

LIGHTWEIGHT CONCRETE "A SNAPSHOT"

This new innovative technology is a natural industry progression in this country which integrates seamlessly with cement providers and contractors alike. It is an extension to the most advanced building technologies but surpasses all others with its energy efficiency features due to the ingredients that make up its composition. Like any new product it will not be embraced by all the market in fact we expect to penetrate only a fraction of the market but in particular those key developers and contractors who are looking for speed of construction activities and quality finish. Because of its "Green" qualities we expect strong support from the media and environmentally conscious market sectors who will understand it's environmentally sound and simplistic features and benefits to the end user. This "Green" aspect of the technology allows those developers and contractors who embrace it to make bold statements to the market about its environmentally friendly features aside from all the commercial benefits contractors will reap from incorporating it in their construction methodology.

SECTION 2

LIGHTWEIGHT CONCRETE - WHAT IS IT?

Lightweight Concrete is as the name suggests "LIGHTWEIGHT CONCRETE". The two main reasons why it is so light are because;

- (i) It has no aggregate in its mix composition and subsequently in most of its normal applications (housing construction) it is not as strong as traditional concrete mix however, in conjunction the Sterling Panel (as we outline later in this document) lightweight concrete is a market leader with overall unprecedented technology integrity.
- (ii) The main ingredient in lightweight concrete that makes it lighter than normal mix concrete is what is referred to as a foaming agent. This foaming agent when mixed with sand, cement and water produces a slurry, the mixing process incorporates small enclosed **AIR BUBBLES** within the mortar thereby making it lighter and having special properties detailed further herein. There are a number of foaming agents available in the market that are generally manufactured from palm oil or similar biomass substance including, protein based foaming agents and synthetic. (**Note the formula of foaming agents is a well guarded secret of the manufacturer that cannot be acquired**). The foaming agent can be





purchased from the manufacturers but generally it is part of a package with their hardware.

When the undiluted foaming agent is mixed with water and processed through a Foam Generator the end product, the foam, can be best likened to that of most shaving foams.

SECTION 3

HOW IS LIGHTWEIGHT CONCRETE MANUFACTURED?

With no aggregate the only ingredients that make up lightweight concrete are cement powder, sand, water and the foaming agent. The strength of lightweight concrete can be varied significantly by the mix ratio of the ingredients. Once the Lightweight concrete manufacturer understands the density of the concrete mix required the composition of each of the ingredients is noted so as to obtain a consistent concrete strength for the job at hand. Lightweight concrete is mixed in an agitator in the same common manner as normal concrete. During the mixing process the foam is pumped into the agitator and the outcome thereafter from the mixing of sand, cement, water and foam although lightweight concrete is best described in appearance and density as a slurry.

SECTION 4

FOAM GENERATOR

This essential piece of technology in the production of lightweight concrete is powered by air. A relatively simple and generally small piece of technology the Foam Generator can be powered from either an air tank or continuously operating compressor. Foam generators have a number of control devices that enable the operator to adjust the foam properties so as to achieve the required density of the slurry.

SECTION 5

MIXING OF LIGHTWEIGHT CONCRETE

Although we stated earlier herein that lightweight concrete is mixed in the same common manner as normal concrete, which it is, it is best to use a dedicated mixer specific to the lightweight concrete as recommended by the foam manufacturer. To obtain a uniform and smooth slurry it is also important to have the mixer and





foam generator in close proximity for speed of operation. The mixing action and time of mixing is equally as important as mixing to long or short can affect the integrity of the lightweight concrete mix — "its all about technique and conditions."

SECTION 6

INSULATION FEATURES OF LIGHTWEIGHT CONCRETE

Due to its very low density and cellular structure lightweight concrete has unprecedented thermal insulation qualities. Subject to the density of the mix lightweight concrete can have up to 30% air content lowering its thermal conductivity thus reducing heat transmission significantly.

