SAND RECLAMATION

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Fifth National Foundry Conclave

26-27 November 2010, Coimbatore
OUR PHILOSOPHY

CONCENTRATED ON A SINGLE SECTOR:

SPECIALISTS IN NO-BAKE TECHNOLOGY

ACTIVE IN A WORLDWIDE MARKET:

WIDEST EXPERIENCE & KNOWLEDGE ABOUT MARKETS TRENDS

PERFECT PARTNER FOR NO-BAKE FOUNDRIES
WE PRODUCE:

- FROM SINGLE MACHINES TO COMPLETE MOULDI NG SYSTEMS
- FOR FLASK OR FLASKLESS MOULDS
- FOR ANY SIZE OF FOUNDRY
- FOR DIFFERENT TYPES OF BINDER
WORLDWIDE ACTIVITY

I.M.F. S.R.L. IN 37 YEARS OF ACTIVITY HAS SERVED APPROX 1,500 CUSTOMERS IN MORE THAN 60 COUNTRIES, KEEPING CONTINUOUS RELATIONS WITH THEM.

I.M.F. EXPORTS MORE THAN 90% OF ITS PRODUCTION

Coimbatore 26-27 November 2010
SOLD UP TO APRIL 2010

- 2053  STATIONARY MIXERS
- 66   MOBILE MIXERS
- 340  COMPLETE MOULDING SYSTEMS
- 428  RECLAMATION SYSTEMS
- 63   THERMAL RECLAMATION SYSTEMS
- 27   AUTOMA MANIPULATORS
- 302  CORESHOOTERS
CARLO BANFI
shot blasting machines

FOUNDARY
AUTOMATION
AUTOMATIC ROTATING HOOK BLASTING MACHINE WITH CHAIN CONVEYOR

Coimbatore 26-27 November 2010
IMF-BANFI SHOT BLASTING MACHINES

TUNNEL BLASTING INSTALLATION FOR PLATES AND PROFILES

Coimbatore 26-27 November 2010
SHOT-BLASTING MACHINE FOR WIRE COILS DESCALING
IMF-FOUNDRY AUTOMATION SHELL MOULD
Sand reclamation consists of a series of operations necessary to bring the sand to a condition suitable for its re-use.
Main factors:

1) High performance Mixer with a suitable control of resin and catalyst to reduce the costs for the reclamation process and improve the quality of the reclaimed sand.

2) Right sand-to-metal ratio and consequent thermal de-bonding of part of the mould during the pouring operation.

3) Good equipments.
L.O.I. CONTROL

% OF RESIN BURNED OUT DURING POURING

Sand/Metal Ratio

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 10%

1/1 2/1 3/1 4/1 5/1 6/1
WHY SAND RECLAMATION?

Sand reclamation benefits:

1) Lower New Sand addition.

2) Low depletion of natural resource

3) Better shape and surface texture of grains which brings a reduction of binder, both resin and catalyst.

4) High reclamation level means less disposal of waste sand, less taxes, less costs.

5) Better foundry working condition in a li t
- MECHANICAL RECLAMATION TOWER
- MECHANICAL DYNAMIC RECLAMATION
- THERMAL RECLAMATION
TOTAL RECLAIMATION

Facing sand 20%

NEW SAND

GAS THERMAL RECLAMATION

15%

MECHANICAL RECLAMATION

4%

MOULDING AND POURING

80%

COOLING LINE

98%

SPILL SAND

97%

SPILL SAND

1%

Facing sand 20%
- Shake out with pre reclamation
- Mechanical reclamation tower
- Shake out with pre reclamation
- Mechanical reclamation tower
- Chromite separator
- Dynamic reclamation (attrition mills)
SAND FLOW – reclamation 3

- Shake out with pre reclamation
- Mechanical reclamation tower
- Chromite separator
- Thermal reclamation
SHAKE-OUT AND PRE-RECLAMATION
THE MOULDS ARE REDUCED ON THE MAIN GRID INTO SMALL LUMPS

