Strength Profiling ECF Kraft Pulps

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Strength Profiling Kraft ECF Mill

Softwood Kraft Mill

- **Batch Digesters, medium-consistency D(EOP)D bleach line**
- **Average chip specific gravity 0.47**
- **Average bleached fiber coarseness 0.27 mg/m**

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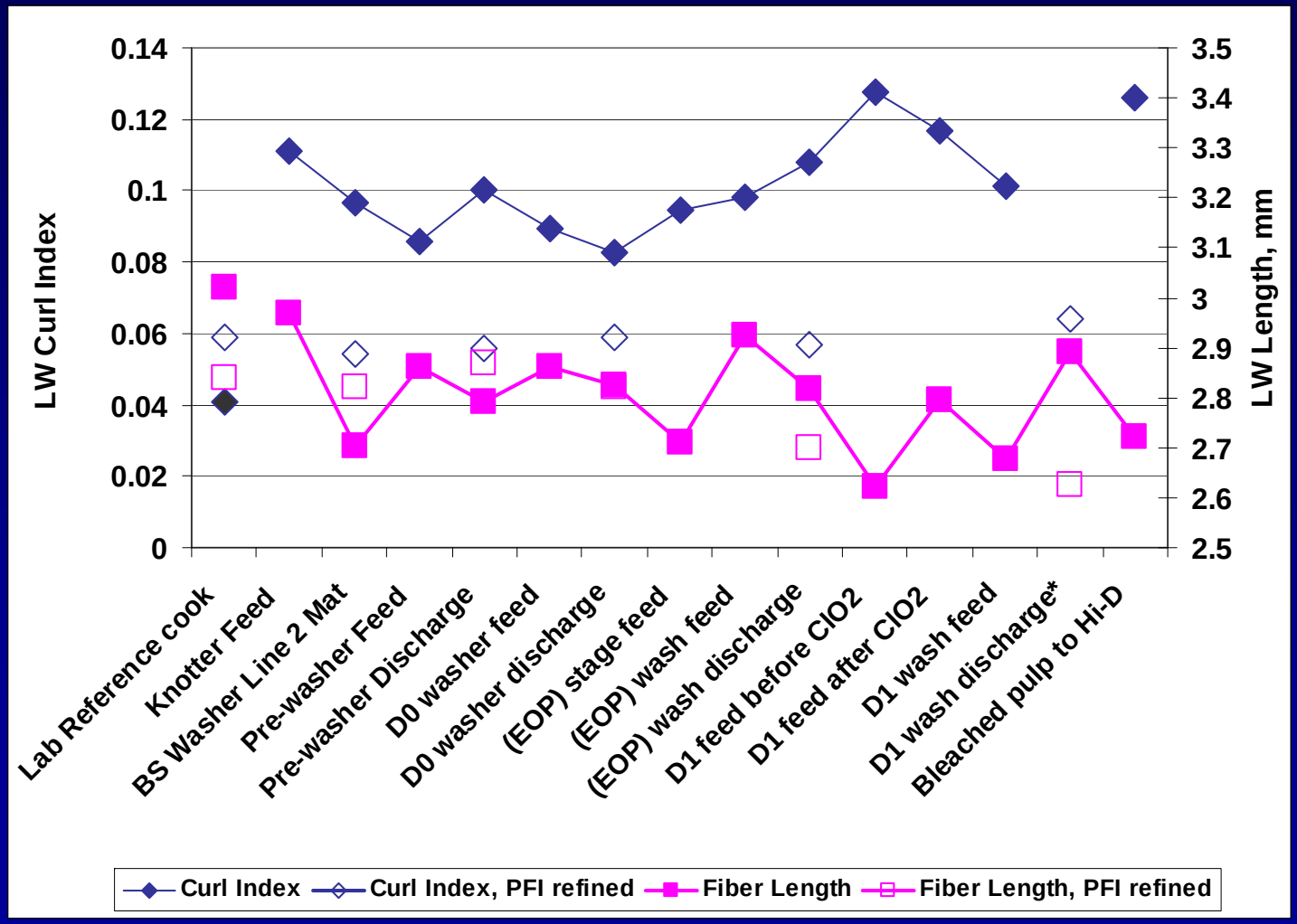
Strength Profiling Kraft ECF Mill