In addition lightweight concrete is basically an inert non-combustible material unlike many other types of insulation which may degrade over time or give off toxic fumes when combusted. One of the key features of lightweight concrete that we broached on earlier herein in the Sterling section was that due to its high flow characteristics it requires *no compaction and by nature it is self levelling*.

When used as a stand alone product, that being when it is not being used as an infill into Sterling Panel for example as a roofing surface it can also be mixed with suitable waterproofing agents to make it impervious. In addition and for further protection a layer waterproof membrane in the form of a polymer modified mortar can be applied on the finished lightweight concrete surface as further protection Lightweight concrete can also be used to replace concrete applications which incorporate polystyrene as lightweight concrete is recognised as one of the leading thermal insulators in the construction industry.

General thermal conductivity of cellular concrete compared to normal concrete

Bulk density (kg/m³)	Thermal conductivity (W/m deg C)
1,000	0.30
1,100	0.34
1,200	0.38
2,400 (normal concrete)	1.83

The table above shows that thermal conductivity of cellular concrete at 1,000kg/m³ is only 18% that of normal concrete.





FIRE RATING OF FOAMED CONCRETE

Attached is the "indicative" fire rating in hrs for concrete of various densities. "As a cement bonded material lightweight concrete is incombustible. In the event of fire to a building, it has been found that lightweight concrete dos not disintegrate or explode."

Table showing thickness of lightweight concrete (mm) for fire resistance at various densities.

	Fire resistance (hrs)			
Density (kg/m3)	2	3	4	5
400 - 480	55.0 - 70.0	70.0 - 82.5	82.5 - 95.0	95.0 - 105
800 - 960	70.0 - 77.5	82.5 - 87.5	97.5 - 102.5	110.0 - 115
1120 - 1280	77.5 – 85.0	87.5 - 105.0	110.0 – 120.0	122.5 - 133
1600	100	125	145	-

SECTION 8

SOUND INSULATION OF LIGHTWEIGHT CONCRETE

Lightweight Concrete provides better (or equivalent) sound insulation transmitted by air (airborne sound) than other solid building materials such as cement bricks or clay bricks under comparable conditions.

The insulation of solid one leaf homogenous walls is dependent on the weight per unit area i.e. surface related mass.

Using the Mass Action Law (Berger's Law) for solid walls;

$$Rs = 14.5 \log (m) + 10 dB$$

Where; m is the mass of the wall element in kg/m2 (inclusive of plaster and any surface finish)

Rs is the sound reduction index (dB) for average range of 100 to 3150 Hz

Below are typical values of sound reduction index for various densities of lightweight concrete compared to brickwork.





Thickness (mm)	Density of lightweight concrete (kg/m3)	Rs (sound reduction index) dB
150	1250	44.45
150	1200	44.25
100	2000 (cement brick)	44.70
100	1850 (clay brick)	44.39

- It is assumed that walls are plastered on both sides with cement based plaster of minimum thickness of 12mm.
- Due to the high bending stiffness and low dry density of lightweight concrete walls, the values above may increase by more than 10 percent. (The chart does not take into account the Sterling Panel we will use in all our construction activities). Typical formulas for Lightweight Concrete given in ISO/171(1982); "Method for rating the airborne sound insulation of buildings and of interior building elements" results in sound reduction index of 54 dB for 1250 kg/m3 which is higher than the values given in the table above and exceeds the values for brick walls.
- Be mindful that as the Sterling panel makes up the interior/exterior walls of our construction activities and being only 5mm thickness the sound reduction index above will obviously change slightly.





<u>LIGHTWEIGHT CONCRETE TECHNOLOGY - SEE'S INVOLVEMENT</u>

South Eastern Equities ("SEE") have been researching innovative construction technologies to be used in construction activities in the Philippines for in excess of ten (10) years. During this time SEE introduced and had accredited by the National Housing Authority ("NHA") a "Sandwich Panel" building technology that suited a multitude of building application but particularly those of the Philippine Housing Industry. Unfortunately this technology as we were to later discover did not pass the "knock test" of consumers and as a result of several years of work and a lot of cost the technology was abandoned.

