Styro glue essay sample

Pollution is one of the main problems the world faces today. One of the reasons is the overload of non-biodegradable objects like plastics, cans and Styrofoam. The invention of plastics and Styrofoam made a huge change in our society and it helped us in many ways. But it is also one of the main pollutants that destroy our planet.

Because of these we devised a way to recycle used Styrofoam, and this is to make glue out of it. This glue can help reduce the number of Styrofoam that will be thrown away.

Styrofoam is made of polystyrene beads which unravel into fine strands whenever it is melted/dissolved. Due to the unraveling of polystyrene, the Styrofoam will become a thick like gel.

When it is a gel, it will be moldable and when it dries it will be very sticky. It is a very effective adhesive to glue things together.

But it is not very safe since it is napalm and it can damage the lungs if it is burned. It also gives off a foul odor.

Statement of the problem

1. Will it help solve the problem of pollution in our society? 2. Will it be useful and effective?

3. What will be the effects of using the glue?

Hypothesis

It will not be effective and it will be harmful.

Theoretical Framework

Theory of Plastic Deformation

There are several mathematical descriptions of plasticity. One is deformation theory (see e. g. Hooke’s law) where the stress tensor (of order d in d

dimensions) is a function of the strain tensor. Although this description is accurate when a small part of matter is subjected to increasing loading (such as strain loading), this theory cannot account for irreversibility. Ductile materials can sustain large plastic deformations without fracture. However, even ductile metals will fracture when the strain becomes large enough – this is as a result of work hardening of the material, which causes it to become brittle. Heat treatment such as annealing can restore the ductility of a worked piece, so that shaping can continue. Significance of the study

* To the respondents

This study wants to inform the respondents of the growing rate of pollution in our society and do something to help lessen the amount of pollutants. * To the teachers

The teachers are informed about the capabilities and talents of their students in research activities. * To the administration

The administration is informed that the students are doing their best in school activities and discovering new ideas to improve our society. Scope and Limitations of the Study

Styro-glue

This aims to gather all 3rd year high school students produces a research that is reliable and precise. The investigation is limited only for the study.

Assumptions

This study will be able to inform the public that:

* Lessening the amount of pollutants by recycling them can make a huge difference in our country. * Be creative in recycling trash into something useful.

* Recycling trash into things as small enterprises can help provide jobs to people.

Definition of Terms

Napalm – is a thickening/gelling agent generally mixed with petroleum or a similar fuel for use in an incendiary device, initially against buildings and later primarily as an anti-personnel weapon. Polystyrene – is a synthetic aromatic polymer made from the monomer styrene, a liquid petrochemical. Styrofoam – a type closed-cell extruded polystyrene foam.

Chapter 2

Review of Related Literature and Studies

Polystyrene is an aromatic polymer made from the monomer styrene, a liquid hydrocarbon that is manufactured from petroleum by the chemical industry. Polystyrene is one of the most widely used plastics, the scale being several billion kilograms per year. It is a thermoplastic substance that is solid state at room temperature, but flows if heated above its glass transition temperature of about 100 °C, and becomes solid again when cooled. Pure solid polystyrene is a colorless, hard plastic with limited flexibility. It can be cast into molds with fine detail. Polystyrene can be transparent or can be made to take on various colors (Natta and Corradini, 1960). In chemical terms, polystyrene is a long chain hydrocarbon wherein alternating carbon centers are attached to phenyl groups, a name given to the aromatic ring benzene. Polystyrene’s chemical formula is (C8H8)n; indicating that it contains the chemical elements carbon and hydrogen.

Polystyrene’s properties are determined by short range van der Waals attractions between polymers chains. Since the molecules are long hydrocarbon chains that consist of thousands of atoms, the total attractive force between the molecules is large. When heated or, equivalently, deformed at a rapid rate, due to a combination of viscoelastic and thermal insulation properties, the chains are able to take on a higher degree of conformation and slide past each other. This intermolecular weakness versus the high intramolecular strength due to the hydrocarbon backbone confers flexibility and elasticity. The ability of the system to be readily deformed above its glass transition temperature allows polystyrene and thermoplastic polymers in general to be readily softened and molded upon heating (Maul et al., 2007)

A more common name given to polystyrene is Styrofoam, which in truth is actually a brand name. Because of its inherent lightweight characteristic, Styrofoam has found many household and industrial applications. Companies produce Styrofoam building materials, including insulated sheathing and pipe insulation. Styrofoam insulation has been used in many notable buildings and facilities in North America. They also produce Styrofoam as a structural material for use by florists and in craft products. Dow insulation Styrofoam has a distinctive blue color; Styrofoam for craft applications is available in white and green. Styrofoam can be used under roads and other structures to prevent soil disturbances due to freezing and thawing (The Dow Chemical Company, 1995) Just like other issues directly linked to the by-products of petroleum, polystyrene also raised environmental concerns about its disposal. Discarded polystyrene does not biodegrade for hundreds

of years and is resistant to photolysis (Bandyopadhyay and Basak, 2007). Because of this stability, very little of the waste discarded in today’s modern, highly engineered landfills biodegrades.

