A Brief

INTRODUCTION

to

ATI-COMPOSITES

and the Potential Applications

for this

New Patents Pending

"Composite Concrete Technology"

For the Conversion of High Volume

Mineral Fines into Eco-Friendly

Building Materials

Presented by:

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ATI-Composites Inc.
a New Business Development Opportunity

Overview

In today's environmentally conscious world, the ability to successfully utilize high volume, nuisance waste is a highly marketable commodity. ATI-Composites has developed a binder technology, which converts high volume waste materials (fly ash from coal fired power plants or high volume mine tailings) into a lightweight, non-combustible, thermally resistive composite material particularly well suited for use in the production of construction materials. The company is ready to take steps towards commercializing the technology, initially for use in the building construction industry.

This ATI-Composites Technology has the potential to provide a new source of building materials for both commercial and residential construction**. The finished products are energy efficient, cost-effective and should easily qualify for "green credits" with Provincial and Federal programs, under the solid waste reduction initiatives, the new Kyoto Accord and the LEED Program.**

After an extended period of development & testing, we have established a workable system for combining waste materials with inorganic binders to form these new building products. The products use fly ash, and any number of other waste materials as the filler to create cost-effective building materials. Fillers may include bottom ash, flax straw, rice hulls, volcanic ash, nut shells, coconut husks, mine tailings and beach sand, etc.

The current technology will allow for production of lightweight, non-combustible construction products that could include:

- modular building blocks and precast wall panels
- high temperature pipe insulation to replace US made imports
- cast-in-place or precast structural floor and/or roofing panels
- cavity wall fill as an insulating and sound deadening medium
- decorative interior pre-cast products – for feature walls and casino interiors
- roof insulation (either panels or poured in place)

ATI-Composites Technology could also be used at construction projects to back fill service trenches in place of the cellular, flowable concrete currently used. It can be formulated to set very quickly, which is of a major benefit in the completion cycle on infrastructure work. It could also be used to insulate high temperature steam, oil or gas lines to prevent heat loss in colder (Arctic) environments.

The benefits of this technology are numerous, including:

> **Variable Mix Capabilities:** thickness/length/height as required to suit the required market, density/loadbearing capabilities as determined by mix design.
>
> **Energy Savings:** Could create a building block with a resistance value of RSI 3.5/R12 *(vermiculite filled insulated concrete block is approximately RSI 1.2/R-2).*
>
> **Energy Efficient Production,** no requirement to cure with heat, pressure and/or steam.

Throughput advantages: Unlike traditional concrete block that requires expensive, sophisticated curing equipment, the ATI-Composite blocks or panels are poured, set, removed from forms and air cured. Set times are controllable by the mix design.

Flexible Production: may be factory or site produced without expensive equipment.

Kyoto Credits: Produces alternate products with minimal energy input.

Cost Effective: Raw materials are primarily waste products. Production costs are low

Labor Savings: The finished products are 60% lighter than conventional concrete block, thus the manageable size of a component could be increased, and mortar work eliminated making the product less labor intensive. Product can be easily sawn; holds screw type anchor devices well.

Construction Savings: Lightweight reduces dead loads to the structure thereby reducing beam, column and foundation requirements equating to capital costs savings

Non-combustible: Can be used in situations that require non-combustible construction.

Patent Pending Technology: The technology could be licensed to off shore producers or to joint venture partners in Canada, the USA and abroad. Research carried out in December of 2003 shows that the technology is sufficiently unique to be deemed as patentable. Patents have been filled in February of 2004 for Canada and March 2005 the USA.

Current Status: We have several contractors who have expressed interest in the product for use a lightweight, insulating modular block as an alternative to the commonly used concrete block in commercial applications.

The estimating department at PCL put the installed cost of a concrete block wall at $10.60 per square foot. The materials are less than 20% of that cost - the majority of the cost is labour. The contractors believe that if ATI Composts can produce an interlocking, larger format block (erected without mortar) installation times can be reduced which creates significant savings. Also, if the inherent insulating qualities of the ATI-Composite block are substantially greater than that of the conventional block, the rising cost of heating and air conditioning would make this block a preferred alternative due to the overall lower operating cost of the building.

We have others who wish to see a precast “curtain wall” assembly, which would replace site built light steel stud and insulation wall sections, which are very labour intensive and slow to completion.

Technology Transfer and License Potential: The potential exists to license the technology to other users in developing countries using either local or imported fly ash (or a locally produced waste product). The production facilities are not heavily capital intensive and can be easily replicated to form a highly efficient automated system to compete with more costly alternatives such as the concrete block industry or the industries involved in the manufacture of various precast structural systems. In developing countries, automation could simply be replaced by inexpensive manpower utilizing simplified forming techniques.

