Publikasi Jurnal Nasional



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Peluang dan Sifat Mekanis Serat Alam Non-Kayu Dalam Pembuatan Papan Partikel (Review Paper)

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Abstrak

Penelitian mengenai inovasi produk dalam material komposit merupakan urgensi, salah satu industri yang memiliki potensi inovasi adalah *wood-based panels* (WBPs) khususnya papan partikel. Selama ini kayu masih menjadi bahan utama dalam produksi papan partikel. Akan tetapi kesadaran konsumen mengenai dampak penggunaan kayu secara berlebih mendorong industri ini untuk mencari alternatif pengganti kayu. Pada penelitian ini dilakukan *review* yang bertujuan untuk mengetahui, membandingkan, dan mencari peluang serat alam non-kayu sebagai material dalam papan partikel. Berdasarkan 11 jurnal yang telah diulas dari berbagai peneliti di dunia didapatkan hasil bahwa penggunaan serat alam non-kayu adalah *feasible* jika material tersebut memiliki karakteristik mekanis yang mirip dengan kayu. Serabut kelapa merupakan serat alam yang memiliki potensi menjadi material pengganti kayu pada produk papan partikel. *Modulus of elasticity* (MOE) dan *modulus of rupture* (MOR) Spesimen yang telah diuji oleh berbagai peneliti menunjukkan bahwa sifat mekanis serabut kelapa memiliki kemiripan dengan kayu dengan beberapa penyesuaian seperti homogenisasi ukuran partikel dan jenis perekat yang digunakan. Maka dapat disimpulkan bahwa serabut kelapa merupakan salah satu material potensial yang membutuhkan pengembangan lebih lanjut.

Kata kunci: *modulus of elasticity; modulus of rupture; papan partikel; serat alam; serat serabut kelapa*

Abstract

Research on product innovation in composite materials is an urgency, one industry that has the potential for innovation is *wood-based panels* (WBPs), especially particleboard. Wood is still the main ingredient in particleboard production. However, consumer awareness about the impact of excessive use of wood encourages this industry to look for alternatives to wood. In this study, a review of various journals examining the use of non-wood natural fibers as materials in particleboard was conducted. Based on 11 journals that have been reviewed from various researchers in the world, it is found that the use of non-wood natural fibers is feasible if the material has mechanical characteristics similar to wood. Coconut fiber is a natural fiber that has the potential to be a wood replacement material in particleboard products. *Modulus of elasticity* (MOE) and *modulus of rupture* (MOR) specimens that have been tested by various researchers show that the mechanical properties of coconut fibers are similar to wood with some adjustments such as homogenization of particle size and type of adhesive used. It can be concluded that coconut fiber is a potential material that requires further development.

Keywords: *cocofiber; modulus of elasticity; modulus of rupture; natural fiber; particleboard*

1. Pendahuluan

Integrasi antara desain produk dengan nilai-nilai keberlanjutan dimulai pada tahun 1970an. *Design for Sustainability* (DFS) telah berkontribusi pada penerapan ekonomi sirkular dalam produk dan layanan kepada konsumen [1]. Sejak itu, penelitian yang menggunakan DFS sebagai acuan dalam mendesain produk telah populer dan bahkan beberapa produk telah digunakan secara luas oleh konsumen. *Design for Sustainability* bertujuan untuk meningkatkan kandungan ramah lingkungan dari suatu produk baik melalui kemasan, bahan dasar, maupun kemudahan dalam daur ulang [2]. Salah satu

Lampiran 2 Pendaftaran Paten

FORMULIR PERMOHONAN PENDAFTARAN PATEN SEDERHANA INDONESIA
APPLICATION FORM OF PATENT REGISTRATION OF INDONESIA

Data Permohonan (Application)			
Nomor Permohonan <i>Number of Application</i>	: S00202312388	Tanggal Penerimaan <i>Date of Submission</i>	: 17 November 2023
Jenis Permohonan <i>Type Of Application</i>	: Paten Sederhana	Jumlah Klaim <i>Total Claim</i>	: 1
		Jumlah Halaman <i>Total Page</i>	: 16
Judul <i>Title</i>	: METODE PEMBUATAN PAPAN PARTIKEL BERBAHAN BAKU SERAT SERABUT KELAPA		
Abstrak <i>Abstract</i>	: Invensi ini berkaitan dengan proses pembuatan produk <i>wood-based panels</i> selanjutnya disebut papan partikel, khususnya papan partikel yang mengandung material serat sabut kelapa dengan perekat campuran urea formaldehida, biosilika, dan lateks alam. Invensi ini menemukan bahwa material serat serabut kelapa berpeluang dalam produk papan partikel yang memberikan <i>value</i> lebih tinggi kepada material ini. Komposisi bahan dan metode manufaktur terdiri dari: jenis serat, proses <i>treatment</i> alkali, suhu <i>hot press</i> , persentase perekat dilakukan dengan proses berikut: merancang desain eksperimen; proses <i>treatment</i> alkali; proses pencetakan dengan perekat dan <i>hot press</i> ; dan proses <i>post-curing</i> . Komposisi optimal dalam invensi ini adalah spesimen X dengan komposisi serat kasar 100%, perekat 50%, dan suhu <i>hot press</i> 1700 C dengan kerapatan 0,53 gr/cm ³ ; keteguhan lentur 135,36 kgf/cm ² ; keteguhan tarik 3,02 kgf/cm ² ; modulus elastisitas lentur 1,34x10 ⁴ kgf/cm ² ; kadar air 7,49%; dan pengembangan tebal sebesar 25,68%.		
Permohonan PCT (PCT Application)			
Nomor PCT <i>PCT Number</i>	:	Nomor Publikasi <i>Publication Number</i>	:
Tanggal PCT <i>PCT Date</i>	:	Tanggal Publikasi <i>Publication Date</i>	:
Pemohon (Applicant)			
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Lampiran 3 Publikasi Jurnal Internasional

The screenshot shows a web browser window displaying the journal's submission interface. The page title is "Submissions Being Processed for Author". Below the title, it indicates "Page: 1 of 1 (1 total submissions)". A table lists the submission details:

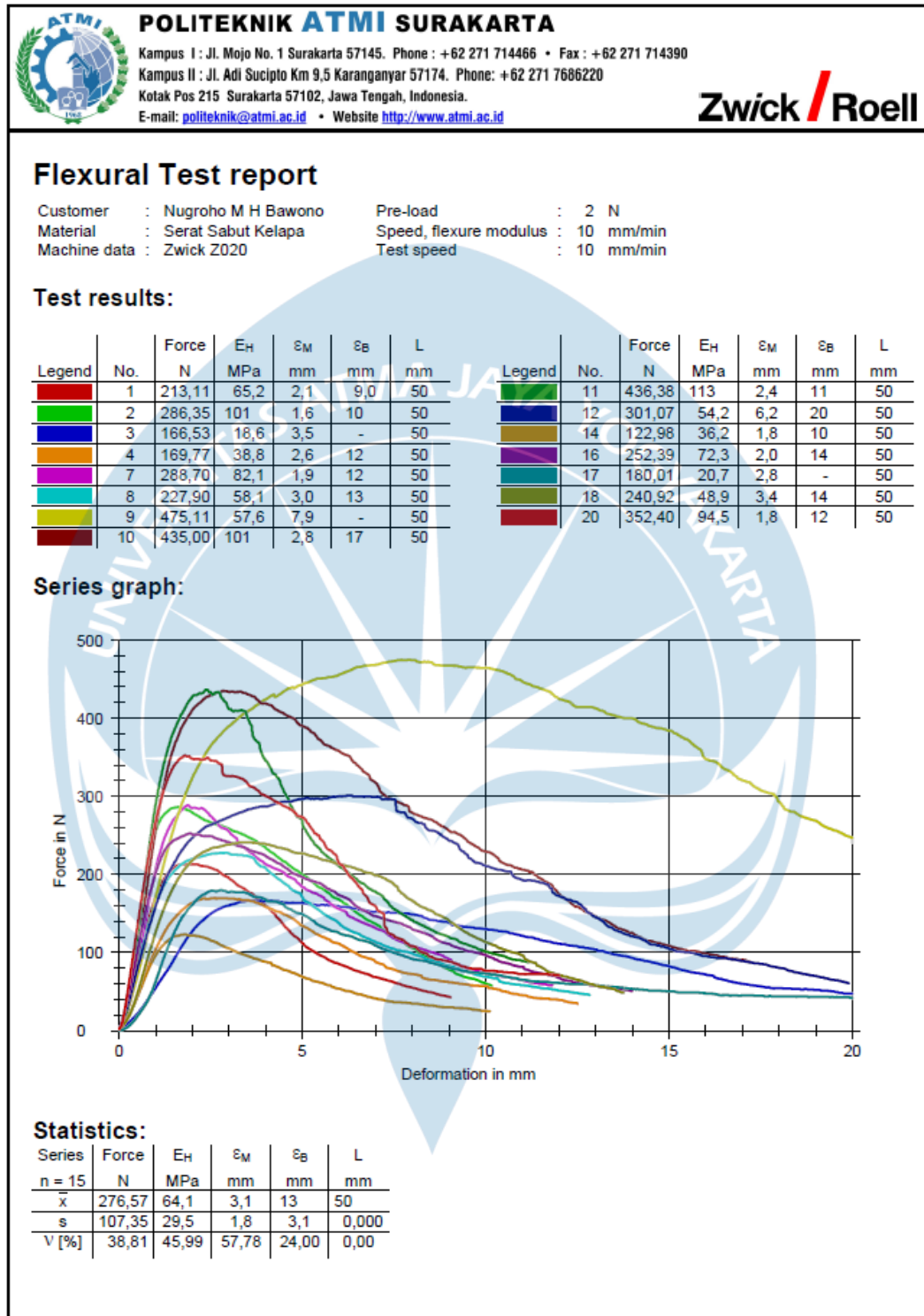
Action	Manuscript Number	Title	Initial Date Submitted	Status Date	Current Status
Action Links	JCOMC-D-23-00114	Study of Application of Coconut Coir Fibre-based Wood-Based Panels: A Literature Review	Jul 11, 2023	Apr 03, 2024	Under Review 3