Fiber Length and Curl from D(EOP)D Pulps



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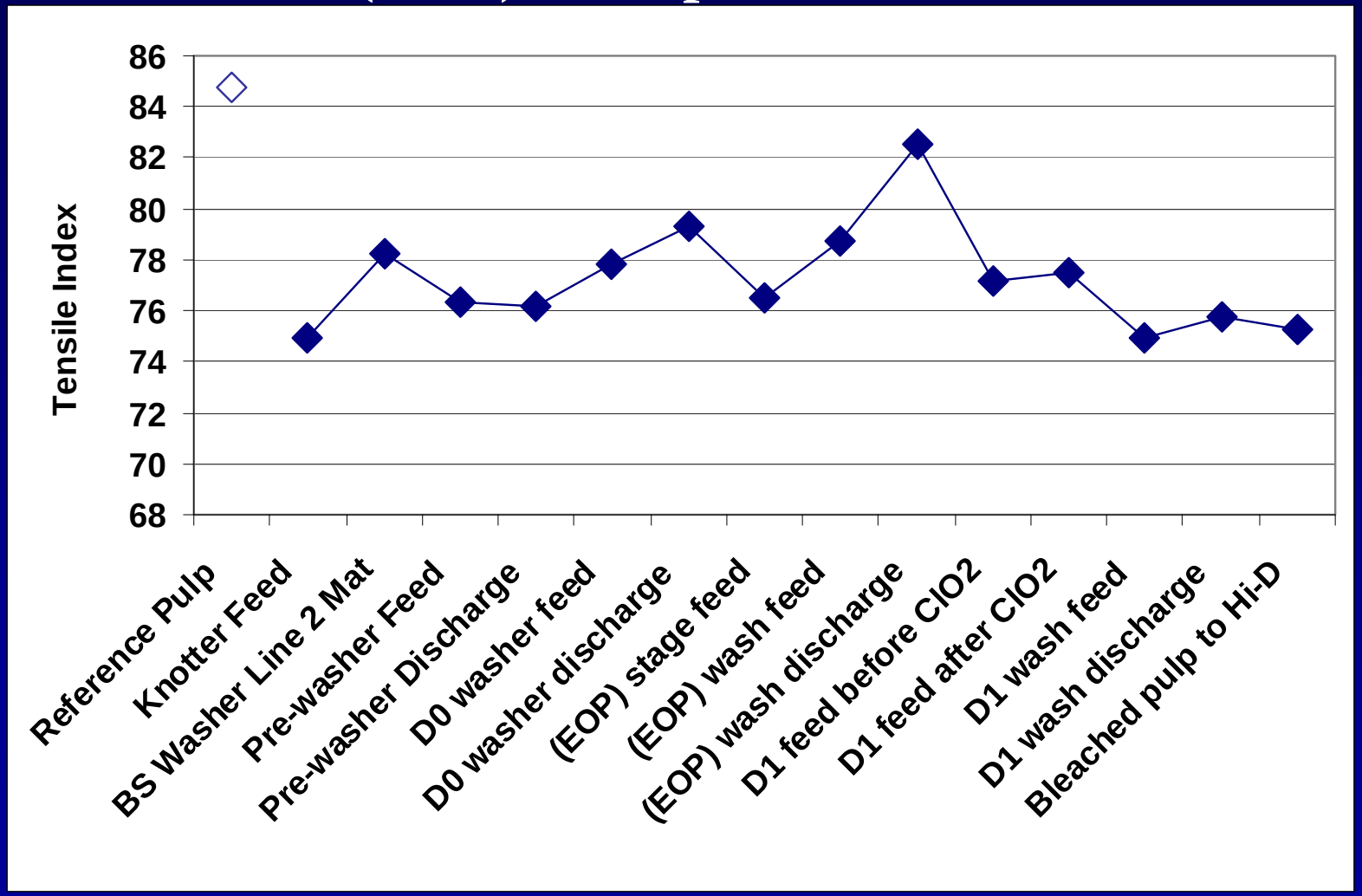
Strength Profiling Kraft ECF Mill