Competitive Advantage: There is another producer of a somewhat similar product but with a very significant difference. Hebel Autoclaved Aerated Concrete (AAC) is a European technology that was introduced into the southern US in 1996. The process involves mixing Portland cement with fine silica and an aerating agent and then curing the mix in a steam injected pressure vessel (autoclave). The up front cost to set up a plant starts at US$27 million with larger scale operations capping out at US$60 million. Even with this huge investment, these plants are in high demand, due in part to the high cost of energy (for air conditioning) in the southern USA.

The overall output for AAC is confined to relatively small, rectangular blocks, which must then be cut or shaped to meet the user's needs. The production cycle requires 12 hours between initial mixing and the release from the pressure vessel. The output is limited by the autoclave and the processing costs are high – yet the demand remains high due to its resistance to fire and termites as well as the insulating properties in markets where air conditioning costs are high - due to the high cost or limited availability, of electricity.

By comparison, the ATI product is a self-foaming, free flowing wet slurry that sets at ambient conditions. The set-up cost for production is little more than the cost of the mixer and the forms. Fully automated systems are also available.

If we can develop a system of casting "tilt-up" wall sections which are lighter than concrete block, more energy efficient than concrete block (R12 vs. R3) and can result in a building being closed in less than ½ the time if takes to build with blocks or stick built steel studs, we will have a winner.

Existing Patent Rights and Recent Developments:

This technology is unique and patentable by virtue of the following characteristics:

- Lightweight to permit ease of handling, to reduce manpower and freight costs
- Designed for improved Fire Resistance (insulation) and noise abatement
- Controlled setting times by managing the reaction to accelerate the cure and control production parameters
- Will not sustain mould or fungal growth
- Is NOT based on Portland cement, Vermiculite, Perlite, or other energy-intensive compounds.

The efforts of the past 48 months has shown that **we can produce lightweight composites** which exhibit relatively low density (0.35 to 0.75 g/cc) - at 350 - 750 Kg/M3 - with a good thermal resistance, while exhibiting moderate to good structural or compressive strength.

Competition from Existing Systems:

The major competition to this venture will come from a number of sources; they include the following:

Hebel (of Germany) sells a plant that will produce a lightweight cement matrix suitable for use as a precast structural item. The advantage of this product is a low raw material cost. As well, the product carries a number of local and national Code Approvals. The disadvantages are that the manufacturing process is very capital intensive (approximately US $27 to $30 million to set up a plant) and the production cycle, which requires ten (10) hours of autoclaving (steam and pressure) time to cure the cast blocks. These finished blocks are then cut to final shape for each purpose or project. This technology does not accommodate insitu application or one site production. Throughput is limited by capital equipment. The production process is very energy intensive.

Urethane (SIP) Panels: Since the two component urethane creates it's own gases the SIP's must be manufactured in a press as they must be restrained in order to prevent the panels from distorting when the chemical reaction occurs. The challenge for these producers is that the cost of the urethane has continued to rise (as it is a petrochemical derivative) and the panels can only be economically shipped within a relatively short radius from the plant. These panels however offer superior insulation properties when compared to other insulating materials. These SIP panels are becoming more popular but are limited to areas where combustible construction is acceptable. They cannot be used in buildings where non-combustible construction is mandatory by building code requirements.

EPS (SIP) Panels. These SIPs are essentially the same as the urethane core panels, only based on EPS (Expanded Polystyrene) rather than polyurethane. These panels are produced from cut slabs of EPS foam with skins of OSB or various other metal glued to the interior and exterior surfaces. Once again, these panels are limited to areas where EPS production plants are within easy access. Once again, there uses are somewhat limited by virtue of the combustible nature of the materials. The other disadvantage with these panels is the large volume of foam, which must be transported, stored and cut as part of the manufacturing process.

ATI Composite Technologies, THE LOWER-COST-ALTERNATIVE: We envisage shipping relatively low volumes of binder, which may be mixed with fly ash (or alternative fill materials such as tailings or sand) from a local source. In addition, the production process increases the volume of the finished product by a factor of up to four so that 2,000 board feet (2,000 square feet by 1" thick) of insulation requires only 500 board feet of dry mix. This reduction in volume will have dramatic impact on warehousing, inbound transportation and all the other costs associated with these procedures. Additionally, the density, insulation values, compressive strength and finished volume of insulting **ATI Composites Block** can be adjusted to meet the needs of various applications without changing the dry mix or complicating the ordering and inventory procedures. One dry mix formulation can be used to make a variety of end products by simply adjusting the mixing procedure and the ratio of the curing agent in the mix design.

Competitive Notes regarding Commercial Concrete Block Wall Systems:

We envisage creating a unique dry stacking, interlocking block building system to compete in the commercial construction market place utilizing an adhesive as a bonding agent (between blocks) applied by a caulking gun or brush. The concrete block industry sells millions of dollar worth of product annually which are used as both interior and exterior non-load bearing walls in all types of construction.

In addition, the potential exists to cast light weight "tilt-up" wall panels with structural members, such as lightweight galvanized steel studs, embedded right into the mix to create a load-bearing wall section.

For more information, please contact:

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