The "knock test" is a simple credibility test used by Filipino's to hear and feel the integrity of construction materials adopted in the construction of any building. It is particularly important for home owners. The short thud noise that resonates when a wall is thumped on with the palm of a clenched fist comforts the owner of the house that the integrity of the construction material(s) are either solid and secure or otherwise. Quite simply, like most countries Filipinos want to know that their home is constructed of concrete or a concrete based materials and that it is secure. Given the climatic conditions of the Philippines it is ironic that self comfort is a distant consideration to security. Bearing this in mind South Eastern Equities three (3) years ago began to research all concrete building technologies and it wasn't long before we realised that lightweight concrete was the way of the building industry in the future. Lightweight concrete is not a new technology to the building industry but generally most of the preparation and application processes we have seen are archaic to say the least; hence the use of lightweight concrete has been limited. Aside from spraying lightweight concrete the most frequent way it is being used at this time in construction activities is as a filling in in-situ formwork. However, adopting lightweight concrete in in-situ applications has many downsides as the formwork is expensive and time consuming to construct and dismantle. Furthermore, most of the in-situ formworks have limited uses due to the erosive effects cement has on the surface of the formwork over a period of time. Despite how well it is cleaned after each application the formwork ultimately decays, which result in an expensive exercise to replace. Having sourced a number of lightweight concrete products within the region we were of the opinion that our future construction technology issue had been solved. However, there were still a number of hurdles to overcome before the regular use of lightweight concrete would be viable for us, the biggest problem was the sourcing of a suitable formwork that was practical and commercially viable.





STERLING CONSTRUCTION & DEVELOPMENT CORPORATION ("STERLING")

Approximately 12 months ago we were introduced to Sterling who had patented an in-situ building technology that was fabricated from the regular James Hardie panel manufactured in the Philippines. The Sterling technology is best described as a permanent in-situ building technology and has been embraced by construction companies in the local and international markets. On a commercial basis the technology is on parity with traditional building methods i.e., concrete hollow blocks ("CHB") but the Sterling panel is many times faster in construction and has a far superior finish.

In all the time that Sterling have been providing their technology to the market the only way of "filling up" the cavity in their panel with concrete is by pouring traditional concrete mix from a bucket or similar carrying apparatus directly into it. In its natural state of readiness for accepting traditional concrete fill the Sterling panel is not robust enough to accept concrete fill from a pump. The filling of the cavity by using a concrete pump would result in a "blow out" at the panel seams due to the shear weight and pressure of the concrete. The current system of filling the cavity with buckets of traditional concrete mix is also floored with technical issues not to mention the time it takes to bucket fill the cavity or the manpower required. At the forefront of these issues is when the concrete mix is poured into the cavity out of buckets it leaves air pockets around the plastic "recycled" panel spacers that hold the two (2) sides of the Sterling panel together. The only way around this problem is to compress the concrete fill with what is commonly known as a concrete vibrator. However, once again the use of a vibrator would result in "fracturing" of the Sterling panel.

Whilst Sterling have a technically sound in-situ construction technology it has some flaws as detailed above which can only be overcome by the filling of the in-situ wall cavity with a very liquid self levelling concrete – "lightweight concrete".





SEE'S PUMP AND MIXER TECHNOLOGY

Being technically satisfied with the Sterling panel and likewise with several of the suppliers of lightweight concrete product (foaming agent) was comforting but South Eastern Equities was still not satisfied with the hardware solutions it had been offered during its hardware sourcing exercise. Quite simply we wanted a combined mixer and pump that would transfer the lightweight concrete directly into the cavity of the Sterling Panel and we were not about to compromise.