Tensile Index of D(EOP)D Pulps



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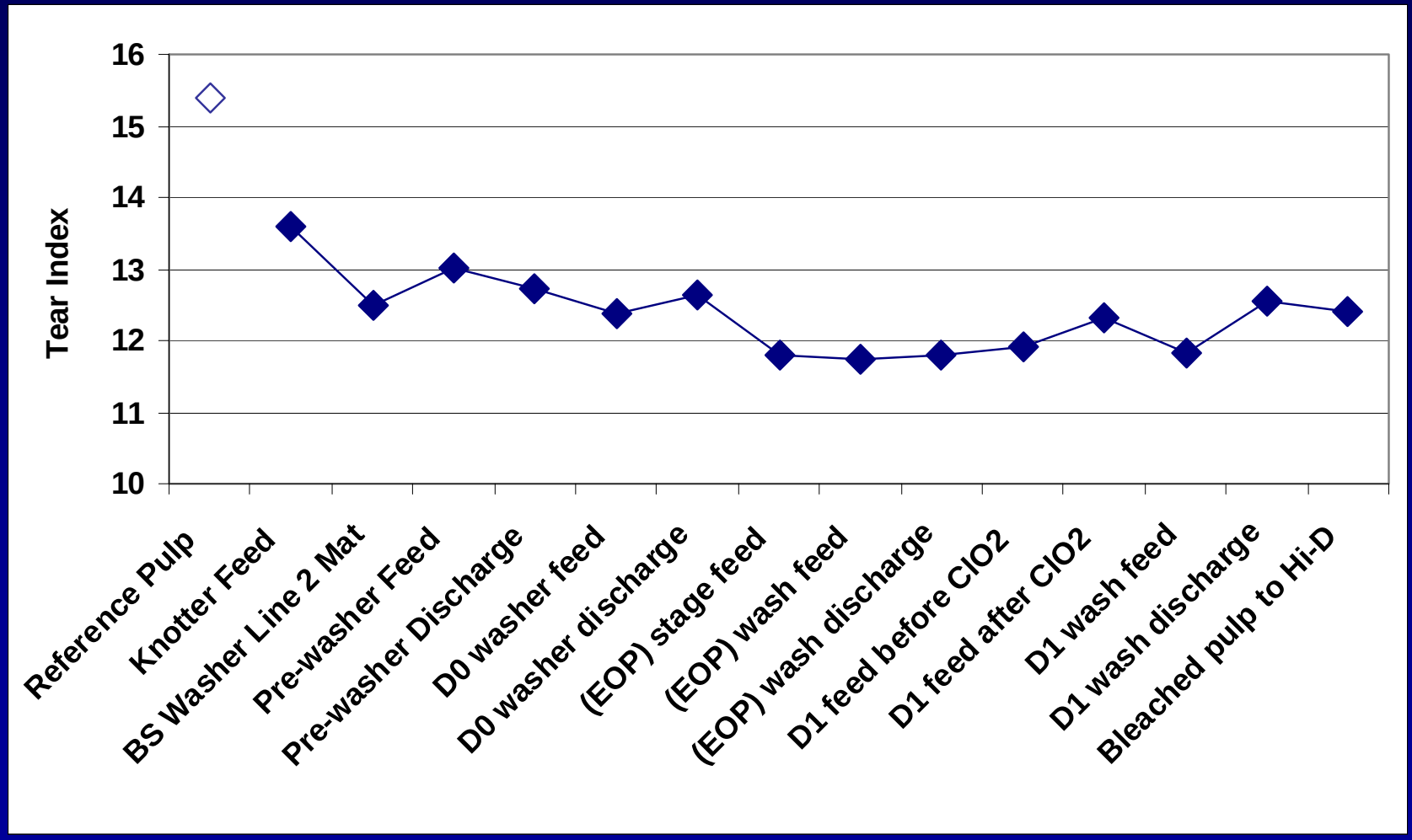
Strength Profiling Kraft ECF Mill

