

662 Cromwell Avenue, St. Paul, MN 55114-1776  
 (651) 645-3601, Fax: (651) 659-7348

TO:  **BAXIM®**  
 Fibrillated Concrete Fibers Baxi-Fiber P200

DATE: July 10, 2002

PROJECT NO: 032059

PROJECT: PERFORMANCE EVALUATION – AVERAGE RESIDUAL STRENGTH  
 CONCRETE WITH SYNTHETIC FIBERS – FIBRILLATED FIBERS

### TESTING OF CONCRETE WITH SYNTHETIC FIBERS

#### INTRODUCTION:

This report presents the results of our laboratory testing of concrete with P200 Fibrillated Fibers (1.5 lbs/yd<sup>3</sup> dosage rate).

The scope of our testing was as follows:

1. Perform laboratory concrete trial batching of concrete with P200 Fibrillated Fibers according to ASTM:C1399 for the determination of the Average Residual Strength (ARS).
2. Prepare a written report outlining our test results.

The following test program was conducted in accordance with Miami Dade County Test notification Number TCTCMN02003.

#### SUMMARY OF TEST RESULTS:

The following is a summary of the test results:

<u>Test</u>	<u>P200 Fibrillated Fibers</u>
Average Residual Strength, MPa (psi)	0.42 (61)

<sup>1</sup>The results are the average of three samples.

#### TEST PROCEDURES:

The testing was initiated on May 10, 2002 and subsequent dates using applicable portions of ASTM:C1399-98, "Test Method for Obtaining Average Residual-Strength for Fiber Reinforced Concrete". The concrete test mixture was derived using the procedures outlined in ASTM:C494 Sections 11-15. The mix design used is included in the Concrete Materials section of this report along with the other pertinent information. Additional ASTM procedures were also used in conjunction with this test program.

#### SYNTHETIC FIBER DATA:

Synthetic Fibers - P200 Fibrillated Fibers  
 Date Submitted – February 21, 2002  
 Application/mixing - Min. 4 minutes

## TESTING OF CONCRETE WITH SYNTHETIC FIBERS

CONCRETE MATERIALS:**Concrete Trial Mixtures**

Mix Number	1
Mixture Type	Fiber
Cementitious Content <sup>1</sup> , kg (lbs)	234.5 (517)
Slump, mm (in.)	50.8-76.2 (2-3)
Nominal Coarse Aggregate, mm (in.)	19.2 (3/4)
Air Content, %	n/a
Specified Minimum Compressive Strength, MPa (psi)	27.6 (4,000)

<sup>1</sup>Type I Cement and Type C Flyash

**Materials**

Cementitious Materials	Lehigh Type I Portland Cement (ASTM:C150) Mineral Solutions Type C Flyash (ASTM:C618)
Fine Aggregate	Shiely Aggregates Inc. (Natural Sand Meeting the Requirements of ASTM:C33 and C494)
Coarse Aggregate	Shiely Aggregates Inc. (Limestone Size Number 57 Meeting the Requirements of ASTM:C33 and C494)
Admixtures	P200 Fibrillated Fibers

**Batch Weights**

Mix Number	1
Mixture Type	Fiber
Portland Cement, kg (lbs)	199.1 (439)
Type C Flyash, kg (lbs)	35.4 (78)
Admixture:	
P200 Fibrillated Fibers, kg (lbs)	0.68 (1.5)
Fine Aggregate, kg (lbs)	648.6 (1,430)
Total Coarse Agg., kg (lbs)	778.8 (1,717)
Water, kg (lbs)	131.5 (290)

Mix numbers 1 was used in casting of the ARS samples.

## TESTING OF CONCRETE WITH SYNTHETIC FIBERS

TEST RESULTS:**Concrete Test Data**

Mix Number	1
Mixture Type	Fiber
Slump, mm (in.)	76.2 (3)
Air Content, (%)	1.6
Unit Weight, Kg/m <sup>3</sup> (lbs/ft <sup>3</sup> )	2,373.7 (148.2)
14-Day Compressive Strength, Mpa (psi)	27.2 (4,060)

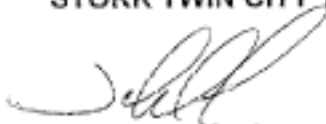
All of the samples were cast into beam molds. The samples were moist cured for 13 days and tested at 14 days from casting.

**Average Residual Strength – ASTM:C1399**

Please see the attached data sheet.

REMARKS:

The samples were discarded at the completion of testing. If you have any questions about this report, please feel free to contact us at (651) 659-7340.

