TR12_162_163

R. 544

RECOVERY OF SHELL FROM ESTUARINE BANKS

Introduction

A sample stated to have been obtained from the Branch Creek area of the Rubicon River estuary was submitted by Mr O. Harvey, Wivenhoe, for concentration and recovery of its shell content.

Clean shell would be acceptable to Associated Pulp and Paper Mills Ltd as a source of lime.

The sample, about 3 cwt, as received contained 21.1% of moisture. Samples for assay and the various tests were taken from the 'as received' material.

All results are reported on a dry basis.

HEAD ASSAYS

$CaCO_3$	26.7 per cent
Acid Insoluble ..	67.9 per cent

Investigation

Visual examination of the sample indicated that the shell in the sample was relatively coarse by comparison with the sand content. Two possible methods of treatment were therefore investigated, namely:—

(1) Separation of the shell as a coarse product of a log washer.

(2) A straight wet screening operation to separate the shell as oversize from a fine sand undersize.

In Method (1) the laboratory Akins spiral classifier was used to imitate the action of a log washer. The classifier was set to its highest speed and the material hand fed to the pool. A copious water spray was applied to the coarse product during its progression through the unit. Samples were taken of coarse product and overflow.

Results of this test are shown under Test No. 1 (*a*).

During this test it was observed that the recovered shell still had a considerable amount of fine puggy sand adhering to it. Accordingly a further sample was agitated for five minutes in a conditioner in a 50% solids slurry and the slurry fed to the Akins classifier as before.

Results of this test appear under Test No. 1 (*b*).

In the screening test a small sample (1 lb approximately) was violently agitated in a laboratory flotation machine for five minutes and then hand screened on a series of test sieves. Results are shown under Test No. 2.

TEST NO. 1 (*a*)

Fraction	Per Cent			Per Cent Distribution	
	Weight	$CaCO_3$	Insol.	$CaCO_3$	Insol.
Shell	32.3	74.0	22.5	86.7	10.5
Sand	67.7	5.4	91.5	13.3	89.5
Composite Feed	100.0	27.6	69.2	100.0	100.0

TEST NO. 1 (*b*)

Shell	23.6	94.8	2.9	79.8	1.0
Sand	76.4	7.4	90.3	20.1	99.0
Composite Feed	100.0	28.0	69.7	100.0	100.0

TEST NO. 2

+10 mesh	11.3	93.0	3.3	37.5	0.6
+22 mesh	6.2	94.0	3.3	20.8	0.3
+36 mesh	1.5	93.5	5.6	5.0	0.1
Composite Shell (+36 mesh)	19.0	93.3	3.5	63.3	1.0
−36 mesh	81.0	12.7	81.9	36.7	99.0
Composite Feed	100.0	28.0	67.0	100.0	100.0

Comment

The tests show that a high grade shell product can be recovered by either of the methods investigated.

Comparison of $CaCO_3$ grades in Tests 1 (*a*) and 1 (*b*) illustrate the necessity for sufficient agitation to free sand and shell from each other. Pool turbulence in a commercial log washer may be sufficient to effect this. Otherwise, pre-agitation would be necessary.

With regard to separation by screening, trommel screening has a sensible lower size limit of about 10 mesh.

Test 2 shows a shell recovery of only 37.5% at this size. Vibrating screens will effect separations at finer sizes and at 36 mesh, shell recovery has advanced to 64.3%. In the case of screening also, washing of the shell by pre-agitation is necessary to achieve a high grade product.