IN THE SAME TIME ALL METAL PARTICLES AND OTHER IMPURITIES BIGGER THAN 5-6 mm ARE SEPARATED FROM THE SAND AND DISCHARGED INTO A BIN THROUGH A DISCHARGE DOOR, WHICH IS OR MANUALLY OPENED

THEN THE LUMPS ARE REDUCED TO SINGLE GRAINS BY THE PRE-RECLAIMER WITH A PUNCHED PLATE WITH 4 OR 6 MM CONIC HOLES.
SHAKE-OUT AREA SOLUTIONS
SHAKE-OUT AND PRE-RECLAMATION
SHAKE-OUT AND PRE-RECLAMATION
MECHANICAL RECLAMATION TOWER
MECHANICAL RECLAMATION TOWER
THE DETAILS OF THE TOWER

- SCRUBBER
- EVAPORATING TOWER AND WATER PUMP
- STATIC COOLER CAPACITIES FROM 200 m² TO 1200 m²
- SLEEVE FILTER
- IT creates THE NEGATIVE PRESSURE FOR SAND DEDUSTING
- VIBRATING SCREEN
- SAND GATE
- OVERSIZE COLLECTING BIN
- PROPULSOR
This process must have the proper intensity in order not to use too much energy consumption and not to start a process of degeneration of the sand grain size (breaking of grains).

Exceeding proper attrition means: more fines, higher dumping costs, shorter sand life, higher purchase costs for new sand, higher costs for energy.
DYNAMIC RECLAMATION

(ATTRITION MILLS)
DYNAMIC RECLAMATION

BUFFER SILO

ATTRITION UNIT

RECLAMATION TOWER

SILO

SHAKE-OUT

ATTRITION UNIT

FILTER
DYNAMIC RECLAMATION

DUST COLLECTOR

ROTARY UNIT

VI BRATING SCREEN

SHAKE-OUT

FLUIDIZED BED/ COOLER CLASSIFIER

DUST COLLECTOR
DYNAMIC RECLAMATION
## Dynamic Reclamation

### Test on AlphaSet Sand

<table>
<thead>
<tr>
<th>SAND</th>
<th>L.O.I %</th>
<th>Fines &lt; 0.1 mm%</th>
<th>KOH %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before treatment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.71</td>
<td>0.92</td>
<td>0.131</td>
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<tr>
<td><strong>After Attrition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.44</td>
<td>2.17</td>
<td>0.128</td>
</tr>
<tr>
<td><strong>After fluidized bed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>0.65</td>
<td>0.128</td>
</tr>
</tbody>
</table>

*First cycle*
## SECOND CYCLE

<table>
<thead>
<tr>
<th></th>
<th>L.O.I %</th>
<th>FINES &lt; 0.1 mm%</th>
<th>KOH %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>After attrition</strong></td>
<td>1.03</td>
<td>1.69</td>
<td>0.116</td>
</tr>
<tr>
<td><strong>After fluidized bed</strong></td>
<td>0.95</td>
<td>0.35</td>
<td>0.119</td>
</tr>
<tr>
<td><strong>Fines Extracted</strong></td>
<td>3.84</td>
<td>24.44</td>
<td>0.355</td>
</tr>
</tbody>
</table>

**BMF 3-module attrition unit**
Sand treated 1350 Kg
Dust extracted 230 Kg - (8-9% each cycle)
THERMAL RECLAMATION
THERMAL RECLAMATION SYSTEM
AVAILABLE DELIVERIES FOR GAS FIRED THERMAL RECLAIMERS:

- 0.25 TPH
- 0.5 TPH
- 1 TPH
- 1.5 TPH
- 3 TPH
- 4 TPH
- 5 TPH
THERMAL RECLAMATION SYSTEM

GAS PLANT
GAS PLENUM
AIR MANIFOLD
FLUIDIZING AIR BLOWER
THERMAL RECLAMATION SYSTEM

AIR + GAS, ATR, FLUIDIZED BED, SAND, AIR, GAS
THERMAL RECLAMATION SYSTEM
THERMAL RECLAMATION SYSTEM

WORKING TEMPERATURE OF SAND 650 – 750 °C

L.O.I. ALWAYS BETWEEN 0,01 AND 0,05

NORMALLY BETTER THAN NEW SAND
THERMAL RECLAMATION SYSTEM

PLANT - DELIVERY 3 T/H
GREEN SAND RECLAMATION
GOAL: TO OBTAIN SAND SUITABLE FOR CORE PRODUCTION

FINES PERCENTAGE < 0.1%
L.O.I. <0.2 %

MINIMUM RESIDUAL BENTONITE CONTENT NECESSARY NOT TO INFLUENCE THE SAND CHEMICAL CURING.
GREEN SAND RECLAMATION

1) STRONG DRY MECHANICAL TREATMENT TOGETHER WITH AN EFFICIENT DUST EXTRACTION TO REMOVE AN IMPORTANT PERCENTAGE OF SPENT BENTONITE,

2) GAS FIRED THERMAL RECLAMATION TO GUARANTEE A COMPLETE REMOVAL OF ORGANIC RESINS AND DEACTIVATE RESIDUAL BENTONITE.

3) DRY MECHANICAL TREATMENT TO REMOVE SPENT BENTONITE
GREEN SAND RECLAMATION

1° PNEUMATIC STAGE: TAKES OUT THE LARGEST PERCENTAGE OF CLAY (A PERCENTAGE OF CLAY REMAINS IN THE SAND DUE TO THE PRESENCE OF COAL DUST)

2° PNEUMATIC STAGE: TAKES OUT THE LARGEST PERCENTAGE OF CLAY

THE THERMAL RECLAMATION REMOVES THE ORGANIC RESINS (CORES) AND COAL DUST AND DESACTIVATES THE RESIDUAL CLAY

2° PNEUMATIC STAGE: REMOVES THROUGH EXTRACTION THE RESIDUAL DESACTIVATED CLAY
GREEN SAND RECLAMATION
GREEN SAND RECLAMATION

- Fine Exhaust Dust Collector
- Target
- Sand Inlet
- Deflector Plate
- Bast Tube
- Refuse
- De-dusting Chute
- Reclaimed Med Sand
- Air Plenum
- Screen Classification
IT IS VERY IMPORTANT TO HAVE PROPER SETTING OF THE TWO SECTIONS OF MECHANICAL RECLAMATION

THIS ALLOWS TO OBTAIN A CORRECT BALANCE BETWEEN THE CLAY REMOVAL AND THE FINAL EFFICIENCY OF THE INSTALLATION (PERCENTAGE OF RECLAIMED SAND)
IT IS POSSIBLE TO EXPECT AN AVERAGE PERCENTAGE OF SAND LOST FOR DEGRADATION DURING THE TREATMENT OF ABOUT 20-30%.
## CAST IRON FOUNDRY - JOBBOING FOUNDRY

Average results from the combined reclamation (scrubber, thermal reclamation, scrubber) with green sand blends – cold box

<table>
<thead>
<tr>
<th></th>
<th>BEFORE RECLAMATION</th>
<th>AFTER RECLAMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.O.I.</td>
<td>5.3</td>
<td>0.09</td>
</tr>
<tr>
<td>FINES</td>
<td>5.8 %</td>
<td>1.6 %</td>
</tr>
<tr>
<td>AFS CLAY</td>
<td>13.2 %</td>
<td>0.5 %</td>
</tr>
<tr>
<td>MB CLAY</td>
<td>8 %</td>
<td>0.0 %</td>
</tr>
</tbody>
</table>
GREEN SAND RECLAMATION
GREEN SAND RECLAMATION
Thank you for your attention!