BIO World Congress
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FlaxStalk Natural Fiber Solutions

Leaders in the Field
MATERIALS FOR A SUSTAINABLE FUTURE
The world’s largest purchaser and processor of linseed flax straw.

Supply flax tow to our paper operations in the United States for more than 60 years.

We purchase 90,000 tons of flax straw annually from Manitoba, Saskatchewan & North Dakota from more than 900 farmers and 180,000 acres of flax.

Subsidiary of SWM INTL, a producer of specialty papers with 2,800 employees, $700 million US in sales, and operations in 90 countries.

Facilities located in Canada, United States, France, Brazil & China.

Listed New York Stock Exchange
To be the undisputed leader of natural fiber solutions by providing engineered biomaterials to the biocomposite, bioproduct and bioenergy sectors helping foster the developing new bioeconomy.

To grow & develop technology for processing flax and hemp fiber, along with shive and hurd into a new business, that allows us to partner with customers to supply custom applications throughout North America and around the world.
Core Values

Innovation

We believe that only through innovation can we displace non-renewable materials with our natural raw inputs.

This is reflected in our commitment to ISO manufacturing standards, our use of technology and the creativity of our workforce.

Sustainability

Our long term success depends on sustainable practices from field to factory. This allows future generations to enjoy the resources we have today.

Synergy

We believe that true partnerships with customers generate ideas and applications that neither party could create on their own.

Leadership

We take responsibility to lead the industry in the development and application of residual agricultural materials.
Our line of natural fiber products is processed from unused straw and is a blend of oilseed flax fiber and flax shive. We also source and process hemp straw. We process our straw into the following innovative products:

- **Hemp80Blend**
  Hemp80Blend is a blend targeting 80% fiber. It can be used as substitutes in a wide range of manufacturing applications.

- **FlaxCustomGrind**
  FlaxCustomGrind is a blend of ground flax fiber and shive customized based on customer specifications.

- **FlaxShiveBlend**
  FlaxShiveBlend is a combination of fiber and shive that will not exceed 50% fiber content and is used in applications not requiring the cleanliness of the higher blends.

- **FlaxCustomBlend**
  FlaxCustomBlend is a technical grade flax fiber which is cleaned and customized based on customer specifications targeting a range of 5% to 15% shive content. FlaxCustomBlend can be used as substitutes in a wide range of manufacturing applications.

- **Flax80Blend**
  Flax80Blend is a blend targeting 80% flax fiber content. Flax80Blends are also used to make natural, environmentally sustainable fiberboard panels. Flax is mixed with other agri-forestry products and resins to create building material products for both interior and exterior applications.

- **FlaxBed**
  FlaxBed is premium horse bedding containing the larger shive fractions. It has low dust with a neutral ph providing a healthy environment for both horses and handlers. Beds made from Flax are not only dry, but warmer in the winter and cooler in the summer.

- **FlaxFill**
  FlaxFill is a premium flax shive fraction used primarily as filler or extender for composite applications like injection molding or artificial lumber.

- **HempCustomBlend**
  HempCustomBlend is available on a special order basis.

- **HempFlour**
  The smallest of the hord fractions, HempFlour can be used as a filler in plastic applications or burned as biofuel.

- **FlaxFlour**
  The smallest of the shive fractions, FlaxFlour can be used as filler or compressed into pellets or logs and burned as biofuel.

- **FlaxMulch**
  FlaxMulch or raw shive can be burned loose or used as mulch in commercial growing applications.
FlaxShiveBlend fibre is being used in an erosion control project overlooking the Panama Canal

FlaxMulch continues to be used as a biomass source of green energy displacing the use of coal and natural gas helping reduce MB’s carbon footprint

We continue to supply bedding to MB’s cattle and dairy industries with a put back on your land bedding

FlaxFlour is preparing for head to head competition against wood in the plastic filler market helping meet the need for “green”

We continue to market FlaxStalk to the ag machinery industry as a “grow your own parts” opportunity for farmers
Current Uses

**Benefits of using FlaxBed**

- In trials, FlaxBed was significantly more absorbent than comparable alternatives.
  - 3 times more absorbent than wood shavings
  - 10 times more absorbent than straw
- Less bedding used and less wastage
- Made from 100% natural flax providing clean, low dust environment for a healthy stall
- Most economical premium bedding on the market
- Quicker and easier to muck out, smaller muck heap, saves you more time and money
- Breaks down quickly unlike wood based products and produces excellent compost
- FlaxBed is packaged in a recyclable brown paper bag
- Proven and widely used in Europe
- Low pH, so it absorbs ammonia well

- Introduction of a premium performance animal bedding from flax, proven and previously only available in EU
- Europeans appreciate the sustainable, renewable aspect of agricultural residues versus wood
- Comes in 40 lb. brown paper bags, not plastic, in 1,000 bag container loads
- Straw is easily compostable and readily lends itself to spreading on farm fields
- Currently supplying the MB equine industry and the Greater Toronto area
- There are 180,000 horses in CA. We look to enter US equine market with an eco friendly bedding & package

For more information call:
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The sustainable aspects of FlaxFill are helping market a line of Eco friendly kitchen housewares in California.

