ThermaLock Cement: Unstoppable, Beneficial, and Revolutionary

Erica Cooperberg

East Meadow High School

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Brookhaven National Laboratory is currently celebrating its sixtieth year of scientific innovations, and has been the recipient of the R&D 100 Award multiple times. In 2000, they received the award for the development of ThermaLock cement. Toshi Sugama, a Brookhaven chemist, created this high-performance cement with hopes that it will become a popular substitute to the current cement.

Prior to the development of ThermaLock cement, Portland cement was utilized. The Portland cement is made up of a "finely-ground powder produced by grinding Portland cement clinker (more than 90%), a maximum of about 5% gypsum which controls the set time, and up to 5% minor constituents (as allowed by various standards)" (Portland Cement, 2007). However, it was not very efficient; the Portland cement would often deteriorate due to carbonation. This deterioration would lead to serious damage and costly remedial services.

Sugama created ThermaLock cement for the purpose of having a type of cement that would be beneficial to the environment, as well as an all-around effective produce. Currently, the cement is being used in geothermal wells. These wells pump hot water or steam from the interior of the earth to drive electricity-generating turbines. However, in geothermal environments, the wealth of carbon dioxide caused conventional cement to deteriorate. The ThermaLock cement is protected from this destructive chemical reaction by creating zeolite and calcium phosphate minerals (R&D 100 Awards, 2002). "Formulated from calcium phosphate, ThermaLock cement is resistant to both CO_2 and acid" (ThermaLock Cement, 2006). Sugama pointed out the pros of this new cement:

“The service life of ThermaLock cement is estimated to be about twenty years. In contrast, conventional cements severely deteriorate after only one year in the harsh environment of a geothermal well” (Brookhaven National Laboratory, 2000). In addition, ThermaLock is safe for the environment, as it is composed of “recycled fly ash, the byproduct of coal combustion, and no harsh chemicals are used in manufacturing it” (Brookhaven National Laboratory, 2000). All of the constituents used to produce this cement are inexpensive and quite abundant; therefore the ThermaLock will be very economical in comparison to the other cements that are currently on the market. Overall, this new form of cement is a very promising development.

The improvement made upon cement with ThermaLock is one that will surely influence future discoveries. Currently, ThermaLock cement is being used in specialized environments, which is what its creator had in mind. However, now that we are witnessing how well it works, ThermaLock cement may begin to be used in public settings. These public places could include “walkways, roads, and buildings, anywhere ordinary cement is used” (Brookhaven National Laboratory, 2000). By using this revolutionary cement in everyday situations, we can avoid many problems. For example, if we use ThermaLock as public sidewalks, we can reduce the amount of injuries caused by cracks in the cement. We can also use the cement on the construction of buildings. Due to its long life, the ThermaLock cement would hold up phenomenally well in most any weather condition, making it unnecessary to constantly fix up eroding or cracking cement. The cement can also be used in a variety of other situations, such as the blockades in the center of highways and steps, as a better quality, more environment-friendly type of cement.

The advances made following the creation of ThermaLock cement would definitely impact human society. Firstly, it would make our communities and world a lot healthier. The manufacturing of the ThermaLock does not involve harsh chemicals that are detrimental to our environment, so we would slowly impact our world to make it less polluted. These advances would also be beneficial from an economic standpoint. Due to the lower cost of producing ThermaLock cement, products including it would be more inexpensive, therefore allowing more companies to buy the products. In addition, there is "no technical training required to make the cement" (Brookhaven National Laboratory, 2002), so it could offer jobs to inexperienced people who are in need of work. From environmental, economic, and scientific standpoints, ThermaLock cement is a revolutionary product that will truly impact our society.