STEEL MILL PRODUCTS DIVISION

RESEARCH AND DEVELOPMENT DEPARTMENT

AUGUST 1973

1. New Binder used in Profax Recipes

During the month, a critical shortage of RM 177A resulted and we were forced to find another binder to replace it. The replacement was considered to be at minimum 50%.

The binder noted X3578 is a non-processed starch from American Maize and it is working only in combination with RM 177A.

In two week's period we converted almost all Profax® recipes being in production in Cleveland, Mt. Braddock and Chicago.

So the former Profax® 31 recipe became EP-5452, EP-5297 became EP-5453, Profax® 10 became EP-5459, EP-3999C became EP-5457, EP-3408A became EP-5458, EP-3900A became EP-5463, EP-3982D became EP-5462, and EP-3901 became EP-5460. All these recipes were tried under the existent laboratory equipment and were acceptable. Under production procedure all were acceptable except EP-5460. Also EP-5462 was not accepted due to shrinkage. Other starches which could be taken into consideration are produced by Hubinger Company and A. E. Staley Manufacturing.

Examining the possibility of using only X3578 as binder without any RM 177A, our laboratory work showed that using around 20% Hexamethylentetramine by weight of solid the transverse strength is acceptable. The usage of X3578 and Hexamethylentetramine is not feasible from this standpoint.

2. Fungicide usage for new Binder System in Profax® Recipes

The starch binder was considered less resistent in time than RM 177A. The tests showed that after three days of storage there is not any loss in strength or slurry characteristics. The present recipes using X3578 do not incorporate the fungicide usage. The other starch binders do need fungicide as preservation component.

3. Shelf Life for Profax® Material using X3578

One of the important problems of using X3578 was envisioned to be the shelf life. Under lab conditions, we tried Profax® boards using EP-5452 recipe into a humid chamber. After six days tha boards lost 17% of their initial transverse strength which is comparable with the standard Profax® 31 boards.

4. U.F. Liquid Resin in Profax

Because U.F. liquid resin is cheaper than U.F. powder, we tried to replace U.F. powder in our recipes. The laboratory work showed good preliminary results.

The friability tests showed that the usage of X3211 in place of RM 447 at the same level is as good as the standard recipe. We have to schedule a production run.

5. Fireproofing Paper in Profax

Many flame retardants and fireproofing compounds were tried but none were acceptable. We tried flame retardants and fireproofing compounds thinking that the developed temperature during the paper carboration process is around 400-450°F so the RM 177A would not be ignited. The lab work showed that there is no difference among the paper bearing materials with or without flame retardants and/or fireproofing compounds.

6. Other Binders

Under our laboratory conditions we tried successfully to use PVA liquid as a binder. So we found that in combination with RM 177A (1-1.5%) and RM 477 (powder or liquid) the results are acceptable. The used recipe was EP-5273D. We intend to try that recipe in production. X3579 is cheaper than X3578 and certainly cheaper than RM 177A.

7. Dry Scrap Hammermilled Addition to Profax Material

A 5% dry scrap hammermilled addition to EP-5452 was tried under lab procedure and was found satisfactory.

Five production batches were tried on the 669 one-piece tops with no problems. We have to ask the Production Department to use it under regular basis.

8. Non-Asbestos Profax

Because of the RM 177A crisis during the month, we did not spend considerable time improving one of the existent non-asbestos non-paper recipes or to come up with a new one. However, under lab conditions we found that an EP-5273 type recipe using a new type of surfactant (cheaper than X1281) has better suspension properties and after 48 hours of settling it went back easily in suspension.

The suspension properties are not destroyed after 20 minutes of vigorous pulping action.

More work should be done in this respect and we have to schedule a production run to prove our lab work.