



# Low Cost Housing Technical Information & Product Manual



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Low Cost Housing  
Technical Information & Product Manual



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# Low Cost Housing



## General Corporate Information

Low Cost Housing (L.C.H.) has provided products and services to the housing industry since 1998. L.C.H. has expanded products and services to include special community re-development projects, incorporating environmental management with effective social and community sustainable modelling.

L.C.H. is a joint venture company with RoadPacker Group Ltd. an integral part of The RoadPacker Group of Companies, which is an integrated group of companies specialising in the manufacturing of chemical soil stabilisers and dust abatement products. Other areas of activity are environmental soil reclamation consulting, with environmental, social and community planning, products and field services to governments, institutions, aboriginal groups, and the petroleum, forestry and mining industries. LCH maintains a philosophy which combines low cost housing and infrastructure together with modern chemical stabilisation technology. Therein, further supporting community sustainability within low cost community re-development projects.

## Project Management

L.C.H. has recognised a unique project management market niche within international housing and community development projects; associated with an increasing demand for low cost housing. The need is greatest for community redevelopment projects as a result of environmental disasters or as a component of economic reform programmes. The expertise of company personnel in providing project planning and management, allows L.C.H. the ability to provide total project management services for not only housing construction, but also total infrastructure design and construction.

## Products and Technology

L.C.H. brings both the construction expertise and practical chemical and mechanical products of L.C.H. & RoadPacker Group Ltd. to support low cost re-development projects. L.C.H. has international license agreements for such products as the ionic soil binding chemical, RoadPacker Clay Brick Stabiliser and the technology of their own Stabilised Earth Brick Machine (SEB). Both components of the technology are very effective in providing low cost housing.

L.C.H. has an ongoing product and technology assessment program to identify, license and market Canadian and international products and technologies for low cost community re-development projects.

## Sustainable Communities

L.C.H. has developed a management and field team of knowledgeable personnel who understand that the total success of a community re-development project, depends on the ability of the community to be sustainable. That successful planning involves the people who will live and work within the community. As a result of this understanding to design for successful sustainability, L.C.H. has developed a social and community affairs assessment and auditing model, which is utilised as both a planning and monitoring component for community redevelopment projects.

## Integrated Team Approach

L.C.H. has developed a planning process that understands the benefits of a concept referred to as social engineering. Social, environmental and community affairs experts, form a strong component of the planning and master plan development team. Utilising assessment models, the planning team integrates various 25 year regional land use scenarios into the master plan. This process allows for a higher level of confidence in the design of a master plan.

## Capital Budget Forecasting

L.C.H. provides the expertise and data base systems for accurate capital budget forecasting. To support these budget programs L.C.H. has in place personnel experienced with international product and service contract negotiations.

## Pride of Ownership

L.C.H. recognises the benefits, both in lowering costs and successful community development, of utilising future home owners and community members in constructing their own homes and communities. A viable asset in providing low cost community re-development housing, is the utilisation of this labour force.

## Viability of Micro-Enterprises

The success of community re-development is the capability of the planning team to integrate small businesses or micro-enterprises into the master plan. To provide a sustainable community both business and work needs must be considered. This is especially true in agricultural areas where small plots of land are the key to household economic survival.

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## Corporate Management Team

L.C.H obviously does not maintain offices around the world. We have however, through many years of experience and operations throughout the world, built up a vast network of highly experienced individuals of uncommon talent and achievement, working together smoothly and quietly in well-disciplined teams.

This allows Low Cost Housing Ltd. to work quickly and efficiently on behalf of a client, to bring about a satisfactory and profitable conclusion to any venture they may decide to pursue.

The key L.C.H management team consists of senior personnel who represent an integrated team with capabilities in environmental planning, design and engineering. The variability within their professional backgrounds and also their collective expertise, provides a strong team for community re-development projects. The talents of the experts available to expedite a client's requirements are without doubt, evidenced in their Curriculum Vitae's which detail their recent and past engagements which may be made available upon request.

## Environment, Health and Safety Training Programs

L.C.H integrates environmental, health and safety programmes into all community re-development projects. All supervisors, contractors and personnel are provided environmental, health and safety training programmes prior to commencement of any construction work.

## International Partnerships and Financing

The L.C.H management team's capabilities include the ability to find and develop international partnerships. This management team is currently concentrating on partnerships in the Philippines, China, India, Venezuela, Mexico, Nigeria and other countries where their knowledge of these governments, construction industries and re-development programmes, provide the formulae for successful business ventures.