From international inquiries we were able to locate several lightweight concrete manufacturers who had the pump technology that allowed end user to pump lightweight concrete directly into in-situ formwork. Those involved in housing construction activities who use in-situ building systems all have residual concrete markings and scoring when the formwork is removed. These marks and scoring are created by the panel joints in particular the general uneven nature of in-situ formwork. To remove these visible markings which crisscross internal/external walls they have to be cement rendered but this a time consuming and expensive exercise and more importantly the walls rarely have an even finish appearance. With the Sterling product this is not necessary as the formwork, that is the in-situ bonded James Hardie panels are never removed they make up the internal and external walls. Several months ago South Eastern Equities on a back to back formal arrangement with Bubble Double (a BVI company) entered into a commercial arrangement with an organization who has successfully developed and tested a lightweight concrete mixer and pump. The mixer/pump chemical additive injector including the diesel motor and hydraulic pump which operates all the function of the technology are full encased and integrated on a mobile trailer.

To the best of our knowledge and research the technology we will be offering to the Philippine construction industry in association with Sterling is a world first and South Eastern Equities have secured the exclusive rights thereto.





THE SEE TECHNOLOGY

(i) THE HARDWARE

During our hardware sourcing exercise we noticed that all the lightweight concrete suppliers we met or spoke to all had similar hardware components. Each had a Foam Generator, Mixer, and where we did locate it a pump. These were all separate units and on several occasions also included a generator that was required to power the hardware as most of it was electrical. It is not hard to understand that with all these separate pieces of hardware connected by pipes, cables, etc. and all having their own specific task in the manufacture of lightweight concrete that life is more than just a little bit hectic for the operators. Worst still there is no uniformity in the process as the operators are moving from hardware to hardware and then transfer the end product ("lightweight concrete") from one machine to another. This process is just to complex, messy and unproductive given the loss in time in managing all the various pieces of hardware. With one of the manufacturers of hardware and foaming agent in Asia we spent several months sourcing components so that they could develop a fully system for us but this also became too hard. On several occasions we were told by other operators that an integrated system would simply just not work. After months and months of international enquiries we located an American engineering corporation who had just developed what we were looking for. Now referred to by us as the "Air Crete Junior" this piece of Technology has all the components integrated and mounted on a trailer that can be towed by the average sized household car. It is in fact so compact that the operators have no reason to be distracted by peripheral hardware activities.

This Technology includes the mixer, pump, foam generator, diesel operating motor, hydraulic systems, air compressor and air holding tank all in the one compact unit. The unit is compact and mobile but has great performance output to meet the demands of the most discerning contractors when engaged in general housing activities. Due to its compact size and the fact that it is mounted on a trailer the unit can be crane lifted allowing it to be used in high rise development activities. SEE have secured the exclusive rights to this Technology for the Philippines and we expect to expand these rights to the other countries where Sterling supply their panel to i.e. Middle East, South Africa, India to name a few and there are more countries on the enquiry list.





(ii) **FOAMING AGENT**

Foaming Agents are in most instances the intellectual property of manufacturers of Lightweight concrete Technologies and are mostly sold to end users on a package basis. That being the end user generally acquires the hardware of the foaming agent manufacturer on the basis that it has been specifically set up ("so they say") for their foaming agent.

With the exemption of one (1) all the foaming agents we have knowledge of all work on the same basic dilution formula of around 40 to 1. This means one litre of foaming agent plus 39 litres of water produces 40 litres of foaming solutions. However, 40 litres of foam mix (i.e. foaming agent and water) expand to around 500 litres of foam.

(iii) BUBBLE DOUBLE FOAMING AGENT

The foaming agent we have procured the licensing rights to is simply known as "Bubble Double Foaming Agent" which works and looks different to all other foam concentrates. More importantly it complies with all the American Standards (ASTM-C869 Standard Specifications) and (ASTMC-796 test procedures) which is a stability during "pumping" test. Lightweight concrete is tested during mixing and pumping and the loss of air content is not allowed under the test conditions to exceed 45.5% of air mass.