Tear Index of D(EOP)D Pulps



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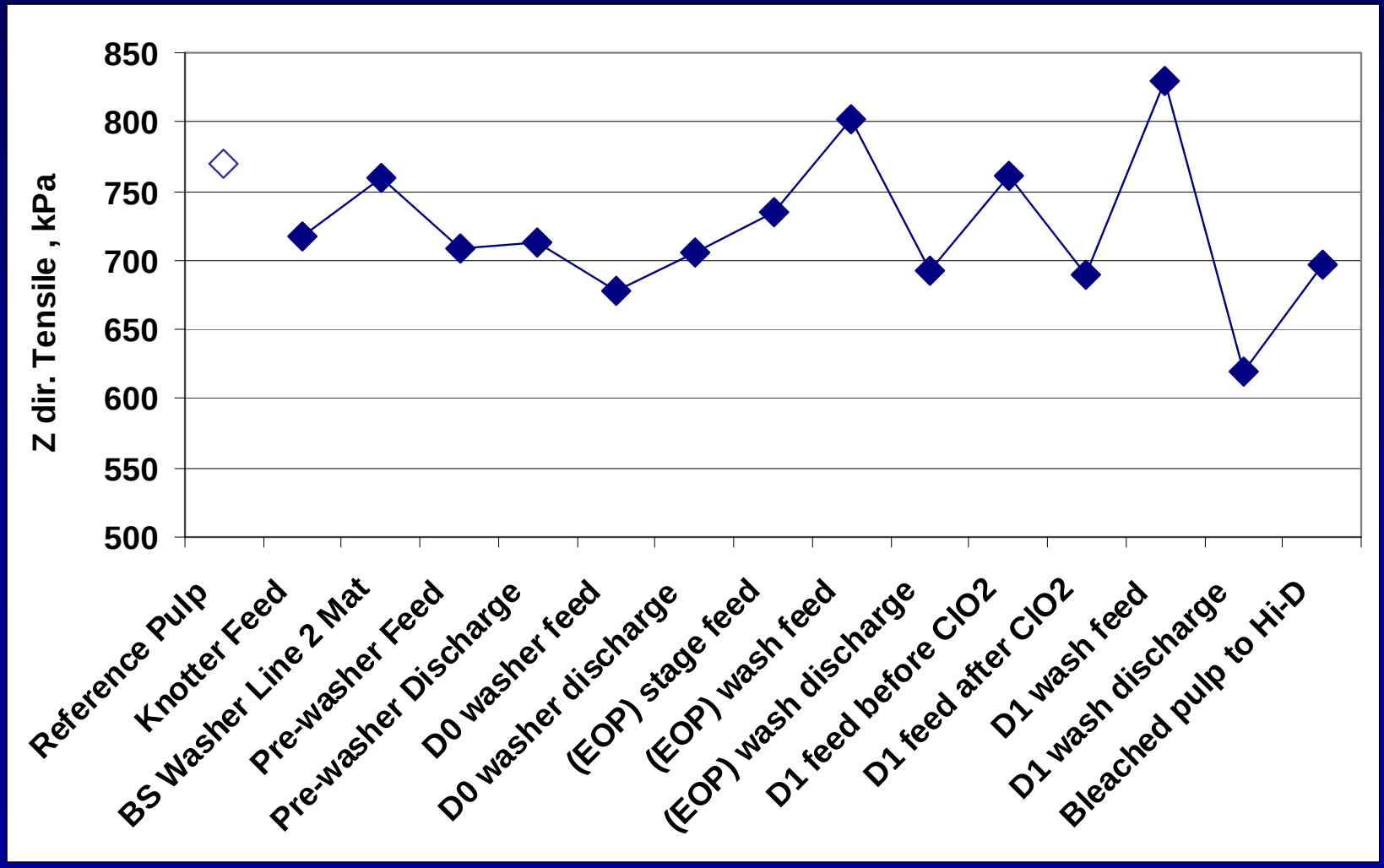
Strength Profiling Kraft ECF Mill