The type of financing for re-development projects is the key to the successful completion of a re-development project. The L.C.H. management team provides the expertise to utilise Canadian government financial assistance and, acquire contracts funded by international aid and banking institutions.

The primary purpose of the L.C.H. Stabilised Earth Brick (SEB) technology is to produce low cost housing for the poor of any country where there is a distinct lack of conventional housing.



It's biggest advantage is that it is immediate. Not only can this procedure be used in creating new communities of a permanent nature, it can be used in the event of a disaster being declared due to typhoons, flooding, earthquakes and any other disaster that renders people homeless. The benefits of this system of home building is that a disaster rescue unit does not need many raw materials to immediately move into a declared disaster area and begin to provide the rudimentary requirements for a community to return to a position of normalcy.

By the simple movement of several mobile LCH Stabilised Earth Brick Machines into a disaster area, the local government people can immediately begin to produce homes, schools and even hospitals to accommodate the homeless population. All that is required is a LCH Stabilised Earth Brick Machine, RoadPacker Clay Brick Stabiliser product and the local insitu soil. If there is already a machine in place and an adequate supply of RoadPacker Clay Brick Stabiliser, then reconstruction of the country's infrastructure can begin immediately. Should the equipment not be in place, then the LCH Stabilised Earth Brick Machine and the RoadPacker Clay Brick Stabiliser can be brought into the area as emergency relief equipment. Another option is to move in the finished material from an off-site location.

# Low Cost Housing



## Low Cost Housing Technology

The primary purpose of the RoadPacker SEB technology is to produce low cost housing for the poor of any country where there is a distinct lack of conventional housing. Its biggest advantage is that it is immediate. Not only can this procedure be used in creating new communities of a permanent nature, it can be used in the event of a disaster being declared due to typhoons, flooding, earthquakes and any other disaster that renders people homeless. The benefits of this system of home building is that a disaster rescue unit does not need many raw materials to immediately move into a declared disaster area and begin to provide the rudimentary requirements for a community to return to a position of normalcy.

By the simple movement of several mobile SEB making machines into a disaster area, the local government people can immediately begin to produce homes, schools and even hospitals to accommodate the homeless population. All that is required, is a SEB machine, RoadPacker Clay Brick Stabiliser product and the local insitu soil from the side of the road or near-by fields. If there is already a machine in place (as seems to be the intention of the existing livelihood programme) and an adequate supply of RoadPacker Clay Brick Stabiliser, then reconstruction of the country's housing infrastructure can begin immediately. Should the equipment not be in place, then the SEB machine and the RoadPacker Clay Brick Stabiliser can be brought into the area as emergency relief equipment. Another option is to move in the finished material from an off-site location.

## SEB Machine Specifications.

The SEB machine is easily transported onto a construction site and can immediately produce high quality, interlocking blocks made from the insitu (local) soil. By using the unique interlocking features, SEB's allow "dry construction", i.e. no mortar is required to hold the blocks together. Made from soil treated with RoadPacker Clay Brick Stabiliser products, the LCH SEB's can be used almost immediately after production. The fast, reliable and easy to handle, SEB machine, will allow for low cost construction of high quality houses with unskilled labour.

The construction of a 50 square metre house requiring 5,000 SEB's, can be achieved in two or three (2 or 3) days and will be of the highest standard. The home will also be heat resistant, sound proof and completely stable.

The following details serve to give the reader an idea as to the effectiveness and versatility of such a machine;

## Stabilised Earth Brick (SEB) Machine Specifications.

<b>Capacity:</b>	The SEB can manufacture 200 blocks per hour. If the length of the working day is 10 hours, a total of 2,000 RoadPacker SEB's can be made each day
<b>Engine:</b>	Diesel air-cooled 10 kW hand-start, or electrically powered 13 kW.
<b>Size:</b>	1,300 cm ( length) x 1,200 cm ( width ) x 1,300 cm ( height)
<b>Weight:</b>	850 kg (1,000 kgs with trailer)
<b>Hydraulic oil:</b>	S A E 40
<b>Qty/Blocks m3:</b>	100 to 110 blocks
<b>Qty/Blocks/ RP Clay Bricks Stabiliser **:</b>	110 blocks
<b>Qty/Blocks/Per Bag of Cement:</b>	65 _ 70 blocks
<b>Fuel consumption:</b>	+/- 1 litre per hour
<b>Option:</b>	Mobile, integrated roadworthy trailer



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## **Can I use any soil with LCH Stabilised Earth Brick Machines ?**

No! pure sand cannot be used as we must compact the mixture. We use prescribed dosage of RoadPacker Clay Brick Stabiliser to bind the soil. To achieve the compaction necessary for the strength to produce a strong brick, we need a clay soil of 10%>. If the insitu soil is too sandy, then most definitely some clayey soil has to be mixed in with the existing insitu soil. A compaction test will give you a clear idea of the proper mix to work with.

