



International Congress of Science and Technology of Metallurgy and Materials, SAM -
CONAMET 2013

Waste of Molded Pulp Industry. Filler Panel Production for Construction

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Abstract

In the production process for producing recycled pulp cellulose, there are waste generated by the raw material entering the system. This residue is separated from the pulp by physical methods, and is mainly composed of plastics, paper, laminated papers and other materials in smaller proportions.

In order to recycle this waste, in this paper we analyze the viability of use in the production of insulated panels.

With the untreated residue extracted from the plant, panels of 30 cm side and thickness of approximately 6 cm were made. On these panels, parameters such as density and compression strength were evaluated for the study of the homogeneity of the material obtained.

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Selection and peer-review under responsibility of the scientific committee of SAM - CONAMET 2013

Keywords: residue cellulose industry; panels; insulating

1. Introduction

Non-hazardous solid wastes are those solid industrial waste have not effective or potential danger to human health, the environment or public patrimony, when it is properly disposed. This group may include: food scraps,

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rags, cloth, wood, cardboard, paper and plastic scrap. The best solution for these wastes is their collection and treatment together with domestic waste.

In the last years, generation of waste from different industries has presented a significant increase. This is principally a result of the different technologies used in production processes, which allow to process increasing volumes of raw materials with the consequent increase waste to discard. They have also contributed to this problem other factors such as increased consumption and facility with which industries can place their waste at different landfills.

One of the immediate environmental problems facing the industry is directly related to the generation of waste and emissions. Traditionally, waste management strategies are based on end-pipe technologies. Thus, for example, solid waste is carried to landfills (no previous recycling). The economic and environmental costs of these treatment technologies are high, so are serious obstacles to the competitiveness of enterprises.

Research into the use of waste products from industrial processes is of interest both from the environmental standpoint, since that use reduces the environmental impact of the new material or product, and from a financial standpoint, in connection with the potential cost savings on treatment or disposal of those waste products. The construction industry provides broad scope for potential applications, since it uses large volumes of materials and a wide range features in those materials (mechanical, functional, and others). (Luis Agulló, 2006)

Cellulose and paper making industry generates important amount of waste material. The pulp and paper industry is characterized by four major processes: (i) chemical pulping (Kraft or sulphate pulping), (ii) mechanical and chemi-mechanical pulping, (iii) recycled fiber processing and (iv) paper-making related processes. By-products and residues from mechanical and chemi-mechanical pulping include wood, straw and reed residues, fiber rejects, excess sludges from external biological waste water treatment. (Ismail Demir, 2005)

The impact of recycling of paper and cardboard waste in industrial production of cellulosic pulp packaging is broadly significant from environmental and socio-economic point of view. (Area, et al., 2012)

The reuse of these components involves not only the preservation of forest resources, but also a decrease in the volume of solid waste and / or a reduction in the need for incineration. (Zanutini, 2012)

The first step in any recycling process recovered paper and cardboard is the disintegration or repulp operation that aims to achieve a suitable fibrous suspension to be treated in the subsequent molding process (Àngels Pèlach, 2012). Fiberisation (repulping) is performed in the "pulper" in batch. Once generated recycled pulp, is proceed to the separation of pollutants by different stages of sieving and / or purification surge. Like the pulping stage, purging must be performed so as not to reduce the size of contaminants to not compromise their subsequent separation.

This paper proposes the possibility of reuse of the waste of the first separation of contaminants from the pulp, which in the company under study, is generated at 5 m³ / day. The final disposition of this large volume of waste involves high environmental and economic costs.

The waste generated in the production process is closely related to the raw material entering the system. The quality of paper and cardboard is determined by the quality of the fibers (type of paper that is recovered) and the degree of contamination which has the burden of raw material to reach the processing plant.

The construction industry uses large volumes of raw materials and therefore can be an excellent receiving waste and could include very important waste percentage in their formulations.

There are a lot of work (M. Pelegrini, 2010) (Agulló, 2006) (Breslin, 1998) (Pelegrini, 2005) (Spinacé, 2005) on the use of this waste, in which it is heat treated, however no literature has been found concerning the use with Portland cement agglomerate.

In the context of this problem arises the idea of using waste from the first separation in the manufacture of building elements from a waste-binder composite as panels and building blocks, allowing the revaluation of this residue.

An alternative to be evaluated is the use of the composite material as a replacement polystyrene panel currently used as insulating material in double wall, supporting energy efficiency of buildings.

2. Experimental Procedure

To evaluate the feasibility of using this waste as material for the construction industry, it raised the agglomeration with cement paste. The residue used in this study is shown in Fig. 1. Should be clarified that, due to the

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