The dilution rate of Bubble Double exceeds 1.300 this being seven to eight (7-8) times the dilution ratio of other brands of other liquid foam concentrates which their manufacturers promote as 1.40 dilution ratio. Not only can Bubble Double be diluted seven to eight (7-8) times more than any other brands of foam concentrate on the market but it is also formulated to allow a wide range of adjustment in dilution ratios and yields.

As an environmentally friendly product it is not aggressive, will not chap your hands not cause problems with surfaces that it touches. Unlike other foaming agent products it does not decompose in an opened container and the shelf like is for years.

In its natural state or when mixed into slurry there is no odour and with a very attractive strawberry colour, texture and no odour it is a very simple product to work with.

Similar to the "Aircrete Junior" hardware SEE have procured the licensing rights to the Bubble Double Foaming Agent both which work perfectly in harmony.





In summary, SEE have spent an enormous amount of money, time, and effort in researching this rapidly emerging technology, Lightweight Concrete. From such research we are of the opinion that what we have the marketing and distribution rights to is the most technologically advanced hardware and foaming agent available in the world today. We are comfortable from test results that the Technology produces a constant integrity of Lightweight Concrete in accordance with specification predetermined to the batch mix of the ingredients. As an environmentally friendly technology what they, that is the hardware and foaming agent collectively are able to produce is unprecedented in the construction industry in the Philippines. The end development in particular housing constructed from Lightweight concrete will provide a huge range of benefits, pleasure, and uninterrupted living comfort due to its thermal and acoustic properties.

Working in co-operation with Sterling the combined Technologies will be difficult to surpass both as a packaged building technology or as a commercially prudent business opportunity. Collectively they will establish a new benchmark for all construction activities in the country that others will aspire to, "or quite simply be forced to join".

This is a very exciting opportunity for any bank or Investment Corporation to be involved with particularly organisations who support clean energy efficient construction processes that can be replicated on a global basis at an affordable cost to the end user.





COMPETITION

In the Philippines we were only able to locate two (2) suppliers of what their manufacturers label as lightweight concrete technologies but each are vastly different and inferior in their applications to the SEE technology, they are;

- (i) <u>SPEEDPANEL</u> An Australian technology only recently introduced to the Philippines manufactured from galvanised steel with a lightweight concrete infill. This technology is geared for commercial application. Whilst it has excellent acoustic and thermal qualities it is expensive and being manufactured offsite there will always be carriage/storage issues to be dealt with but it is well suited for a number of specialized commercial applications.
- (ii) BOX SYSTEM CONSTRUCTION A USA patented product promoted locally by Northcon Construction & Management Group ("Northcon"). It is a pre-cast in-situ panel system that is produced from a normal concrete mix blended with polystyrene beads, Portland cement and chemical admixtures.

It is said to be a cost effective building system comparable with concrete hollow blocks but much faster. As an in-situ building product the finish should be of high quality and we are informed it has very good Acoustic and Thermal qualities. Once again being manufactured off site it has the same carriage/storage issues as Speedpanel above. Due to its finish most of the clients of Northcon are reported to be foreigners which is testament to the finish of the product.

We believe that Northcon may also manufacture concrete hollow blocks but the information available suggests they are more expensive that traditional CHB which restricts their market opportunities immediately.

Other than these two products we are not aware of any other competition in the Philippines to that of our lightweight construction technology.

In Malaysia, Thailand, Indonesia and other Asian countries there are a number of lightweight concrete fabricators using various configurations of preparation and delivery of lightweight concrete. However, our research indicates that most of the manufacturers are focused on pre-cast moulding of hollow and solid blocks including wall panels. Another common use is the pre-casting of decorative wall, ceiling and garden features.





There are a few manufacturers of lightweight concrete in Asia who use in-situ building systems but their formwork is expensive and time consuming to construct and dismantle. Generally there are quality finish issues with using in-situ formwork building systems that become evident after the formwork has been removed.





TARGET MARKETS

Our target market is just a fraction of those highly rated contractors licensed with the Philippine Contractors Accreditation Board ("PCAB"). For the records and to appreciate the size of the Philippine market as of September 2009 PCAB had issued a total of 3,698 contractor licenses for 2009/2010. Of this number 97.1% were license renewals and the remaining 2.9% were new entrants. Important to qualify for our target market is the large contractors "AAA" and "AA" account for only 6.3% of the issued licenses. The medium sized contractors "A" and "B" composed of 36.2% while small contractors still remained the majority of PCAB licenses at 57.5%. However, more comforting for our entry into the Technology side of the construction industry is the surprising increase in the trade figure related to the construction industry referred to as construction investments. Amidst the global economic crisis, soaring oil, gold, and food prices and general economic uncertainty during the first semester of 2009 the Philippine economy managed to grow by 3.8%. Whilst there was mixed earnings recorded by all market sectors there was a staggering 15.8% growth in the construction industry. In the first six (6) months of 2009 construction investments, as measured by the gross value in construction ("GVC") reached Php66.2 billion representing a 9.7% increase in the same period in 2008. Generally market optimum is high and we have not seen or heard anything to the contrary that the industry has slowed down in 2010.

Having regards to the financial stability of the construction industry we are of the opinion that we could not have forecast a better time for the introduction of the lightweight concrete technology into this market. Our general sentiments are that it will obtain huge recognition and acclaim from all areas of the construction and development industry once they become aware of it. The applications for its use are wide and varied but our immediate focus will be directed towards existing clients of Sterling and thereafter potential clients of Sterling.

The reciprocal benefits to both Sterling and SEE working in a collaborative relationship should become apparent almost immediately and will also allow Sterling the opportunity to re-visit customers that they may previously were unable to close due to mixed reasons associated with their technology.

The technology in time will have impact, but little, on the concrete hollow block ("CHB") industry as there will always be users of this type of technology as it has applications that we would could not even consider. It's just a matter of time as to how we penetrate this market with our lightweight concrete technology but a Lightweight concrete hollow block at the same price as the traditionally made





concrete hollow block would be our objective. As the business matures there will be a requirement for technology diversification that being larger and smaller models of the technology to accommodate large commercial developments and similarly to support the small provincial developers and manufacturers of cement based building products. These opportunities will be addressed as they come to hand.

The market penetration for this type of technology is controlled by capital costs and our forecast of twenty (20) machines in year one (1) to well rated contractors of the Philippines Contractors Accreditation Board is in our opinion very conservative.





CARBON CREDITS

This commercial area of the technology has not been researched at this time as it would be premature until such time as production of Lightweight concrete commences (October 2010). However, given its green qualities we see no reason as to why it would not qualify for Carbon Credits. In the immediate future we will schedule meetings with; key advocacy groups the likes of Philippine Green Building Council ("PHILGBC") and LEED to discuss the innovative and environmentally friendly features of lightweight concrete.

We are of the opinion that we would obtain immediate status as one of the leading technologies within the Building for Ecologically Responsive Design Excellence ("BERDE") programme being developed by PHILGBC.

SECTION 16

HOW WILL CONTRACTORS/DEVELOPERS GET TO USE THE TECHNOLOGY?

The Technology will not be for sale to any party, the ownership of the hardware will always remain the property of South Eastern Equities.

We will however rent the hardware and sell the foaming agent to customers on a package basis. A draft of the Double Bubble Services and Rental Agreement is attached at the rear of this section which outlines the terms and condition for the commercial arrangement proposed.

To the benefit of the end user under the proposed commercial arrangement they have no capital outlay and will still enjoy the benefits of the product delivered by specifically trained operators in the use and application of the Technology. The pricing of the daily rental has been structured in such a manner that the technology and services provided thereafter including the supply of the foaming agent should not cost the end user anymore, or very little, if any, than the cost of using the Sterling Panel adopting traditional concrete mix infill. Quite simply what we have structured the Rental Agreement results in nothing less than a commercial "WIN WIN" for SEE, Sterling and the beneficiary (Contractor/Developer) of the Technology and Services thereto.

