Flexible yet Standardized Stone Paper Manufacturing

A revolutionary production of water and tree free paper from stones and mining waste

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The Benxi plant with the stone dust supply pipe to 3 production units and converter to the left

Raw materials: stones delivered from a mine 13km away

Pellet production

Stone paper production

China invented paper production two millennia ago. China re-invented paper in the 21st century. The creation of water repellant paper that requires no tree fibers nor water is a breakthrough. However, this redesign of paper is accompanied by an innovative and yet highly standardized production process that permits the manufacturing of 17 custom designed paper types coated to the client's specifications. This offers unique opportunities to create more value and take market share while generating jobs.

The starting point is the supply of rocks. While calcium carbonate rich stones are the reference, it is possible to use a wide variety of mineral sources provided that the input material meets the standard size of fine dust. The crushing installation valued at a capital investment of $10 million provides a core material transported through a pipeline to avoid the generation of dust at the pellet production unit.

The stone dust is mixed with 20% polyethylene, today a virgin material to be replaced by a recycled PE, and ultimately by a bio-based PE generating more value for the local farmers and creating a higher impact in the region that now can reconnect farming and mining with industrial production.


Stone paper coating


Stone paper conversion to humidifier


Stone paper conversions

The pellets are fed to the paper film production. A battery of 17 different paper types with a weight varying from 80 to 800 microns in thickness, and a stone content of maximum 80% and as low as 60% is then processed through one of the 4 coating machines into dozens of final products. The coating adds maximum 2% material offering color and printing specifications with combinations of one or double sided treatment ensuring compliance with nearly all clients' requirements at short notice. Thus a standard stone pellet can be converted into over 50 different paper types.

The investment cost of equipment is estimated at $150 million, 40% less than a traditional paper plant for equivalent volume (120,000 T/a). The reason for this considerable reduction of capital requirements is due to the fact that no water nor water treatment is needed. This subsequently reduces energy demand. In addition, the cost of pulp is replaced by a low cost crushed stone seldom costing more than $200/T. However, it must be pointed out that virgin PE costs $1,500/T which is double the fiber cost. Since the percentage of PE can range from 20-40%, the overall cost of raw materials by weight can be up to 40% lower than standard fiber-based paper.

The stone paper rolls or sheets are delivered to "converter" companies that produce notebooks, paper bags, golf score cards, children's books, packaging and wrapping paper even humidifiers and medicine boxes. While the factory in Benxi City (near Shenyang) starts with a production capacity of 120,000T/a, it is set to increase to one million ton, good for one thousand jobs.

The downstream job generation in bags and notebooks is a multiple compared to production of the paper itself demonstrating the potential of transforming mining and construction waste into a product that saves the forest, frees up land for farming and liberates millions of tons of water for productive use while adding value to society. It eliminates the concept of tailing dams. It is no surprise that the major investors in China are all mining companies.