Because degradation of materials creates potentially harmful liquid and gaseous by-products that could contaminate groundwater and air, today’s landfills are designed to minimize contact with air and water required for degradation, thereby practically eliminating the degradation of waste (Rathje and Murphy, 1989). Polystyrene foam is a major component of plastic debris in the ocean, where it becomes toxic to marine life. Foamed polystyrene blows in the wind and floats on water, and is abundant in the outdoor environment. Polystyrene foams are produced using blowing agents that form bubbles and expand the foam. In expanded polystyrene, these are usually hydrocarbons such as pentane, which may pose a flammability hazard in manufacturing or storage of newly manufactured material, but have relatively mild environmental impact. However, extruded polystyrene is usually made with hydrochlorofluorocarbons (HCFC) blowing agents which have effects on ozone depletion and on global warming.

Their ozone depletion potential is greatly reduced relative to chlorofluorocarbon (CFC) which were formerly used, but their global warming potential can be on the order of 1000 or more, meaning it has 1000 times greater effect on global warming than does carbon dioxide (IPCC Third Assessment Report on Climate Change, 2001). To respond to the possible detriments that Styrofoam could cause to the environment, experts on sustainable development suggest that people recycle the product. As a matter of fact, Polystyrene is easily recycled. Due its light weight, especially

if foamed, it is not economical to collect in its original form. However if the waste material goes through an initial compaction process the material changes density from typically 30 g/l to 330 kg/m3 and becomes a recycable commodity of high value for producers of recycled plastic pellets. It is generally not accepted in curbside collection recycling programs. In Germany polystyrene is collected, as a consequence of the packaging law that requires manufacturers to take responsibility for recycling or disposing of any packaging material they sell.

In the US and many other countries the interest in recycling polystyrene has led to collection points being established. The producers of large quantities of polystyrene waste (50 tons per year or more) who have invested in the EPS compactors are able to sell the compacted blocks to plastic recyclers. Currently, most polystyrene products are not recycled due to the lack of incentive to invest in the compactors and logistical systems required. Expanded polystyrene scrap can be easily added to products such as EPS insulation sheets and other EPS materials for construction applications. Commonly, manufacturers cannot obtain sufficient scrap because of the aforementioned collection issues. When it is not used to make more EPS, foam scrap can be turned into clothes hangers, park benches, flower pots, toys, rulers, stapler bodies, seedling containers, picture frames, and architectural molding. The research stems on extending the possible ways at which Styrofoam can be recycled. With the properties of Styrofoam being mentioned above, the researchers thought of determining the feasibility of producing concrete tiles using Styrofoam bits as an additive ingredient.

Moreover, the researchers also thought of comparing the characteristics of the produced tiles when the added Styrofoam is first dissolved in gasoline. Gasoline is a toxic, translucent, petroleum-derived liquid that is primarily used as a fuel in internal combustion engines. It consists mostly of organic compounds obtained by the fractional distillation of petroleum, enhanced with a variety of additives. Some gasolines also contain ethanol as an alternative fuel. Under normal ambient conditions its material state is liquid, unlike liquefied petroleum gas or “ natural gas” (Dabelstein et al, 2007). Gasoline has been used as solvent since any groups attached to the carbon backbone will help dissolve polystyrene. Hydroxyl groups are too polar, so glycerin and alcohols don’t do it. Gasoline attacks styrene foam because it has modest percentages of benzene, toluene, and xylene. Other possible solvents are also available. Paint-store denatured alcohol has 10% acetone in it as the denaturant, so it will attack Styrofoam a little. All cousins of acetone will attack polystyrene. Paraffin wax, drug-store mineral oil, and candle oil won’t quite dissolve Styrofoam except when heated (NEWTON AND ASK A SCIENTIST, 2007).

There have been a lot of related articles showing the extents at which Styrofoam can be recycled. Styrofoam is commonly pressed into solid insulation boards or made into loose-fill insulation. However, there has been suggested backseats to this since standard polystyrene in small bits is highly flammable. Polystyrene can emit hazardous gases when exposed to heat. When it is used for building materials, municipal building codes typically require a fire barrier (Vulcan, 2010). Also, a blog indicated the feasibility of using Styrofoam as a raw material in the production of a sealant. The

researcher used gasoline to melt the Styrofoam to produce a sticky solution which was then used a sealant to holes in household roofs. The drying time was determined and was compared to commercial sealants. Furthermore, Tsutomu Noguchi of the Sony Research Center found that the oil from orange peels would dissolve polystyrene. By using a product called Limoene, that contains . 5% of the orange peel oil Noguchi found that the polystyrene would break down into a liquid form that created a very strong glue and can be used to create styrene pellets that go back into the production of more polystyrene (Karr, 2010) From the reviews done by the researchers, none indicated that an investigation about comparing characteristics of concrete tiles with dissolved and undissolved Styrofoam has been done. Hence, this study.