MeshLin: an ultimate full bio-composite

Investor presentation
April 2013
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Problems

- Strong social demand for natural, organic, bio materials, products, commodities in the industry
- Stringent global regulations for more natural parts
- Price volatility of petrochemicals and petrol
- Hazardous processes in industry
- Produce lighter, enhance energy efficiency
- Increasing emission of carbon dioxids and technology heavy gases
- Greenhouse effect
The emergence of bio-composites

• Surprising natural solutions: materials and fibers
• Full recycled
• Copy and adapt natural plant structures (cells, fibres, filaments)
• Complicated and complex spatial forms made from (bio) raw materials (yarns, granules, laminates)
• Mass and large serial production with cost effective molding processes (thermoforming processes)
• New concept of sales, natural design, simplicity, clean patterns and shapes
Carbon vs. bio-composites

**CARBON**

- Environmental hazardous materials
- Expensive technology
- Outstanding physical characteristics
- Limited ability for design purposes
- Non-recycling material
- Expensive technology

**BIO-COMPOSITES**

- Fully environmentally friendly & recyclable
- Agro-Industrial value chain integration technology
- Substitute to traditional & carbon materials
- Design & structural utilisation
- Cost effective, mass and serial production ready
Bio-composites pros and cons

MAIN ADVANTAGES

• Specific mechanical properties
• Biodegradability
• CO2 neutral
• Renewable resources
• Production is low energy consuming

MAIN DISADVANTAGES

• Quality varies as a function of weather and growing location
• Low dimensional stability
• Low thermal stability
• Anisotropic fibres
• Discontinuous reinforcement
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Introduction of MeshLin™

- MeshLin is the pioneering full bio-composite product family
- Made from MESHFlax™ and thermoplastic bonding
- Based on continuous fibre technology
- Prepared for mass production
- Multilayered for structural and design purposes
- UD (uni-directional) or multi-axial for competitive technology requirements
- Laminate prepregs have natural beauty in patterns
- Transparent texture for extravagant illumination
Unique Selling Proposition

- Full recycled and biodegradable
- Customized by engineers
- High variety of design
- Transparent
- Responsive and flexible
- Applicable for serial production
## The product family

|---------------|--------|-----------------|-----------------------|----------------------------|----------------------------|------------------------|--------------------|-------------------|-----------------------------|---------------------|
| **STANDARD PREPREGS**
Thermoforming Full Bio-composite laminates

**MESHLIN-381-1-L**
- Flax
- PLA
- 1,55
- 35
- 115
- 110
- 3,8
- 0,5
- 125
interior design, sport equipments

**MESHLIN-303-0-L**
- Flax
- PLA
- 1,45
- 40
- 265
- 55
- 6,2
- 0,65
- 125
structural parts

**DESIGN TEXTILE FAN**
- Flax / Cotton
- PLA
- 125
interior design, sport equipments

Halogen free, non toxic, 100% recyclable

**MESHLIN-381-1-P**
- Flax
- PP
- 1,4
- 35
- 65
- 60
- 1,2
- 0,5
- 110
vehicle interior

**MESHLIN-303-0-P**
- Flax
- PP
- 1,45
- 40
- 160
- 45
- 4,0
- 0,65
- 110
structural parts

**DESIGN TEXTILE FAN**
- Flax / Cotton
- PP

Status

- MeshLin is the manifest of mechanical engineering and material law-making of 15 years
- The prototypes of the full product family have been developed
- Tested and evaluated by scientific laboratories
- Documented and filed for patents
- Small capacity machineries have been installed
- Small series production is before starting
- Introduced in world-wide exhibitions to hundreds of potential partners and customers, experienced enormous interest
- First orders from premium bike industry
- Market lunch in 1-2 months
Competitive advantages

**PHYSICAL PROPERTIES**
- High tensile strength
- Advantageous elongation break
- Perfect flexural strength and modulus
- Low molding temperature
- High density and fibre content
- Transparent, ready for internal paint, patterns in-lighting

