Nipuni Dhananjana

University of Moratuwa, Sri Lanka,

A Modular Unit to Enhance the Soil Quality and Sustenance the Vegetation Produced Material Manipulation from Tetra Pack Waste in Sri Lanka

Abstract – This project is targeted to provide a solution for the waste tetra pack collection problem in a new way of material development. There is a huge problem arisen with the collection of larger amounts of Tetra packs in the country from the beverage and food packaging in Sri Lanka. But these do not have a proper discarding method or a recycling method to avoid this problem. This Experimental project addresses to provide material aspect solution for this waste type and finding out more possibilities of this waste packaging material a new product after life. Project approach has been taken by studying about the current scientific research done on waste material developments. Tetra pack waste has been tested mixing with different ecofriendly substances, in different proportions. Each sample has been mechanically and chemically tested to identify strongest material properties and with the ability to apply this ecofriendly, biodegradable material to the natural context, potentials have been identified to get a product approach matching to outdoor environment. With the parallel studies about the material and the problems in natural environment, the problem of soil erosion has been identified as a situation where solution can be applied from this strong material to strengthen weak soil structure. Material development has been stopped in a stage where satisfactory material properties have been identified in the developed final sample with correct proportions of mixed materials. The identified problem soil erosion has been thoroughly studied by spotting Ratnapura, Malwala area as the sample context for the research. After doing a context analysis, theoretical facts related to soil erosion, consequences of soil erosion, why soil erosion are identified. Before approaching a product form, current landscaping solution given to reduce soil erosion are studied as the precedence. Features, forms, textures, and other product qualities have been studied through this precedence. Product with the ability to retain soil structure and to stay itself in the weak soil structure have been the main targets of the product development. Geometric forms were developed and tested to select most suitable form for the product with the main ability to retain in the soil, different cut shapes, number of cuts, different protruded shapes, number of protruded parts have been applied in prototyping. Product has been developed with an inner rough cavity to grow plant which can avoid soil erosion from the root system growth. In this application, the product itself retains the weak soil layers in the first stages of its life span, and while the plant growth happens, the structure begins to degrade and adds nutrients to infertile soil found in frequently sliding soil structures. Production method is similar to brick molding and sun drying method Is used to solidify the final unit in order to preserve organic additives in the tetra pack waste mixture. Providing job opportunities, finding out different solution foe tetra waste and enhancing waste material development field are the ultimate outcomes of this experimental research.

Keywords: Tetra pack waste, Material development, Soil Erosion, Material manipulation