
Alternative Concrete

— Information needed for the game —

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Rules

We created a game of pairs with up to 64 cards available to play with. We have aimed the game at people aged 13-15 to teach them about more environmentally friendly construction techniques.

You can play by either printing and making the cards or by playing online.

You get the choice to play to with 12, 24, 32 or 64 cards depending on how difficult you wish to make it, the older the players the more cards you can include in increase the difficulty

Everyone playing takes it in turns to choose a pair, if you get a matching pair then you get to go again.

Portland Concrete



Concrete is made from cement, water and aggregate. To ensure that the concrete is strong and reliable a high cement content, low water/cement ratio is needed

Concrete remains popular because of its low financial risk and it is easy to use, having being used for over 3000 years. In the production of concrete issues are; acidification of oceans, finite of natural resources. In the production of making cement large amounts of Carbon dioxide is produced, with 3.2 billion tonnes produced alone in 2018

We can make concrete more sustainable for example by changing 20% of aggregate with plastic waste, which can reduce material sent to landfill and is unarguably more sustainable

Geopolymer Concrete



Geopolymer concrete is made in a reaction between silicate and aluminate with a caustic activator, which produces 75% less Carbon Dioxide than Portland concrete. Not only that but it requires 30% less freshwater.

It has mainly been used for walkways as there is less history on its durability. The University of Queensland's Global Change Institute which was completed in 2013 is the first building built from geopolymer concrete.

Geopolymer concrete requires special handling and contains sodium hydroxide which is harmful to humans, making it hard to use in construction.

It's 4 x times stronger than portland concrete, but during geopolymerisation if completed incorrectly can cause dehydration leading to cracks appearing, weakening it, making it more vulnerable to erosion.

Screw Piles



They are a ground anchoring system used as deep foundations, they are drilled into the ground with hydraulic machines and disperse the weight of a structure, and have become popular in the last decade, but being first used in the 19th Century.

Screw Piles only need a fraction of the manufacturing, machinery and transport that concrete does. As screw piles do not remove large amounts of earth and replace it with concrete there are no problems with flooding or erosion.

Screw Piles are a near perfect alternative for concrete foundations in small to medium projects and it can be used in a wide scale of different environments

Rammed Earth



A technique that can be used to construct foundations as well as walls and other materials by either packing earth into a wall framework where different layers are added at different stages. This method dates back to 5000 BCE

It is completely fire resistant, however if not covered by a roof it is vulnerable to erosion.

Being built in layers means that the construction process can be fairly slow compared to other conventional methods. Rammed earth is relatively expensive when compared to concrete as it is a specialist method, with a very low carbon footprint and has high premiums

Like concrete, rammed earth has a high thermal mass and is a great heat regulator within an building

Wood



Wood is the only completely renewable construction material, it can be grown and harvested multiple times.

The main treatments for wood to make it more durable in construction are; coatings, drying, preservatives and fire retardant

There are 60,065 species of trees in the world giving a vast variety of possibilities in different tensile strengths and flexibilities whilst also providing a wide selection of artistic variables for architects.

Scandinavian countries use wood for stylistic purposes, an example of a successful project is Aalborg Airport in Denmark

Wood however can become susceptible to swelling and shrinking when interacting with moisture, if it hasn't been treated correctly

**The link to the game can be found below.
You can play with up to 4 people in total or you can play
against the computer**

<http://www.pexeso.net/en/pairs/0DI5A>