## **Can I mix water with the soil ?**

LCH Stabilised Earth Bricks use what is called a “dry mix” which in fact uses a minimum of (10 to 15 %) water . Most often the soil is wet enough to be used as is. If need be, a small amount of water can be added. The mixture must not be over wet, otherwise compaction will not be achieved

## **Do I need a mixer ?**

For small projects, mixers are not used at all. (but can be if so desired) We emphasise the labour intensive possibilities of LCH Stabilised Earth Bricks. If the project needs a high output of bricks, we recommend the use of a pan mixer (supplied by LCH) to improve productivity.

## **Do I have to prepare the soil before mixing in the RoadPacker Clay Brick Stabiliser ?**

Once again, for small projects, there is no need for mechanisation of the soil preparation. A good grid trough (into which the soil is shovelled) will eliminate stones and other big components and will produce very good results. If a higher output is required, we recommend the use of a crusher that will reduce the lumps and stones and give a very high consistent quality of the final product.

## **Can we be sure that these walls are not going to fall down?**

This the most commonly asked question and where people who have not yet seen a LCH Stabilised Earth Brick building have the most concern. The answer is simple, LCH Stabilised Earth Bricks have a patented shape that gives them the most solid interlocking feature ever. The walls are made from bricks that are interlocked with each other. It is totally impossible to remove one brick out from a wall unless a pick is used to break through it. There is no more solid wall available on the market today.

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## **If there is soil movement, will the wall crack and fall down ?**

Here again is the very basis of the strength of the LCH Stabilised Earth Brick concept, each and every brick in the building is interlocked to the others, but is not bonded to the them as with cement mortared bricks. With traditional mortar, once there is a soil movement, the bricks come under such strong tension that the bond eventually cracks and the wall starts a cracking process that never ends and is most difficult to correct. With LCH Stabilised Earth Bricks, each brick undergoes a minimal amount of movement and the whole wall will adjust progressively without damage or cracking.

## **How can you avoid the top bricks from being removed on a roofless structure?**

If you build a wall with no top structure, then it is recommended to seal the two top layers of bricks with mortar or, better still, put a firmly fixed topping on the wall. (such as a pre-cast shaped beam, or wood trusses).

## **For a perimeter wall, how can you avoid reinforced columns ?**

LCH Stabilised Earth Bricks have no magic formula, walls of long length have to be supported ( as with any other construction method ). In this case, we can very simply make a supporting column with LCH Stabilised Earth Bricks only. You still won't have to buy and transport reinforcing bars and mix concrete.

## **How can you fit the trusses for the roofs ?**

If simplicity and low cost is required, we can do it very easily indeed. Once the building has reached a height where there is only 3 to 4 rows of bricks to be added, then fit a flexible strapping steel and keep laying the bricks. Once the roof trusses have to be fitted, link the strapping steel with the trusses to hold them all together.

## **How do you build the corner walls ?**

The LCH Stabilised Earth Bricks have a top shoulder that has to be manually removed (very simply with the trowel) up to a length to allow the bricks to be cross fitted together. Alternatively, corner mould are used.

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The primary purpose of the RoadPacker Stabilised Earth Brick (SEB) technology is to produce low cost housing for the poor of any country where there is a distinct lack of conventional housing. Its' biggest advantage is that it is immediate. Not only can this procedure be used in creating new communities of a permanent nature, it can be used in the event of a disaster being declared due to typhoons, flooding, earthquakes and any other disaster that renders people homeless. The benefits of this system of house building is that a disaster rescue unit does not need many raw materials to immediately move into a declared disaster area and begin to provide the rudimentary requirements for a community to return to a position of normalcy.

By the simple movement of several mobile SEB making machines into a disaster area, the local government response unit can immediately begin to produce homes, schools and even hospitals to accommodate the homeless population. All that is required, is a SEB machine, some RoadPacker Clay Brick Stabiliser (C.B.S.) and the local soil from the side of the road or near-by fields. If there is already a machine in place and an adequate supply of C.B.S., then reconstruction of the homes can begin immediately. Should the equipment not be in place, then the SEB machine and the RoadPacker C.B.S. can be brought into the area as emergency relief equipment and supplies. Another option is to move in the finished bricks from an off-site location.

