To: Mr. D.W. L and

Department and/or Company

Your Ref

Copies to: (please quote in full)

Mr. J.H. Mackna

Date: 29th April, 1968.

From: F.J. Wallace Division: Steelworks

PLAINTIFF'S EXHIBIT FOS-228

SUBJECT: FIBRE WORK

I understand that you need to take records of fibre work at F.I.L. for discussion with Dr. Phoenix in U.S.A. I give first a quick general history for perspective, then more detail on relevant parts and finally attach various documents.

General History

(i) Foseco's first contact with fibre techniques was PROFAX, which uses both organic and inorganic fibre and is formed by standard fibre forming systems (slurry and filer).

(ii) For some years no development at F.I.L., but work at BORMEM and MARCAILO on forming systems i.e. ISOSTATIC PRESS, ROLLING MACHINE and more recently VACUUM ASPIRATOR.

(iii) First F.I.L. fibre work concerned with asbestos removal from PROFAX. Most fibres examined, non considered satisfactory. Sandvik working on same problem at same time agreed with results.

(iv) Foseco became interested in use of pure fibre sleeves to feed castings, such products already on market by Johns Manville. Manufacture very simple, application of standard fibre technology.

(v) Kalminex interest started about same time as above.

(vi) Foseco (F.S.) Ltd used Kalmin fibre (Ca. Silicate slag wool) to replace asbestos in PROFAX. We issued report (R&D 235) to group.

(vii) Foseco Inc. produced E.P.3417 high fibre PROFAX.

(viii) BORMEM produced PROFAX N.1.

(ix) F.I.L. carry out much work on high fibre recipes - all fail test on one aspect or another.

(x) F.I.L. progress to Duplex concept so do (F.S.) Ltd. Certain Duplex seem to be successful.

(xi) General fibre project started under P.S. Clark.

(xii) Attempts to make very low density duplex at any cost for special heading experiment, so far unsuccessful.

(xiii) Experiments to make collapsible head for Toddish to see.

Detail Comment

(I use the same heading numbers as previous section for tie-up.)

(i) PROFAX is a typical filled fibre product. It uses normal fibre systems i.e. the fibre is dispersed in water and the shape formed by a filter technique.

To get the fibre to layer properly it is necessary to have a lot of water and not much fibre. The fibre should be very well dispersed before filtering starts, this means a high intensity mixer of the hydropulper type.

PROFAX slurry is about 2% fibre and the remainder filler. If a higher fibre recipe is used it is necessary to lower the solids content of the slurry to keep a low fibre concentration. The PROFAX fibre concentration of 2% is high by fibre technology standards, slurries of 0.5% are common in the paper industry.

(ii) Other forming systems :-

The Isomatic is a poor forming system, for many reasons not least of which is high running costs it is generally agreed that there is little future in this line.

The Rolling Machine with adaptations this could be made to work very well on pure fibre sheets from the technical viewpoint.

The Vacuum Aspirator this equally would work satisfactorily on high fibre systems with a few minor changes.

Generally the techniques for making high fibre shapes are self-evident mods of existing equipment and little laboratory work is called for.

(iii) Asbestos replacement in PROFAX was the first heading under which other fibres were examined. The conclusions at P.I.L. were that there was NO satisfactory alternative. We were forced to assume our tests were wrong when (F.S.) Limited claimed that slag wool was successful and we issued R&D 295 (attached) reporting on all the fibres we had examined, but using Drayton reported performance. It is now generally agreed at Drayton that their PROFAX is very inferior to the asbestos containing products they used to sell, this suggests our original tests and results were valid. On the basis of our original tests both PP.3417 and PROFAX H.1. would be expected to be poor.

(iii) continued.....

PROFAX N.1. has been reported O.K. and a lot is sold at present, but as you know, some reports suggest N.1. is bad. It may be that it is low price which is selling it or it may be that it is O.K. - time will tell.

E.P. 3417 has always been reported as being O.K., but Inc. don't seem to be selling any, again the picture becomes uncertain. A clear, honest situation report on E.P.3417 would be very helpful at this time.

(iv) Foundry Division have been unable to make a pure fibre recipe for the high temp. metals (cast Iron, Steel). The pure fibre compositions are limited to Aluminium etc.

They have a composition for Cast Iron but it is filled with coke, although it is a good product it fails against steel.

Their best composition for steel is KALMINEX, which is B.M.D. filled PROFAX which confirms our own findings that PROFAX is best for steel at the present state of "know-how".

Foundry Division are continuing to attempt high fibre recipes for steel and have a full work programme ahead, but no success so far.

(v) Kalminex mentioned above.

(vi) Asbestos replacement mentioned above.

(vii) E.P.3417 mentioned above.

(viii) PROFAX N.1. mentioned above.

