Crushed Stone Quarry Fines Use for Structural Devices Production

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ABSTRACT
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REFERENCES
1. Introduction

Figure 1 - Overview of a Typical Stone Quarry Crushing and Screening Plant.
2. The state of the art

1. Istambul in Turkey (Fujimura et al., 1994)
2. Portuguese (Fujimura et al., 1995)
3. SWEMP 1996, at Cagliari in Italy (Fujimura et al., 1996)
4. 1997, 3 papers deals with the equipment selection for quarry plants
5. Mendes et al., MPES 2002, basalt fines
7. MPES 2005, quarry fines for mortar (D’Agostino et al.).
8. MPES 2006, Brazilian quarries (Hennies et al.).
Figure 2 Aggregate production by States in Brazil in 2006
### Table 1. Crushed Stone & Fines Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Crushed stone sold/year</th>
<th>Crushed Stone fines/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>18290</td>
<td>3228</td>
</tr>
<tr>
<td>1995</td>
<td>20844</td>
<td>3628</td>
</tr>
<tr>
<td>1996</td>
<td>25813</td>
<td>4555</td>
</tr>
<tr>
<td>1997</td>
<td>25239</td>
<td>4454</td>
</tr>
<tr>
<td>1998</td>
<td>27227</td>
<td>4805</td>
</tr>
<tr>
<td>1999</td>
<td>25188</td>
<td>4445</td>
</tr>
<tr>
<td>2000</td>
<td>27002</td>
<td>4765</td>
</tr>
<tr>
<td>2001</td>
<td>26659</td>
<td>4705</td>
</tr>
<tr>
<td>2002</td>
<td>25845</td>
<td>4561</td>
</tr>
<tr>
<td>2003</td>
<td>22786</td>
<td>4031</td>
</tr>
<tr>
<td>2004</td>
<td>26757</td>
<td>4722</td>
</tr>
<tr>
<td>2005</td>
<td>26478</td>
<td>4655</td>
</tr>
<tr>
<td>2006</td>
<td>27000</td>
<td>4785</td>
</tr>
</tbody>
</table>
Figure 4: Segmentation of quarry product in Brazil

- Pavement enterprises & Public Organisms: 17%
- Concrete enterprises: 15%
- Resale & Retail enterprises: 16%
- Building enterprises: 7%
- Prefabricated industry: 5%
- Others (ballast & rockment): 40%

Source: ANEPAC
**Alternative to produce artificial sand on the quarry**

A. Integral exploitation of the quarries without discarding the effluents;

B. Obtaining sand with physical characteristics and chemical constants;

C. Lesser cement consumption in the manufacture of structural devices; and;

D. Solution of the environmental problems.
The Quarry commercial products

- (a) Stone 4 (70 – 50 mm)
- (b) Stone 3 (50 – 25 mm)
- (c) Stone 2 (25 – 12.5 mm)
- (d) Stone 1 (12.5 – 4.8 mm)
- (e) Stone Dust (<4.8 mm).
Brazilian consumption of aggregates sand, crushed stone and total 1988 until 2010
Conclusions

- The use of industrial residues, such as quarry fines represents a primordial component of the effort to serve as an indicator of auto-sustainable development.
- Therefore, there must be foreseen increasing investments in techniques of treatment and recycling of residues, in mining, as well as by-product attainment, that generates job and income.
- In a quarry, two are the found possible situations:
  - a) the effluent solids are discarded in piles, or,
  - b) the solids effluent are recycled and internally or externally giving it some use.
- This second practice, has translated additional economic consequence in an increase of income and greater environmental respect.
Acknowledgments

I thank You very much for Attention
Questions?