## SEB Machine Specifications.

The SEB machine is easily transported onto a construction site and can immediately produce high quality, interlocking bricks made from the insitu (local) soil. By using the unique interlocking features.



The LCH Technology allows "dry construction", i.e. no mortar is required to hold the bricks together. Made from soil treated with the RoadPacker C.B.S. product, the RoadPacker SEB's can be used almost immediately, after curing. The fast, reliable and easy to handle, SEB machine, will allow for low cost construction of high quality houses with unskilled labour.

The construction of a 50 square metre house requiring 5,000 SEB's, can be achieved in three or four (3 or 4) days and will be of the highest standard. The home will also be heat resistant, sound proof and completely stable.

Made of "Insitu" soil plus RoadPacker Clay Brick Stabiliser (C.B.S.) and compressed at over 6000 lbs PSI, the block size is consistently +/- 200 mm (length) x 200 mm (width) x 100mm (height) weight +/- 12kg and the MPA is > 8 mpa



*An interlocking Clay Block*

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RoadPacker SEB technology, the following procedures must be adhered to:

A soil that contains 15%+ percentage of clay, must be used. (pure sand will not work nor will lahar) If inferior soil/clay/lahar is to be used, then a clayee material will have to be imported and properly mixed with the insitu material.

Mix the soil with 0 . 2 of a litre of RoadPacker Clay Brick Stabiliser per Cubic Metre (m3) of material/soil. (for foundations, 0 .3 of a litre per Cubic Metre ( m3) of material/soil is recommended)

Adjust the hydraulic pressure from the SEB machine to the type of soil and moisture used.

Then, the treated material is placed into the machine and compaction begins.

The lever that activates compaction is then operated and the process begins. The technology involved in this process is of the simplest type requiring no highly specialised labour to operate the equipment.

The application for this type of technology is endless, not only is suitable for the emergency disaster low cost housing projects, it can also be used to construct quality type homes for the middle to upper cost bracket. The unique isothermic features of the RoadPacker Clay Brick Stabilised home allows for whole villages and sub-divisions to be constructed.



RoadPackerSEB's are firmly interlocked on the top, bottom and sides. A wall built with RoadPacker SEB's is extremely

strong and highly isothermic. Each block is perfectly extruded and all blocks are of the highest quality.

There is no available technology that will allow you to build as fast, as with RoadPacker SEB's at such a competitive price.



## Reasons Why This Technology Should Be Used

RoadPacker SEB's allow you to use the most abundant raw material on earth-soil. The SEB uses only 0 .2 litres of RoadPacker Clay Brick Stabiliser per m3 to be mixed with the soil to stabilise it . The blocks being strong and highly compacted, are of the highest resistance (>8mpa) do not require the use of any reinforcing bars to build a completely strong durable dwelling of up to 2 floors

RoadPacker SEB's can be produced on the construction site, which negates the need for transporting the blocks and thereby reduces the risk of damaging the already "paid for" blocks. This technology utilises unskilled labour to manufacture the blocks, therefore, employment is provided for the indigenous population and costs are kept to a minimum. These houses require a minimum of skilled labour to build. A professional bricklayer supervising the job will be sufficient, all other workers can be unskilled from the surrounding area.

RoadPacker SEB's are of a quality so high and a finish so good, that most of the builders do not plaster or paint the external walls. Furthermore, the majority of the low cost housing, because of the high standard and finish, can be left with the internal walls not painted. A RoadPacker SEB house is totally isothermic to the extent that neither the heat nor the cold will affect the comfort of the occupants. Should the occupant decide that they wish to install air conditioning, then their electricity bill will be to a minimal due to this

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Soil being crushed before mixing with chemical



Filling the mold with treated soil



Pressing the compaction lever



After compaction of the Low Cost Housing brick a second lever is pressed to press the brick from the machine giving a durable, waterproof brick for building.



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Blocks are then stacked for curing for a short period of time and then building may commence



Foundations are made using the same blocks reinforced with mortar, building then commences above by dry stacking the blocks one on top of the other.



Building may easily be done by unskilled labour and the local workforce may be trained in a short length of time to build high quality houses.



The Roof may be easily applied using conventional methods or by using our Agritile technology utilising the insitu soil, as with our soil blocks.



The finished building is both isothermically insulated as well as being soundproof and makes a very comfortable as well as cost efficient to heat dwelling

**Low Cost Housing  
The Gallery**