Maintaining a smaller aspect ratio, we now have the ability to improve mechanical properties rather than act just as a filler for the wood plastic composite industry.

WPC decking is projected to grow to 3.6 billion lineal feet in 2013, valued at $5.2 billion.

Benefits of using biomaterials:
- Carbon sequestering
- Annually renewable
- High strength/low density
- Sustainable/biodegradable
- Thermal and acoustical properties
- Produced with less energy
- Cleaner, less evasive handling
- Aesthetically pleasing, marketable
Potential New Uses

FlaxBed

- We have learned that larger oil companies have been using significant amounts of wood shavings for oil field remediation.
- We would like to begin researching the use of FlaxBed for oil remediation and feel it could be a very successful market due to the high absorbency factor.

FlaxFill

- Aspen Research, Maple Grove, MN is working on producing recycled PLA that would contain FlaxFlour. Currently investigating 5 applications for a totally green products.
- FlaxFill is now being used by Architec at a rate of 30% helping reduce the cost of their product (plastic being $.60/lb vs. $.23/lb).
Fibre Initiatives

- Project involving Composites Innovation Centre (CIC), SWM INTL and Canadian Light Source – Saskatoon, SK

- Working with Composites Innovation Centre on funding for “FibreCity”, a MB based centre capable of providing fibre characterization and performance assessment

- Investigating potential for Micro- and Nano-Crystalline Cellulose (NCC) from flax fibres sourced on the prairies for the food industry

- Partnering with CIC and Melet Plastics project to supply flax fibre for non-woven mat headliner applications replacing off shore fibres

- Supplied hemp fibre needed to produce mat that was used to develop the floor tub structural panels in the Kestrel - Canada's first bio-composite electric car
Sales of natural fibres for use in composites set to double by 2015

Sales of natural fibres for use as reinforcement materials in composites in Europe could increase to 40,000-50,000 tons by 2015 compared with 20,000 tons in 2010, according to a report in the latest issue of Technical Textile Markets -- a quarterly publication from the global business information company Textiles Intelligence.

The global market for natural fibre composites reached a total value of US$2.1 bn in 2010, according to the USA-based market research company Lucintel, and demand for natural fibres and resins will continue to grow rapidly.

The major reasons for using natural fibres are to reduce weight, achieve a better environmental balance, reduce costs and manufacture complex structural elements.

Admittedly, questions have arisen about the cost benefit of natural alternatives and the added challenges of consistency in quality control.

However, it has been convincingly demonstrated by manufacturers and researchers that bio-based material composites can now be produced with major improvements in stiffness and strength.
Future demand is for more stringent straw quality requirements that may lead to the development of a contracted straw purchasing program.

This is envisioned as a partnership between producers, processors and end users to ensure the highest income to farmers for straw quality in return for participating in specified agronomic and harvesting procedures.

This program would start at 5,000 contracted acres eventually going to 20,000 acres annually.

Only the highest quality straw can produce or hope to meet the requirements of technical grade flax fibres needed by tomorrow’s biocomposite opportunities in bioproduct parts for transportation and green building materials.
What the Future Holds

- Nano-Crystalline Cellulose (NCC), the race for the ultimate biocomposite material, the pursuit of large scale flax biorefinery.

- Blue Goose Biorefineries Inc. is looking into the creation of a joint venture to build a 10 MT/Day demonstration facility capable of producing economical NCC alongside food and pharma grade microcrystalline cellulose (MCC).

- Blaine Kunkel, President & CEO, using R3™ technology currently being upscaled at the University of Saskatchewan, plans on processing cellulose from flax shive.

- A commercial sized facility could have a 200MT/day capacity, utilizing a yearly mix of 30,000 MT of processed flax shive along with 30,000 MT of cereal straw.

- Researchers in Green Energy are investigating the production of biodiesel from Flax; avoiding the “Food or Fuel” controversy found in production from other crops.
There are now 7 billion people on Earth. Is anyone volunteering to lower their standard of living to accommodate ever increasing demands on existing resources? Where are the raw materials going to come from to meet our needs and improve life for all of us? A sustainable supply of Biomaterials!

Welcome to the new bioeconomy where everything is being reinvented. Innovation is leading to the rise of agricultural biomaterial opportunities. Alberta’s Biomaterial Initiatives - like the ABDC - are helping provide natural fibre solutions that can help us sustain the new developing bioeconomy.

Any Questions?

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