**STORK TWIN CITY TESTING CORPORATION**

John D. Lee, P.E.  
Senior Staff Engineer  
Construction Materials Department  
C:\My Documents\032059\1.5 File\report.doc

## AVERAGE RESIDUAL STRENGTH - ASTM:C1399

## Standard Values

Sample Number	Sample Width, in.	Sample Depth, in.	Test Span, in.	Load in at Deflection, lbs.				Failure Load, lbs	Failure Load, psi	ARS, psi
				0.02 in.	0.03 in.	0.04 in.	0.05 in.			
1A	4.01	4.00	12.00	318.3	303.0	304.8	302.6	4679.8	875	57
1B	4.00	4.01	12.00	382.3	397.8	413.2	390.2	3806.7	710	74
1C	4.00	4.01	12.00	313.8	291.2	273.6	250.5	3773.6	704	53
Average	4.00	4.01	12.00	338.1	330.7	330.5	314.4	4086.7	783	61

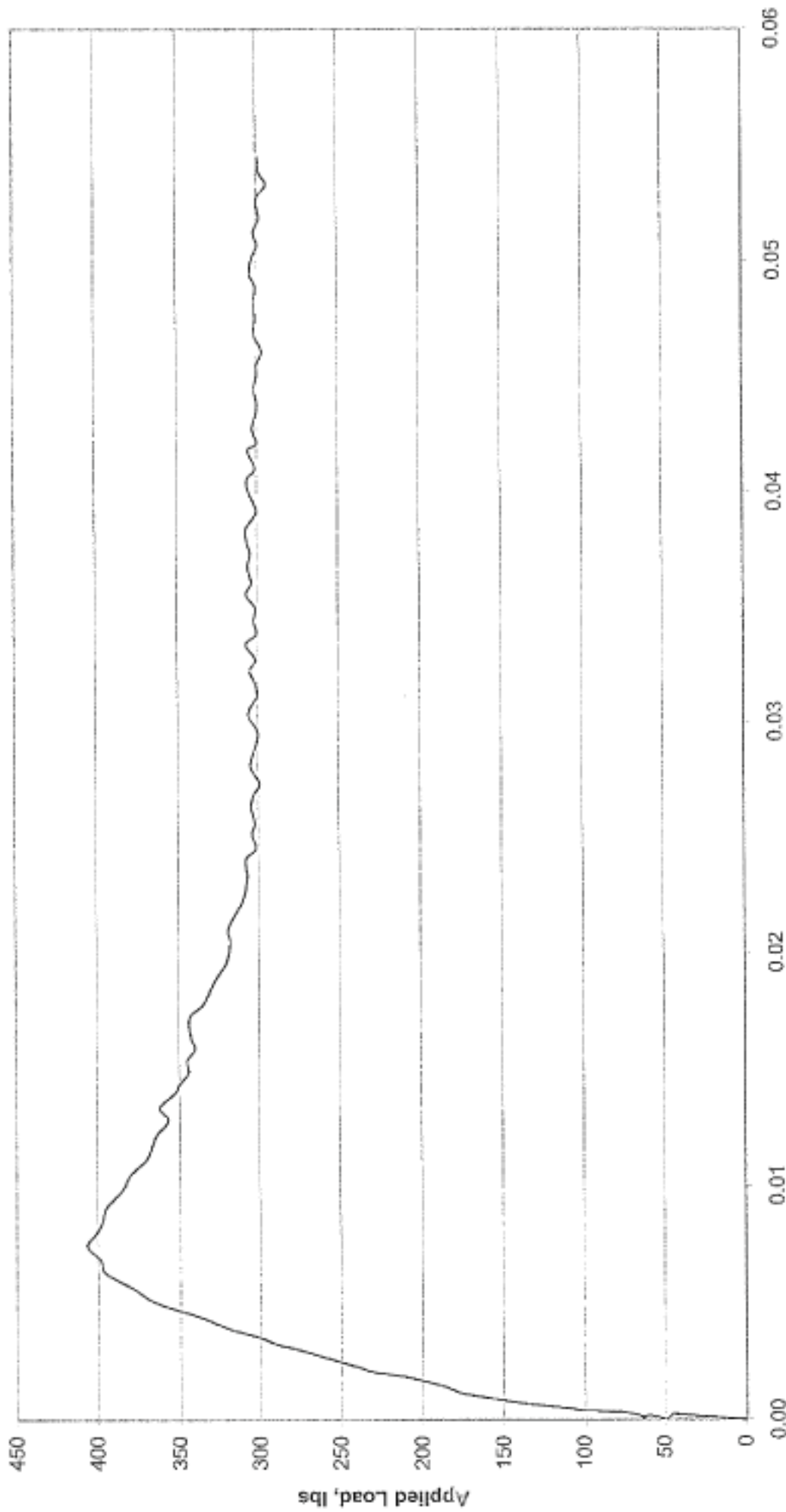
## Metric Values

Sample Number	Sample Width, mm	Sample Depth, mm	Test Span, mm	Load in at Deflection, N				Failure Load, N	Failure Load, MPa	ARS, MPa
				0.02 in.	0.03 in.	0.04 in.	0.05 in.			
1A	101.9	101.6	304.8	1415.9	1347.8	1355.8	1346.0	20816.7	6.00	0.40
1B	101.6	101.9	304.8	1700.5	1769.5	1838.0	1735.7	16933.0	4.92	0.51
1C	101.6	101.9	304.8	1395.8	1295.3	1217.0	1114.3	16785.7	4.88	0.36
Average	101.7	101.8	304.8	1504.1	1470.9	1470.3	1398.7	18178.5	5.27	0.42

TCT Client: ABC Fibers  
TCT Project Number: 032059  
Date: 7/10/02  
Fiber Type: P200 Fibrillated Fibers  
Fiber Dosage Rate: 1.5 lbs/yd  
Concrete Strength: 4080 psi @ 14 Days  
Concrete Slump: 3 inches  
Concrete Air Content: 1.6%  
Concrete Unit Weight: 148.2 lbs/yd

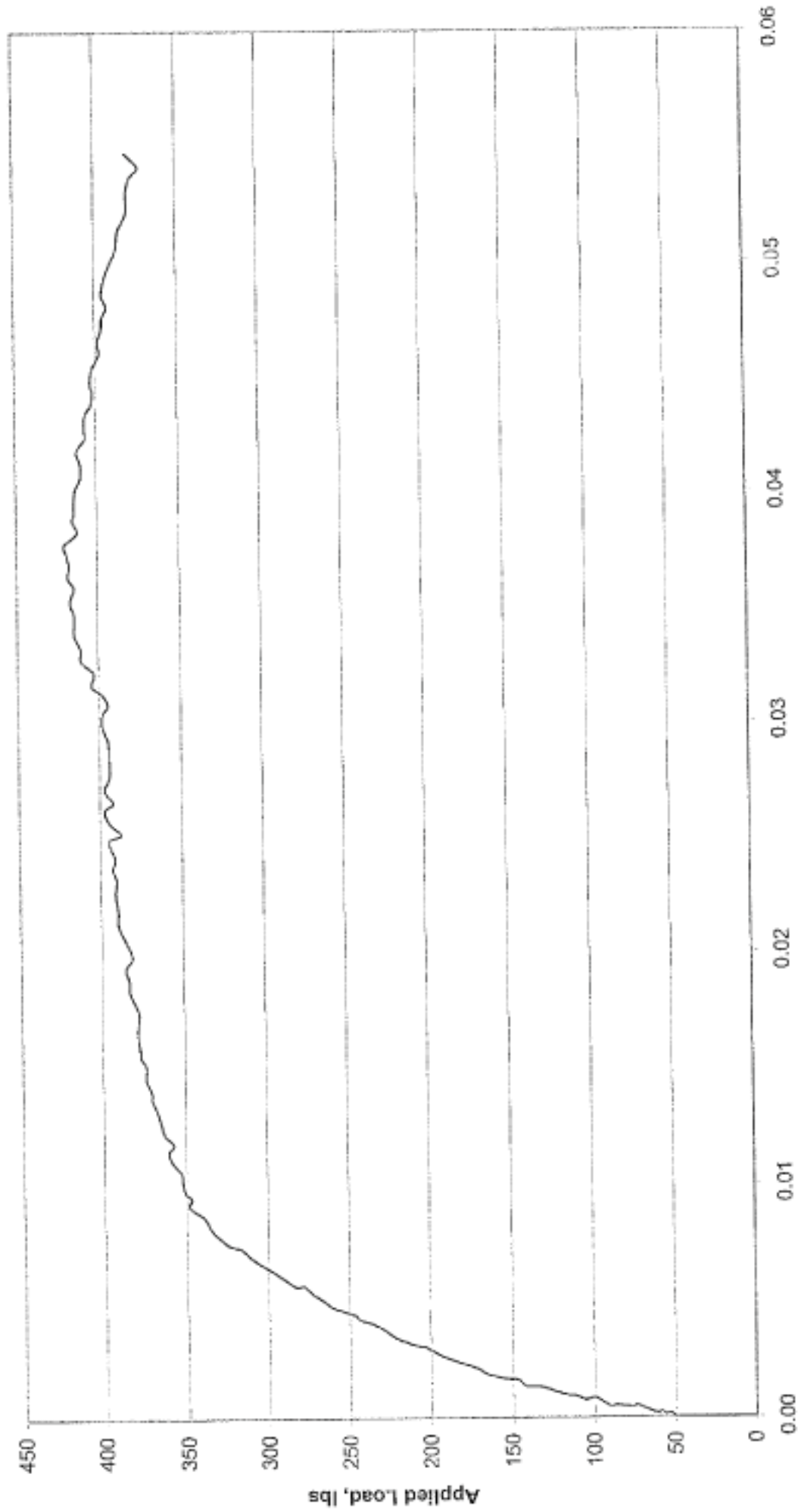
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**Post Crack Deflection vs. Post Crack Load (ASTM:C1399)**  
**Sample 1A (Fibrillated Fiber 1.5 lb/yd3)**  
**TCT Project Number 032059**  
**July 10, 2002**



