

POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE
Degree in Architecture
Honors theses

Polymeric material and eco-compatibility

by Valeria Azeglio

Tutor : Luigi Bistagnino

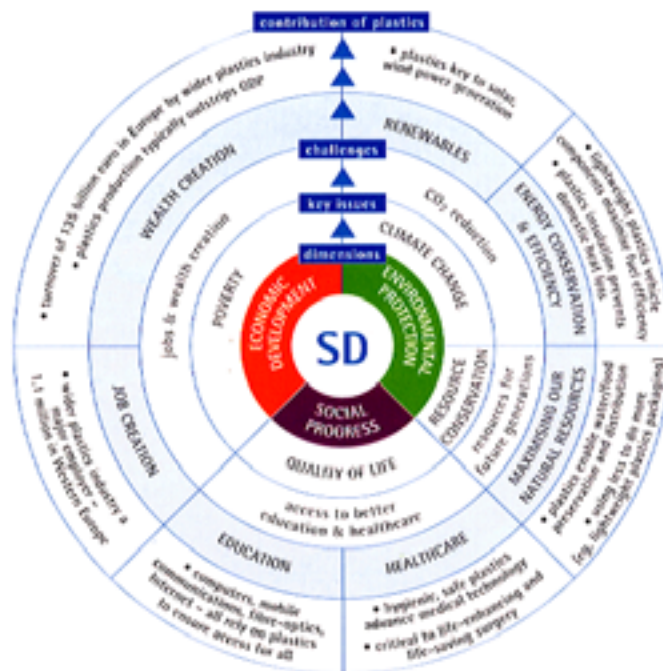
Co-Tutor : Carla Lanzavecchia

This thesis try to examine the environmental compatibility of an important family of materials: the **plastics materials**. We try to underline their pros and cons according to the environmental impact.

This thesis is a result of a research work on informations about polymeric materials on **eco-compatibility** point of view, coming from different subjects (Material Technology, Environmental Sustainability, Design,...).

The plastic was, and it is, in the middle of an inflamed discussion. According to strong critics, coming from prejudices and from a weak knowledge of materials, the plastic pollutes and it's dangerous for the environment. This caused a great confusion in the public opinion.

The thesis is structured in seven sections. The first part, turns one's attention to the role of plastics materials regarding environmental problems, particularly it analyses their role about resource conservation, about their contribute to **Sustainability** (it is shown in the graph below: font: [http:// www.plasticresource.com](http://www.plasticresource.com)), and about their role for a "Sustainability Design".



The article emphasises some products, that are not imaginable in other materials, because

their realization was possible using some new polymeryc substances with different physical, chemical, mechanical and productive characteristic.

The plastics materials help the productive industries to make many products using few material. That permit a little use of **resource**, this limits the use of toxic elements and the some time reduces the environmental's pollution. Plastics materials, besides, are resistant, and that's why they are chosen to built recycled (articles) materials; that reduces a lot our rubbish.

In the transport sector the use of polymeric material have determined an **energetic savings**, thanks to the lightweight of motor vehicles, and of toxic emission in the environment. Plastics , employed in the surgery medical and pharmaceutical sectors, have a fundamental role to improve life, because they are the basis of technology who permit to save human life and increase the length of life.

We have to recognize that at technical benefit of this plastic material products we have to flank disvantages, at level of environmental relapse, of massive consumption and a constant replacement of forms and objects, that's a problem of the last two decades, legate at consumerism conception of products "gadget" and to "**use and throw**".

The elaborate continues with a short story about this materials, in the first part we deal about their structure, chemical composition and the relative environmental effect coming from the incorporation of additives that are generally toxic for environment and human health.

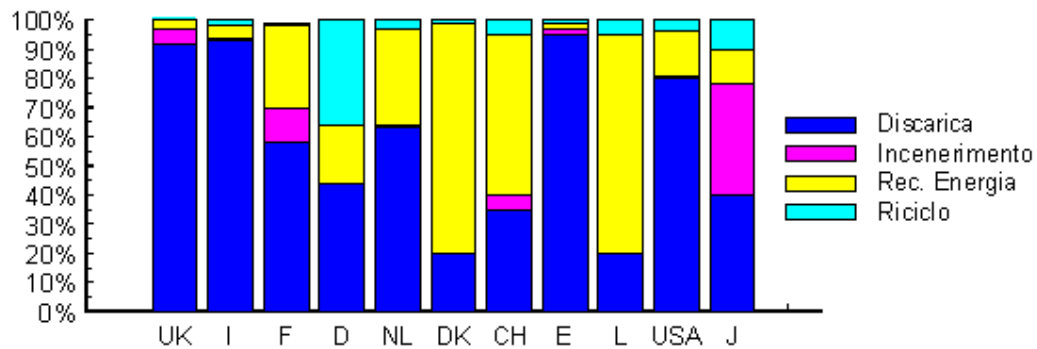
In the second part there is a description of their characteristics, processing and major sectors of application (housing, furnishing, transports, communications, agriculture, packaging, health, sport and free time, spatial sector).

After this descriptions we give a short **toxic** judgement about these plastics materials.

After above-mentioned research about plastics material and their characteristics, we can identfic the principal problems (on environmental terms), first problems at the end of products' **life cycle**, second problems coming from using toxic materials like some polymeric costituens.

In this part we analyse the **post-consume** polymeric material products, paying attention on their recycle's modality.

The graph below reports the recycle's situation in Europe (font: <http://www.greenconsulting.it>)



At the end we continue the analyse in detail of principal family of plastics materials (thermoplastic, thermoset, elastomers, composite, expanded resin, blend biodegradable polymer).

A **collection of specific indication** about the principal plastics materials divided in membership families is enclosed to this report. About each of this families, to wich a sample is given, we describe the characteristics, the productive technology, the environmental aspects, and the companies that product and use them.

For further informations:

Valeria Azeglio, e-mail: basilissa@libero.it