(ix) The conclusions of the F.I.L. work on high fibre recipes (i.e. NOT 100% FIBRE) was that E.P.3417 was the best of a bad job.

(x) Duplex; basically this uses E.P.3417 with a hard, high filler facing. Reports so far are good. There have been some local difficulties but there is nothing to suggest a general technical disadvantage, equally there is nothing so far to suggest significant extra yields, but the low density is a selling point. Production costs may be lower, but production is too small so far to know.

(xi) P. Clark's project you know about but I attach the project plan sheets. Clark is writing survey reports on projects 1(a) and (b) at present. I will get copies to you before you leave for U.S.

(xii) The main problem here is compression of the backing so that 18 m.m. at the start becomes 3 or 4 m.m. after tecking.

Continued.../....

(xiii) Experiments for Toddish

I report this in detail with background because this is what I think Dr. Phoenix wants to talk about.

Certain U.S. fibre makers (Babcock & Wilcox, Carborundum) are supplying wide bandages in polythene bags. These bandages, which are wet, are taken from the bag and pressed around the inside of the ingot mould. The heat from the mould dries them and sets them hard. They then form the insulator of the ingot head. In composition they consist of refractory alumino-silicate fibre and the wetness is caused by silica sol like we use in KORON, a typical example is approximately 70-80 fibre and 20-30 silica sol.

There is nothing difficult about making such a product or packing it.

What interested Toddish is that if a one piece head is made like this, it can be folded flat in the poly bag and so save a lot on transport costs.

In our experiment for him we made such a head, using the DUVAL tool on the [illegible] machine. In order to demonstrate that there wasn't any fundamental production problem.

The questions that do need answering are :

(a) Does the very considerably increased R.H. cost get cancelled by transport savings or does the product end up costing more and if so, by how much. (I attach an estimated R.H. cost).

(b) Does the product give a satisfactory steel result. This question is worthy of very serious attention because the idea has appeared a number of times in the steel industry but has died each time, why?.

The problem that bothers me is as follows :-

We don't make these fibres but Babcock & Wilcox, Carborundum, Morgans etc. do. If we proved such a product and then establish a market, will they sell R.H. to us or take the market themselves? The question is relevant I feel because they have forming machinery and know-how and they do have steel industry contact (witness the hot topping work they're doing). Finally, they have patents covering hot topping use of such materials. At best we may just change Sandvik to someone else.

I feel we might be better considering how to get a better product of our own another way.

I realise in the last paragraph I'm a technical man waffling on commercial aspects, but I thought the point worth making.

Triton fibre Duval head (approx. ¾" wall thickness)

A. Stoved head to our recipe (As seen by Podish)

Recipe

wt. = 1.4kg. (3.08lb.)
price 1lb. (dry) = 4.6 shillings.

90% Triton 2 5/- lb.
10% Co422 9 1/- lb.

∴ price of head = 14.2 shillings.

density = 0.26 g/cc.

∴ volume of material in head = 5.38 litres.

B. Green head to our recipe.

water content = 50% (after standing over weekend)
weight = 2.8kg. (6.17 lb.)
price of head = 14.2 shillings (from A, assume water is free)

∴ price per lb. = 2.3 shillings.

C. Hypothetical green head made with 75% Triton/25% Syton 2XYS

ASSUM head will still require 0.9 x 1.4 = 1.26 kg. Triton and that the Syton will be accommodated in the interstitial spaces.

Head contains 1.26 kg. Triton = 13.86 shillings (@11/-/lb.)
plus $25/_{75}$ X 1.26 = 420 g. Syton = 1.91 shillings. (@ 1/5·16/-)

∴ cost of head = 15.17 shillings.

+ price per lb. = 4.1/- (green, but may be less than this if extra water has to be added to maintain consistency).

C. after drying

wt. of dry head = 1.26 + (0.3 x 0.42) (Syton (= 30% SiO_2 solids)
= 1.386 kg. (3.05 lb.).

Likely density of dry head = 0.258 g/cc.

D. Cost of equivalent head in Profax 10 (cured)

R.M. cost of Px 10 = 12.5/- cwt. = 1.34d/lb.

wt. of equivalent head @ p = 0.94 g/cc. = 5.06kg (11.15lb)

∴ cost of head = 1.245 shillings.

FOSECO BHAM

FOSECO BPVE

ATTN LEONARD

USA Journals (1)

PLEASE BRING ALL HISTORY OF FIBER WORK DONE BY FIL TO DISCUSS DURING YOUR VISIT

Patents.

U.S.A. 3,112,202 - Johns Manville c/o

PHOENIX

Canada 725,192 - Celotex c/o

FOSECO BHAM

FOSECO BPVE

Report 0900 Fri 25-4-68.