New, But Reused: Recycled Insulation

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This project was conducted in order to find a recycled/reused material suitable to be a residential insulator. This study is important because it addresses environmental damages as a result of contemporary insulations used in homes across the world. Insulators are commonly composed of materials that emit greenhouse gases which, in turn, deplete the ozone layer. If these detrimental materials, such as hydrochlorofluorocarbons, could be excised from regular insulative uses, the amount of greenhouse gases emitted and ozone molecules decomposed could be lessened dramatically. In order to effectively study the proficiency of recycled materials as insulators, a box with walls composed of drywall was built to simulate a house. A wired cage was placed in the center of the drywall box—surrounded by insulation—to represent the air contained by a house. All 5 materials: R-13 fiberglass insulation, shredded paper, cut bottles, denim jeans, and air were tested under the same 4 temperatures (between 0F and 110F). Their ability to insulate was determined by comparing the time period taken to have the box's inside air equate to the temperature of the surrounding's air. In all 4 of the temperature trials, the air insulated by denim jeans required a significantly longer amount of time to reach the surrounding temperature. The R-13 fiberglass insulation required the second longest period of time to equate the temperatures. Shredded paper and plastic bottles did not meet high enough standards to be used as an insulator. The jean's insulative capabilities surpassed those of the other materials—likely because cellulose (cotton) in jeans is fibrous, so air molecules become trapped inside of the fibers, resisting a transfer of kinetic energy byway of molecule movement and collisions.

Awards Won: