

July 16, 1952

A. B. Fisher
C. F. Passweiler
K. W. Huffine
Alvin Brown
J. A. O'Brien
C. B. Burnett
T. C. Eaton

(To be noted by:)

R. S. Gardner
G. D. Poole
J. D. Lowry
W. E. Boyd

Task Force Report No. 25
Evaluation of a Shorter Air Cure After
a One Hour Moist Heat Cure.

Task Force Report No. 26
Special Fiber Run 25% M-383-1
(30% Australian Blue, 70% 4Z20)
6-in. 150 Pipe

Attached hereto are copies of the above Task Force Reports.

As a result of the work based on Task Force Report No. 25, plans have been made for the installation of the equipment to Cure Pipe 1 hour in Moist Heat, which will replace the four hour dwell period. This method will reduce the amount of storage space and the number of mandrels that would have been necessary to take advantage of the four hour dwell time.

This report also indicated that after Pipe has been cured in Moist Heat for one hour that Air Curing of two hours after stripping might replace the present 18 hour Air Cure.

Task Force Report No. 26 covers the work on the use of 30% Australian Blue with 70% 4Z20.

Additional work is being carried on to determine the relative effects of 4M28, 4Z20, and 6D fibres in a blend of 30% of African Blue.

SC:cm

S. COLLIER

cc; E. R. Williams-Research
G. B. Brown-Research
A. DelRocco-Manville
R. H. Neisel-Research
R. Jacobs-Manville
H. J. O'Brien-Manville
J. R. Robson-Manville
A. J. Schilling-Manville
J. Q. Trice-Research

K. J. Whalen-Manville
D. Nowlin-Research
P. B. Proctor
R. Nebel
E. C. Lindstrom
W. L. Vanderbeek
G. Smolak-Research
H. E. Richards-Manville
P. D. Cannon

Research Center
July 22, 1952

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S. Collier - G.H. (16) ←
P. D. Cannon - G.H.
H. E. Richards - Manville
G. Smolak

Transite Pipe Process Study
Special Fiber Run
25% M-383-1 (30% Australian Blue, 70% 4220)
6-in. 150 Pipe
Task Force Report No. 26

As part of the Task Force investigation of the use of Australian Blue fiber in the manufacture of Transite pipe, a preliminary plant run was made with blend M-383-1, 30 per cent Australian Blue and 70 per cent 4220.

The preliminary plant run shows the special blend to be an operable blend but requires a slightly longer forming time to produce pipe with the same forming characteristics and ultimate strength level as is obtained with the standard blend M-360-1.

Detailed results are in the attached report.

The Task Force

by: D. Nowlin

fr

cc: E. B. Williams
G. B. Brown

Task Force:

P. B. Proctor - G.H.
R. Nebel - G.H.
A. R. Girardi - G.H. (4)
H. J. O'Brien - Manville
A. H. Schilling - Manville
A. Del Rocco - Manville
J. Q. Trice
K. J. Whalen

Transite Pipe Process Study
Special Fiber Run
25% M-383-1 (30% Australian Blue, 70% 4Z20)
6-in. 150 Pipe
Task Force Report No. 26

SUMMARY:

The use of 25 per cent of special blend M-383-1 (30 per cent Australian Blue, 70 per cent 4Z20) compared to the use of 25 per cent of standard blend M-360-1 in 6-in. 150 pipe.

- a. Results in an operable blend but has a tendency toward fiber clots in the sheet and requires a slightly longer forming time to produce pipe with the usually accepted forming characteristics.
- b. Results in pipe with comparable ultimate strength levels and a tendency for the average ultimate hydro strength to be significantly higher than when using the standard blend.

PURPOSE AND SCOPE:

Mr. C. V. Miller, in his letter of May 14, 1952, presented the question of whether Australian Blue fiber could be substituted for MS Blue in the manufacture of Transite pipe. A previous plant run in which Australian Blue was substituted for MS Blue in the standard M-360-1 blend did not show any significance difference between the two Blue fibers. (See Task Force Report No. 19 dated May 26, 1952.) The Blue content of blend M-360-1 is only 9.5 per cent, and, therefore, the relatively small amount of Blue fiber in the pipe might have been insufficient to show any appreciable difference which might exist between Australian and MS Blue. A Task Force decision was reached to run an eight hour shift of 6-in. 150 pipe using a fiber blend which contained a relatively high percentage of Australian Blue fiber.

PROCEDURE:

The special fiber blend contained the following virgin fibers:

Australian Blue	30%
4Z20	70%

This blend, designated as M-383, was given the standard willowing procedure, that is, willowed once, with 10 per cent scrap addition and was used as a 25 per cent mix on the Manville No. 2 machine, in 6-in. 150 pipe, on May 27, 1952. The 6-in. 150 pipe manufactured with 25 per cent standard blend M-360-1

PROCEDURE: (Cont'd)

before and after the special blend were followed for comparison purposes. Hydro and flexure test pipe were designated at the time of manufacture. Samples of the dry stock feed to the machine were taken from the "before" run of 25 per cent M-360-1 and from the special run of 25 per cent M-383-1 and used in making sag cakes. Production and inspection results were analyzed for inspection losses at each point of inspection and total net recovery.

RESULTS:

Production and inspection results and ultimate strength levels in hydro, flexure and crush are shown in the following tables.

Table I

Summary of Inspection Results
Special Fiber Run—25% M-383-1
6"—150

	<u>"Before" Run</u> <u>25% M-360-1</u>	<u>Special Run</u> <u>25% M-383-1</u>	<u>"After" Run</u> <u>25% M-360-1</u>
No. of Sections Manufactured	86	319	83
Scrap at Pipe Machine	0	0	0
Rejects at Pipe Machine	0	3 = 0.9%	0
No. of Sections Machined and Inspected	86	316	83
Inspection Rejects	1 = 1.2%	4 = 1.3%	0
Flexure Failures	0	0	0
Hydro Failures	2 = 2.3%	6 = 1.9%	0
Net Recovery Based on No. of Sections Manufactured	$\frac{83}{86} = 96.5\%$	$\frac{306}{319} = 95.9\%$	$\frac{83}{83} = 100.0\%$
Net Recovery Based on No. of Sections Machined and Inspected	$\frac{83}{86} = 96.5\%$	$\frac{306}{316} = 96.8\%$	$\frac{83}{83} = 100.0\%$
Average Forming Times - Minutes	1.16	1.26	1.13

RESULTS: (Cont'd)

Table II

Summary of Ultimate Strengths
Special Fiber Blend—25% M-383-1
6"—150 Pipe

	<u>"Before" Run</u> <u>25% M-360-1</u>	<u>Special Run</u> <u>25% M-383-1</u>	<u>"After" Run</u> <u>25% M-360-1</u>
No. of Hydro Test Pipe	17	32	16
Average Load, psi	864	924	827
Standard Deviation	89	65	78
Average MR, lb/sq in.	5079	5423	5099
Standard Deviation	534	397	546
No. of Flexure Test Pipe	3	6	3
Average Load, lbs	4220	3860	4160
Average MR, lbs/sq in.	4607	4318	4617
No. of Crush Samples	34	62	34
Average Load, lbs	8810	9414	8095
Standard Deviation	646	1039	837
Average MR, lb/sq in.	8365	8972	8129
Standard Deviation	844	978	875

Results of sag cake tests on the dry stock feed are shown in the following table.

Table III

Summary of Sag Cake Tests
Cakes Made with Dry Stock Feed to Machine

	<u>Standard Blend</u> <u>25% M-360-1</u>	<u>Special Blend</u> <u>25% M-383-1</u>
No. of Sag Cakes	21	21
Average Modulus of Rupture psi	4067	4322
Standard Deviation	179	167
Average Filter Time—sec.	73	97
Standard Deviation	2.9	5.5

RESULTS: (Cont'd)

As the special blend started through the machine, the following changes were noted:

1. Slightly increased end stretch of the pipe,
2. Formation of fiber clots in the sheet,
3. Large and heavy slug formed on the mold during mandrel change.

From past operating experience, the above forming characteristics are generally avoided or minimized. By lengthening the forming time on the pipe made with the special blend, by about 0.10 minutes, the end stretch was approximately the same as with standard blend M-360-1 and the fiber clots and slug assumed reasonable proportions. The tendency for fiber clots to form, particularly at the ends of the pipe was definitely more pronounced with the special blend than with standard blend M-360-1. Other than the longer forming times, no changes were made in the machine operation and by forming pipe in 1.25 minutes the special blend ran approximately comparable to the standard blend when forming pipe in 1.15 minutes.

The longer forming times for the special blend was verified by the sag cake tests which showed the filter time of the special blend to average 97 seconds, while the cakes made with standard blend filtered in 73 seconds average.

As shown in Table II the ultimate strength levels in hydro, flexure and crush for 6-in. 150 pipe made with the special M-383-1 blend in a forming time of about 1.25 minutes, were in the same range as the strength levels for pipe made with standard blend M-360-1 in 1.15 minutes. The hydrostatic strength with the M-383 blend was higher than with the M-360 blend, but for the number of samples taken, the unit hydro strengths were not significantly different.

DISCUSSION:

One of the characteristics of a fiber blend containing a high percentage of Blue fiber is the tendency for the pipe manufactured to be difficult to strip from the cores. Stripping trouble was encountered on the last special run with a blend containing 30 per cent Blue fiber, therefore, to avoid a repetition of the expected difficulty with blend M-383-1, as the blend was introduced to the machine, the speed of the stock feed screw was increased and air lancing was used. No stripping trouble was encountered but the end stretch increased, fiber clots appeared in the sheet and a heavy slug was formed on the mold during the mandrel change. The stock feed screw was slowed and to minimize the adverse effects and approach the operating conditions prevailing with the use of the standard M-360-1 blend, it was necessary to form pipe a little slower with the special blend than with the standard M-360-1.

Although the ultimate strength level in hydro averaged higher with the M-383-1 blend, the average hydro unit strength for the special blend was not significantly different than the average hydro unit strength with the M-360-1 blend. A significant difference may exist, but the number of hydro test pipe taken was not sufficient to establish a difference statistically.

CONCLUSIONS:

The use of 25 per cent blend M-383-1 in the manufacture of 6-in. 150 pipe results in an operable blend, but requires a slightly longer forming time to produce pipe with the same forming characteristics as when using 25 per cent of standard blend M-360-1. The ultimate strength levels of pipe made with the special blend were not significantly different than the strength levels of pipe made with the standard blend.

An extended plant run would be necessary for verification of the results.