**TECHNOLOGY PROPERTIES**
- Prepregs for thermoforming
- Low molding temperature
- Short forming cycle time
- Cost effective process
- No pre-cooling stage of process
- Low process or technology loss
- Mass production
- Endless (continuous) fibres
- Ability for hybrid fibres
- Ability for bio and non bio resins
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Market size and growth rates

- The global composites industry is significant and growing.
- In 2011, it was valued at an estimated $100 billion and employed 550,000 professionals (JEC Group).
- Composites industry is expected to grow by CAGR 15% to 2018 (ICERP 2013).
- The global production of the composites is 10 million tonnes annually.
- Global natural fiber composites market reached $2.1 billion in 2010 and grew by CAGR of 15% in last five years.
The American, European and Asian markets are equal in value.

In 2008 Asia accounted for 42% of the total composite production and could reach 50% by 2015.

Transportation is by far the first composites end-user sector in the USA.
Market drivers

• Increasing environmental awareness, societal concerns
• Need for sustainability through recycling
• Depletion of petrochemical resources
• Need for energy saving solutions
• Governmental regulations to encourage the use of recycled or ‘green’ products
• Technical benefits such as low density, high toughness, acceptable specific strength properties, ease of separation, enhanced energy recovery, carbon dioxide sequestration and biodegradability
• The desire to promote the use of crops grown for industrial, non-food purposes
## Main competitors

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>MAIN ACTIVITY/PRODUCTS</th>
<th>MESHLIN’S ADVANTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIMALIN FEDERATION (GB, F)</td>
<td>eco-composites fabrication, Technical Flax value-chain development and promotion.</td>
<td>Full bio-composite, material law making</td>
</tr>
<tr>
<td>SAFILIN (F)</td>
<td>Flax fibre development, yarns and technical textile production, multi-axial composites, pultrusion, roving, weaving, warp technologies</td>
<td>Bio resin, full bio-composite, automotive know-how, crash tests, simulation</td>
</tr>
<tr>
<td>PROCOTEX (B)</td>
<td>Flax fibre, and technical textile producer. Prepreg producer, full technology in composites. Eco-composite with thermoform and thermoset process.</td>
<td>Bio resin, full bio-composite, automotive know-how, crash tests, simulation</td>
</tr>
<tr>
<td>BOND LAMINATES (D)</td>
<td>thermoform laminates prepreg production. Leader in thermoplastic composites. High and extreme performance markets and products</td>
<td>Bio-composit knowledge, know-how in engineering</td>
</tr>
<tr>
<td>GROUPE DEPESTELE (F)</td>
<td>full bio-composite technology and prepreg production. Flax base high and low performance, structural and design</td>
<td>Automotive knowledge, material law making know-how</td>
</tr>
<tr>
<td>LINEO (B)</td>
<td>Thermoset prepregs, epoxy based RTM technology for all performances. Flax based composite, with patented fibre handling against water absorption</td>
<td>Bio resin, full bio-composite, automotive know-how, crash tests, simulation</td>
</tr>
<tr>
<td>COMPOSITES EVOLUTION (GB)</td>
<td>full bio-composite technology and prepreg production. Flax base high and low performance, structural and design. Thermoset (PFA) thermoform (PLA, PP)</td>
<td>bio-composite engineering know-how</td>
</tr>
</tbody>
</table>
Secured input (flax) market

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NO. HECTARES</th>
<th>SCUTCHED FLAX (T)</th>
<th>QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRANCE</td>
<td>56.417</td>
<td>100.000</td>
<td>1</td>
</tr>
<tr>
<td>CHINA</td>
<td>100.000</td>
<td>23.000</td>
<td>2</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>12.030</td>
<td>18.000</td>
<td>3</td>
</tr>
<tr>
<td>EGYPT</td>
<td>15.000</td>
<td>15.000</td>
<td>4</td>
</tr>
<tr>
<td>BELARUS</td>
<td>68.000</td>
<td>13.000</td>
<td>5</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>48.000</td>
<td>11.000</td>
<td>6</td>
</tr>
<tr>
<td>NETHERLANDS</td>
<td>2.272</td>
<td>4.000</td>
<td>7</td>
</tr>
<tr>
<td>UKRAINE</td>
<td>7</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>POLAND</td>
<td>4.000</td>
<td>1.500</td>
<td>9</td>
</tr>
<tr>
<td>LITUANIA</td>
<td>10</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: JEC Composites Magazine March 2011
Target sectors

