

FOSECO, INC.

INTER-COMPANY AND INTER-DEPARTMENTAL CORRESPONDENCE

TO: H. D. Shephard

FROM: A. G. Santighian

DATE: January 29, 1973

SUBJECT:

Starting from January 5, 1973, our staff has developed a new recipe trying to substitute asbestos in Profax type material.

Our main intention was and is still being to develop only one recipe asbestos-free covering the necessities of all types of machines.

The main raw material used to substitute asbestos is Wollastonite (fiber type) which has the following principal characteristics:

1. Chemical composition ---

SiO ₂	50.90%
CaO	46.90%
FeO	.55%
Al ₂ O ₃	.25%
MnO	.10%
MgO	.10%
TiO ₂	.05%
L.O.I.	.90%

2. The mineralogical composition, calculated from the above chemical composition and it could be:

-	CaO SiO ₂ (Wollastonite)	98.2%
-	2FeO SiO ₂ (Faialite)	.7%
-	Al ₂ O ₃ SiO ₂ (Sillimanite)	0.41%
-	MgO SiO ₂ (Enstacite)	0.35%
-	MnO SiO ₂ (Rodonite)	0.19%
-	TiO ₂ SiO ₂	0.009%

3. The melting point for pure Wollastonite is 1540°C. The melting point for the used Wollastonite is 1300-1350°C because of the Fondite mineral.

4. The density of the Wollastonite is 2.9.



5. The durity (Mohs S ..)4.5.

The recipe tried in the Lab was:

Silica Flour	61.7
Diatomite	2.8
Resin	3.0
Resin	1.0
Fiber glass	.5
Wollastonite	29.9
Bentonite	1.0
	.1

The solid content tried in the slurry was 20%, 25% and 30%. The best results were obtained at 30% solid content. The flowability is better than Profax 31 which has a solid content between 13 and 18%. The Amitec tests showed a better curve than Profax 31. The final value for the new recipe is 7000 - 7500 Btu/ft² versus 7500-8000 Btu/ft² for Profax 31. The final rate of heat loss is 80-90 Btu/ft² min. versus 90-100 Btu/ft² min.

The above recipe was tried on SAM on Jan. 11, 1973. The slurry worked as follows:

1. The solid content 30%.
2. The tool filling 4-5 seconds, almost even.
3. After 20 cycles without any cleaning of tool or screens, the slurry continued to form corner posts at the correct thickness with no harmful material buildup.

The machine had the following characteristics:

1. Head pressure for forming: 50 constant during the experiment.
2. Head pressure for dewater: 50-32.
3. Pressure to head: 60.

When the holding tank was 1/4 full the slurry was thinned to 20% solid content. There was no indication of the suspension system failing.

The physical properties of the corner posts obtained were:

1. Density: 0.853 - 0.900
2. Trans. Strength: 293 - 432.

On January 17, 1973 was tried a plant run with the recipe on K-3 (Mark III) machine. The tools used on this experiment were 494C boards and 490 end pieces. The 494 tool was tried with a spacer (the tool was set up for Profax 31). During the tool change (494 to 490) the spacer was eliminated. The solid content of the slurry was 30%. Both tools worked well.

The principal characteristics were:

12.5 sec. filling time.
25.0 sec. forming and dewater time.
Static pressure: 60
Dynamic pressure: 40
Cycle time: 79.5 sec.
Green strength: very good.

The material was not cured well because the right oven was not used. The moisture content on green state 32-35%.

The Amitec tests showed 7400 Btu/ft² and final rate was 99 Btu/ft² min.

The density: 0.750; the transverse strength: 250.

On the same day we ran also the K-4 machine using the same recipe for tool #685 ledge boards.

The main characteristics were as follows:

- a. fill: 11 sec.
- b. blowback: 7 sec.
- c. dewater: 14 sec.
- d. cycle time: 70 sec.
- e. static form pressure: 28
- f. -- blow back: 25
- g. -- dewater: 40

The density of the material was: 0.720. The transverse strength: 220.
The Amitec tests showed: 6960 Btu/ft² and the trial rate was 94 Btu/ft² min.

If the run on K-3 machine was close to an ideal experiment without any major problems testing the high qualities for the new recipe, the run on K-4 machine was less successful because of the holes left at the back of the boards when removing the piece.

The opinions are different:

1. A machine problem.
2. A tool problem.
3. An inadaptable material (recipe) to such tool and machine.

My opinion is:

This recipe will work better if the holding tank of the machine will be properly cleaned and doing a minor change cutting the fiber glass content from .5% to .3%. I am still following the leading idea to get only one recipe for all types of machines.

On January 22, 1973 we ran B corrugated machine using the Tool #685. The experiment was smooth without any problem.

On January 23, 1973 was scheduled to run one piece hot top machine. The experiment was not successful. The problem was an unusual screen blockage on the corners of the tool. We could not run the test more than 1-1/2 hours getting only 8 pieces with unacceptable defects. The defects were:

1. A thickness variation from the top to the bottom.
2. The corners of the piece had less thickness than the flat sides.

The factors which can prove such problems are the following:

1. Bad suspension properties for the slurry.
2. Long dewater time.
3. Too much fine particle content in the slurry.
4. Inadequate vacuum pressure.
5. Previous blockage of the tool.

After a careful analysis of the above problems the conclusions are:

1. The suspension properties for the new recipe are better than the suspension properties for Profax 31.
2. Dewatering time is longer than Profax 31 but, I consider, is not the determining one in this case.
3. The finest particle content for the new recipe is, after our estimation, at least 15% less than Profax 31.
4. The tool was not cleaned for a very long time.

My opinion is:

1. To have the opportunity to run another test using a clean tool indifferent of the tool dimensions.
2. To make some changes in the recipe. If these changes will be major, I purpose to run all tests from the beginning all over. Evidently we already started to do minor changes.

The pieces obtained from the above experiments are:

- 1 Pallet of 494
- 1 Pallet of 490 GREAT LAKES
- 1 Pallet of 685
- 1 Pallet of 690 COPPERWELD

These pallets are ready to be shipped to the customers but they need special attention, to follow them through the customer's technological process, to mark down everything indifferent if the man who follows the experiment considers the data useful or not. Also we need a complete report with all the details. I purpose that the experiment in the steel mill plant should be followed by a man from our staff.

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