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Monitoring and evaluation report

on the application of treated sludge in end-products

Abstract

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80 kg of marble and quartz-resin (50% each) were employed at a first firm for the experimental production of 2 blocks of industrial masonry of 50 cm x 20 cm x 20 cm and 2 pavers (interlocking blocks) for road construction of 18 cm x 12 cm x 6 cm, for an amount of about 30% of the used mixture. Technical performance was equal to those produced with conventional mix, but cost price of the treatment process would not allow the product to have a competitive price with respect to other recycled materials for fillers in such applications, under the actual economic situation of the building sector that lost about 30% of its production during last few years.

80 kg of marble and quartz-resin (50% each) were employed at a second firm, for experimental production of tiles in cement conglomerate with marble or stone inerts. Also here the treated sludge constituted ca 30% of the inert materials constituting the mixture. 2 Tiles have been produced in different colours with dimension 40 cm x 40 cm x 3 cm, obtaining similar technical performance as of the manufacts produced with a standard mixture. Though, also for these applications, cost price of the treatment process is not competitive with respect to other kind of available fillers in the actual market for fillers.

11 Ton of treated marble-resin sludge with a humidity of 0,3% has been sent at the beginning of August 2013 to Santamargherita. First analyses were performed on humidity, colour and particle size. Colour and particle size were sufficiently homogeneous and colour as well sufficiently whitish to promise positive outcomes. However, in none of the big bags humidity was below 0,3 %; only one bag came close to this parameter (0,36 %), the others exceeded largely, probably due to climatic influences during transport and storage. This fact prohibited to trial the material in the production of agglomerated marble slabs.

9 Ton of treated quartz-resin sludge has been provided in March 2013 to Santamargherita. Three samples have been realised reproducing 3 standard colours of the firm, whitish, greyish and blackish. Resistance to flexure and to abrasion resulted worsened with respect to the standard, the first with 30%, the second with 5,8 %. Insufficient appeared as well the chromatic performance: this was expected for the whitish colour, due to the insufficient results with decolourisation, as revealed in action 2. Though, also the grey and even the black colours showed a significant difference with the original feature, which led to the conclusion that further trials on bigger scale would be senseless.

The results brought to the following conclusions:

1. an industrial treatment plant for agglomerated stone sludge should be realised within the context of a productive district, in order to be economically feasible (reducing substantial transport costs); environmentally beneficial (reducing fuel consumption and CO2 emissions); and technically feasible (excluding the increase of humidity of carbonate sludge during transport).

2. Use of the treated sludge as filler in the general building industry is only economically feasible if production costs are reduced (see point 1) and the sector regains its lost productivity, so the actually saturated market for fillers will increase its demand. Though exploitation in this market alone will difficultly be sufficient to make the treatment process economically viable.

3. Use of treated sludge within the agglomerated stone industry from which it stems, will be only possible if a technical solution would be found for decolourisation of the sludge, that would provide for acceptable levels in the colour variation. Having proven the inadequate results of manifold bleaching techniques, the solution is actually sought in a separation of sludge of different colours at origin. Such solutions could not be trialed in the SASIES project and would probably need to be foreseen in the design of newly to build production lines.