Z Direction Tensile Strength D(EOP)D Pulps



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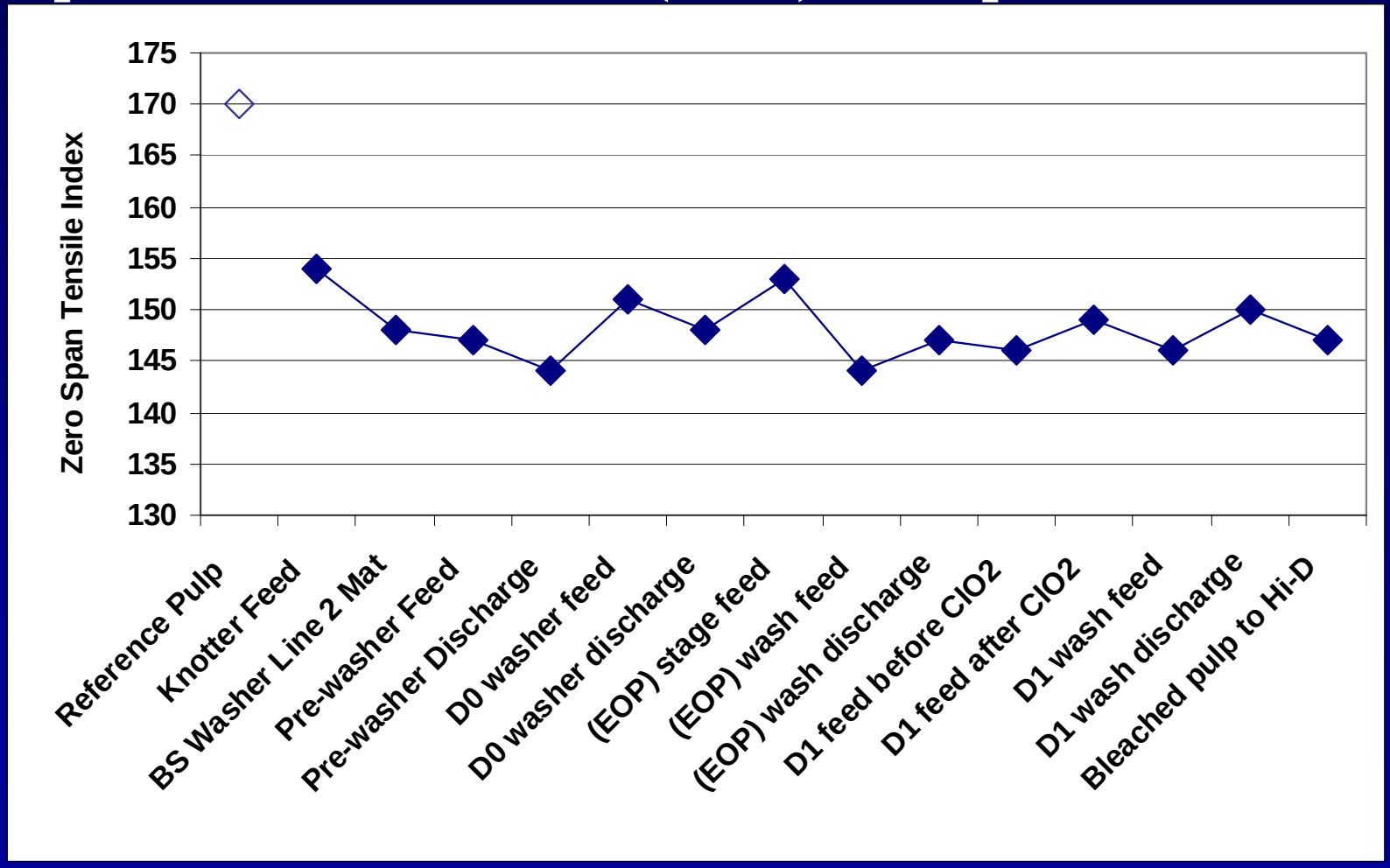
Strength Profiling Kraft ECF Mill

Zero Span Tensile Index of D(EOP)D Pulps



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Strength Profiling Kraft ECF Mill

Composite Sample (PFI refined)	Loss
Reference Pulp	0%
BSW Mat	12.9%
Prewasher Discharge	15.3%
D_0 Washer Discharge	12.9%
(EOP) Washer Discharge	13.5%
D_1 Washer Discharge	11.8%
Pulp to Hi-D.	13.5%

