One-Pager on CoRncrete, for TfCD

By Sam Smits (4146921) and Zsolt Hayde (4105613)

Instructable page: <http://www.instructables.com/id/How-to-Make-Concrete-at-Home-CoRncrete-TU-Delft-Tf>

Video: <https://www.youtube.com/watch?v=9RrmnbNvZVQ>

**Practical application**

CoRncrete is an emerging material developed at the Faculty of Civil Engineering at the TU Delft. It’s a form of concrete containing sand, corn starch and water. Its potential is seen in the ease and low price of production. It is intended as a building material.

**How does it work**

Concrete consists of an aggregate (sand, gravel or other material making for the main mass of the concrete) a cement (the binder, for example asphalt) and water. In the case of CoRncrete the special element is the cement, corn starch is used.

Corn starch and water together make for a non-Newtonian fluid, interesting on its own. When heated in the microwave\* gelatinization will occur, this is the process in which the corn starch particles solve in the water and form a hard medium. Gelatinization happens at a temperature of around 70˚C.

\*) Heating can be done in microwave, oven or even just in the sun. Microwave gives the best result since in the other methods the water tempts to evaporate before it can react with the corn starch.

**Current strengths and weaknesses**

**Strengths:**

**1.** Easy, fast and cheap production process. Easily accessible ingredients. Entire process takes around 10min.

**2.** The compressive strength is high (Up to 26 MPa). Comparable properties to bricks.

**3.** The material is rather environmentally friendly. No harmful ingredients or processes (if the corn is grown and processed in a sustainable way)

**Weaknesses:**

**1.** It is easy to produce ConRcrete but you do have to be exact. 2 drops of water less and the CoRncrete will be brittle, 2 drops more and it will be cracked because the water expanded. The material is prone to imperfections.

**2.** Making products with CoRncrete has size limitations. Anything you design has to be built out of parts that fit in a microwave, or you have to accept the lower quality achieved in an oven or open air.  
**3.** Because of incomplete gelatinization CoRncrete will currently dissolve in water.

**Compare it to alternatives**

CoRncrete was made to be used in buildings but because of its weaknesses it is not ideal for that. However the quick and easy production method possible to do at home brings other opportunities with it.

**Elaborate on future prospects**

Different fields of application are being developed but also the material and its production method develops and changes every day. The best and easiest way of productions has yet to be found. Also additives like colour and scents are looked in to.

Source:

*Kulshreshtha, Y., Schlangen, E., Jonkers, H., Vardon, P., & Van Paassen, L. (2015). CoRncrete: A corn starch based building material.*