

Construction Materials

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A sustainable home must make use of local (indigenous) materials, those occurring 'naturally' in the local area.

House as Assemblage of by-products:

For thousands and thousands of years, housing was built from found materials such as rock, earth, reeds and logs.

Today, there are mountains of by-products of our civilization that are already made and delivered to all areas.

These are the natural resources of the modern humanity.

An Earthship must make use of these materials via techniques available to the common person.

These materials and the techniques for using them must be **accessible to the common person** in terms of price and skill required to use them.



Simple Survival Earthship App



Earthship Mailing Li

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The less energy required to turn a found object into a usable building material the better. This concept is also called **embodied-energy**.

The Primary Building Block Rammed-Earth encased in Steel Belted Rubber



The major structural building component of the Earthship is recycled automobile tires filled with compacted earth to form a rammed earth brick encased in steel belted rubber. This brick and the resulting bearing walls it forms is virtually indestructible.

The Offgassing non-issue. Tires are hazardous in piles, not Earthships.

Aluminum Cans and Glass/Plastic Bottles

These 'little bricks' are a great, simple way to build interior, non-structural walls.

Aluminum can walls actually make very strong walls.

The 'little bricks' create a cement-matrix that is very strong and very easy to build. Bottles can create beautiful colored walls that light shines through.



The Nature of

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Authors

Michael Reynolds

the Materials

In keeping with the design and performance requirements of a Earthship Biotope, the nature of the building materials for an Earthship must have certain characteristics established. These characteristics must align with, rather than deteriorate, the environment of the planet.

The requirements and characteristics below describe the nature of the ideal 'building block' for constructing the ideal building for residential and commercial applications. Many conventional materials satisfy one or two of these characteristics but no conventional materials satisfies all of them. Therefore, we must 'invent' or 'create' a new material or building block for the primary structure of the Earthship.

Indigenous

Materials are found all over the planet. Shipping materials for long distances is not sustainable and uses excessive amounts of energy. In order for the Earthship to be easily accessible to the common person and to maintain a low impact on the planetary energy situation, a "building block" found all over the globe would be required.

Able to be fashioned with little or no energy

If a building material was found that was indigenous to many parts of the planet but it required massive amounts of energy to fashion into a usable form, then it would not be sustainable and not considered. The major building materials for an earthships must require little or no manufactured energy to fashion into use. This keeps them easily available to common people and at the same time would allow the large scale production of Earthships to maintain a relatively low impact on the planet.

Since there are so many of us, if we are to survive without literally consuming the planet, everything we use must be chosen with consideration to the impact of large scale application. We must explore building materials and methods that are not dependent on manufactured energy and that have the potential to contribute to the general well-being of the planet rather than exploit it.

Thermal Mass

The materials that surround the spaces of an Earthship must be dense and massive in order to store the temperatures required to provide a habitable environment for humans and plants. The Earthship itself must be a 'battery' for storing temperature. Making buildings out of heavy dense mass is as important as making airplanes light. Obviously a heavy airplane takes more fuel to fly. Obviously a light house takes more fuel to heat and cool.

Durability

We have built out of wood for centuries. Wood is organic and biodegradable. It goes away. So we have developed various poisonous chemical products to paint on it and make it last. This, plus the fact that wood is light and porous, makes



it a very unsatisfactory building material. This is not to mention the fact that trees are our source of oxygen. For building housing that will last without chemicals, we should look around for materials that have durability as an inherent quality rather than trying to paint on durability. Wood is definitely a good material for cabinet doors and ceilings where mass is not a factor and where it protected so it will not rot, but the basic massive structure of buildings should be a natural resource that is inherently massive and durable by its own nature.

Resilient

Earthquakes are an issue in many parts of the world. Any method of building must relate to this potential threat. Since earthquakes involve a horizontal movement or shaking of the structure, this suggests a material with resilience or capacity to move with this shaking. Brittle materials like concrete, break, crack and fracture. The ideal structural material for dealing with this kind of situation would have a 'rubbery' or resilient quality to it. This kind of material would allow movement without failure.



Low specific skill requirements

If the materials for easily obtainable housing are to be truly accessible to the common person they must, by their very nature, be easy to learn how to



assemble. The nature of the materials for building an earthship must allow for

assembling skills to be learned and mastered in a matter of hours, not year. These skills must be basic enough that specific talent is not required to learn them.

Low tech use/application

Some systems of building today are simple if one has the appropriate high-tech expensive energy dependant device or equipment. This, of course, limits the application of these methods to the professionals who have invested in the technology to enable them to use such methods. Because of the expense and energy required to get set up for these systems the common person is left totally dependent on those professionals for accessibility to these particular housing systems. Therefore the common person must go through the medium of money (bank loans, interest approvals, etc.) to gain access to a housing system that usually dictates performance and appearance.

If high-tech systems and skills are between the common person and their ability to obtain a home, we are setting ourselves up to place the very



nature of our housing in the hands of economics rather than in the hands of the people. This situation has resulted in in human, energy-hog housing blocks and developments that make investors some quick money and leave the planet and the people with something that requires constant input of money and energy to operate.

Earthship technology is the technology of natural phenomenon like the physics of the sun, the earth and people themselves.

About Earthship Biotechture