The interface includes a navigation menu, a search bar, and a user profile icon. A watermark for "UNIVERSITAS ATMA JAYA YOGYAKARTA" is visible across the page.

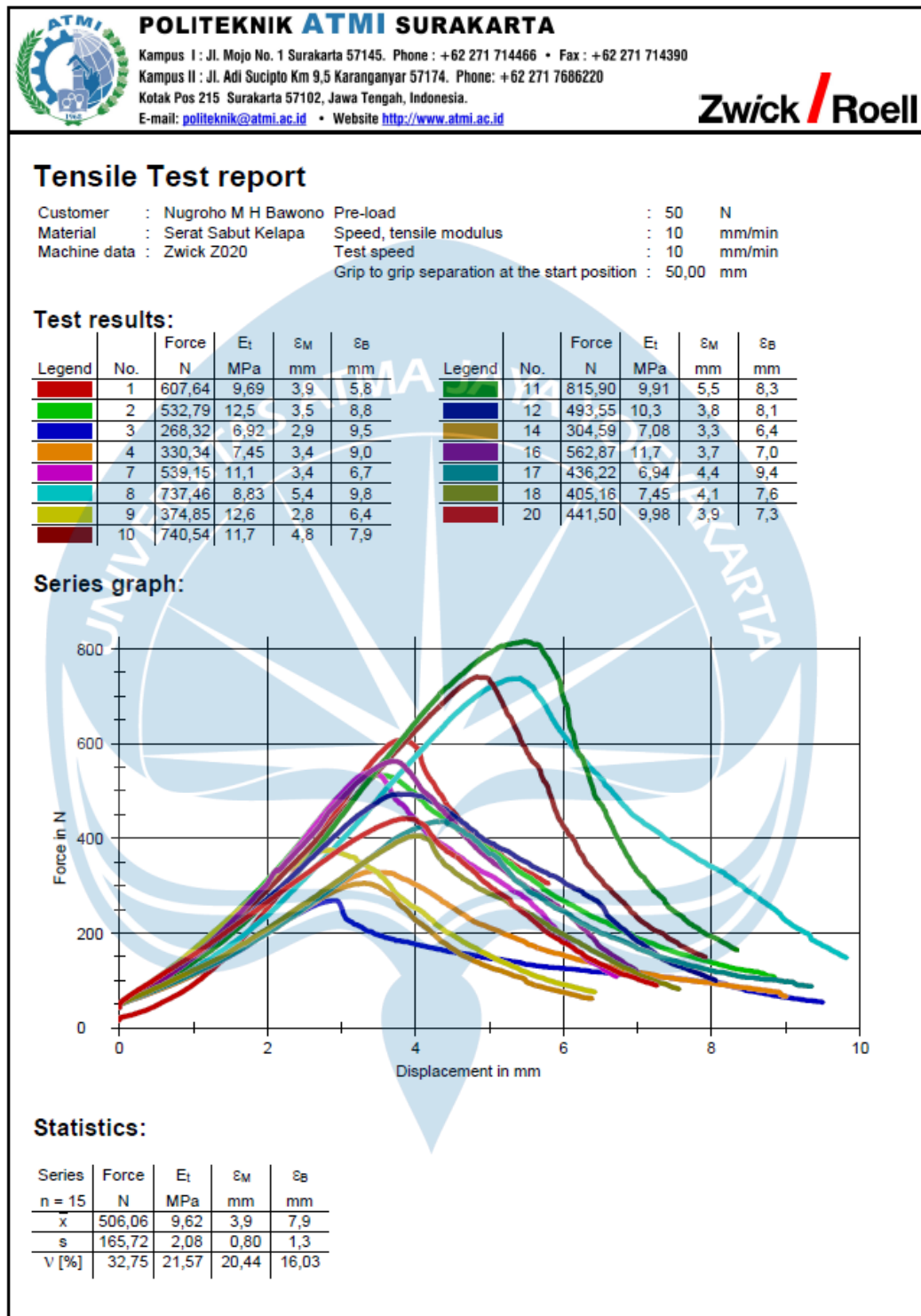
Lampiran 4 Manufaktur Spesimen



Lampiran 5 Pengujian *Flexural Strength*



Lampiran 6 Pengujian *Tensile Strength*



Lampiran 7. Spesimen Penelitian