✓ Automotive industry (OEMs, TIERs)
✓ Extreme sports and leisure
✓ Design, construction, furniture industry
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The company in nutshell

- **Main activities**
  - Engineering: automotive mechatronic design, test, crash simulations (CATIA, CAD/CAM), physical property validation
  - R&D, structural material design and law making processes
  - Bio-composite material design and technology development
  - Composite fabrication

- **Team of 14 mechanical engineers**
- **Total of 200 years of engineering experiences**
- **Proprietary bio-composite material law making know-how and engineering design & calculation**
- **Good reputation in automotive, e-motion development, part engineering, test & simulation**
- **Participation in EU funded R&D projects**
- **Owned by the management**
“To develop and innovate such bio-composite material families that would make chance to substitute dominant group of traditional raw materials for its esthetic and physical features”

(András Csiszári)

“We want to be the most decisive, reliable expert of the bio-composite material design, development and manufacturing to our targeted customers…”

(Zoltán Kabács)
History and main milestones

- **2006** - Foundation of the Meshining Engineering Ltd. (Győr, Hungary)
- **2007** - Engineering services for the heavy trucks and buses as first profit center
- **2008** - The international market entry to USA and Korea
- **2009** - First R&D project initiated by Meshining, in collaboration with EU partners
- **2010** - e-Motion and alternative energy in automotive, HY-GO, Micron cars, Geneva Automotive Exhibition
- **2011** - Carbon Fibre laminates and bio-composite developments, material law, for sports and automotive utilization. First prepreg family validation for patents
- **2012** - MeshLin prepreg development, extreme performance Bio-composite products for market test. Short period small serial production and process development, engineering and documentation for industrialization. eCartec exhibitor, cross-border and collaborative development projects
- **2013** - JEC Composite Exhibition Paris, MeshLin prepreg entry for target groups. Preparation for Test Lab and small serial prepreg fabric production
- - International market entry (USA, Korea)
- - International market entry (USA, Korea)
Management

Zoltán Kabács (CEO)
Transportation engineer
15 years of experience in project management and supply chain management in corporate and entrepreneurial enviroment

András Csiszár (CTO)
Mechanical engineer
CAE expert
25 years of experience

Zoltan Ambrus (CBDO)
Economist
Corporate business development, ICT experience of 20 years
Main exhibitions we have participated in
References Partners and Customers we proudly provide services

OEM assignments as sub-contracting service provider

MeshLin™ is the intellectual property of Meshining Ltd.
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Historical financial data

- 52% growth in 3 years
- 483% growth in 3 years

* Preliminary data (in USD)
Investment

Capital need: $4-5 million

Use of capital:
- Organisation development
- Small scale manufacturing
- Product development

Exit routes: trade sale
Action plan

1. Organization development
   - Increase the engineering capacity
   - Establish the marketing/sales department
   - Strengthen the operations/prepreg production
   - TQM, TQC certificate for processes, R&D processes
   - Logistics and manufacturing process management planning
   - Company image development and branding, legal process management

2. Product development
   - Investment in laboratory equipment and lab-technology machinery (autoklav, young-modulus, microscope, mechatronic examination equipments)
   - Continuous patent documentation
   - International certificates of quality (quali flax, other) by prepregs
   - Tracebility management (product and logistic processes)
   - Product safety and intellectual property management

3. Small serial industrialization
   - Fabric compound
   - Infrastructure
   - Machinery for annual 10 tonnes woven and UD flax capacity
   - Logistics
   - ERP process industry management and ICT support
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Why we?

- First full bio-composite in the world (PLA based matrix)
- Strong social and industrial demand for Bio-philosophy
- Extra profitability and growth for the next decade
- Devoted and professional engineers of composite mechatronic and material technology
- Patented technology
- Market segment before booming
- Strong potential and first orders
- Notable references
Be the part of our success!

Zoltan AMBRUS

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The MICRON project