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**Post Crack Deflection vs. Post Crack Load (ASTM:C1399)**  
**Sample 1B (Fibrillated Fiber 1.5 lb/yd3)**  
**TCT Project Number 032059**  
**July 10, 2002**



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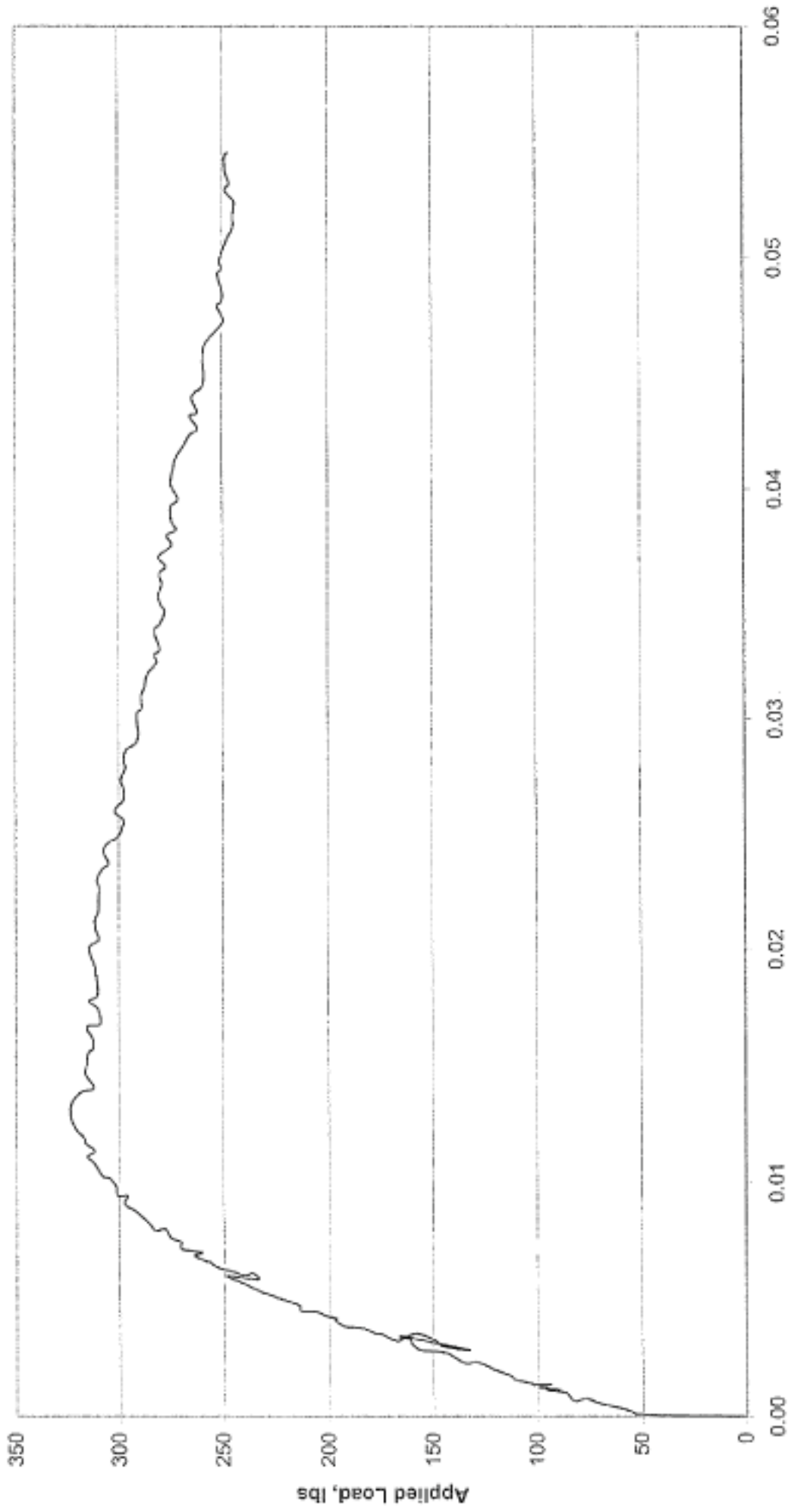
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### Post Crack Deflection vs. Post Crack Load (ASTM:C1399)

Sample 1C (Fibrillated Fiber 1.5 lb/yd3)

TCT Project Number 032059

July 10, 2002



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Deflection, in