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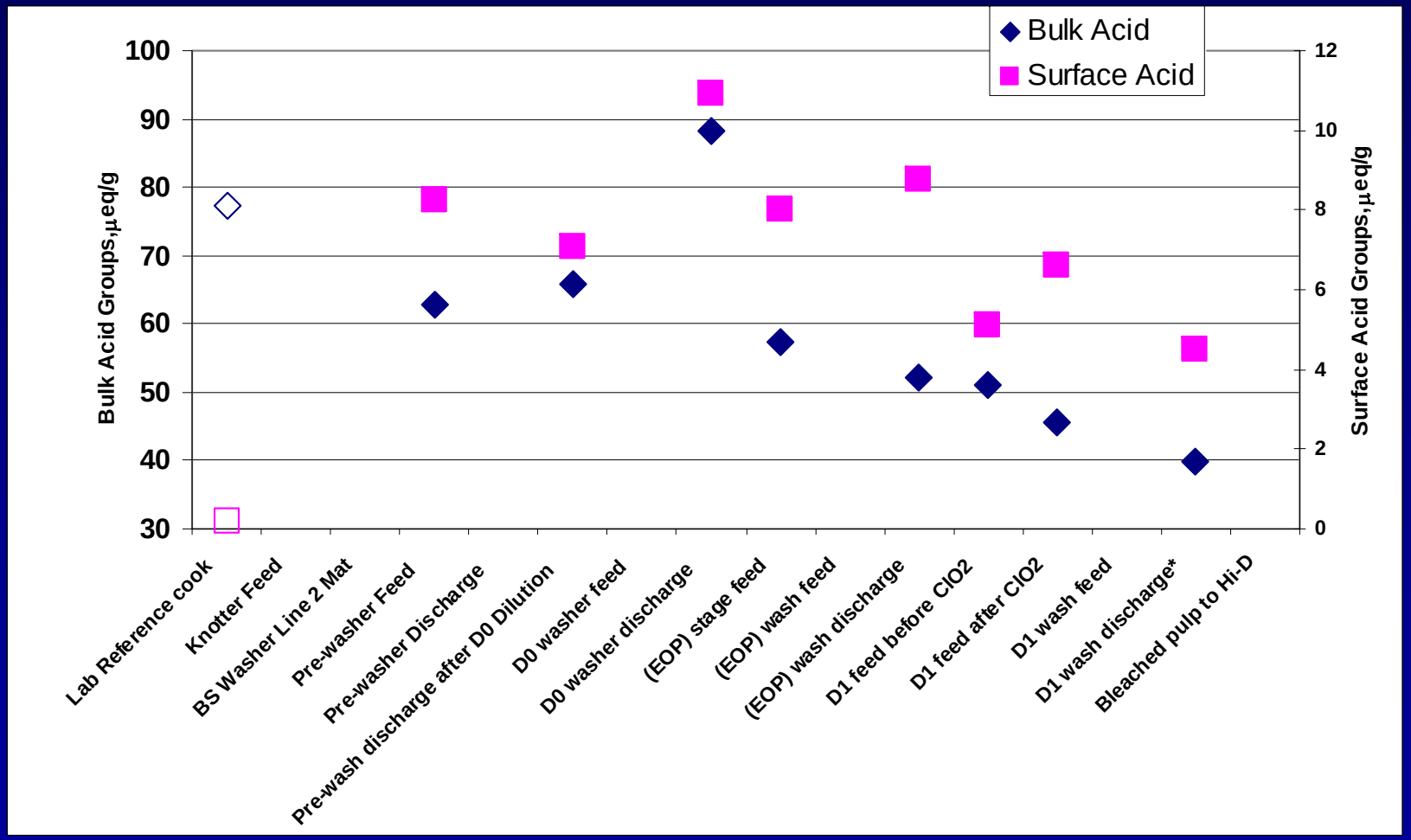
Strength Profiling Kraft ECF Mill

Bulk and Surface Acid Content of D(EOP)D Pulps



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Strength Profiling Kraft ECF Mill

Carbohydrate Analysis of Mill Chips/Pulps

Sample	Carbohydrates % (oven dry basis)					Acid Insoluble	Total
	Arabinan	Xylan	Mannan	Galactan	Glucan		
Composite Chip sample	1.3	6.4	12.2	2.2	43.1	29.7	94.9
Lab Reference cook w. AQ	0.5	7.4	6.8	0.4	77.3	3.4	95.80
Lab Reference cook w/o AQ	0.5	7.7	6.1	0.3	77.5	3.6	95.7
BS Washer Line 2 Mat	0.5	7.5	7.6	0.4	75.4	3.7	95.10
D_1 wash discharge	0.4	7.9	8.0	0.4	78.8	<0.1	95.50

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Strength Profiling Kraft ECF Mill

Kraft Softwood Mill

- **Continuous digester, OD(EOP)D bleach line**
- **Average chip specific gravity 0.32**
- **Average bleached fiber coarseness 0.20 mg/m**

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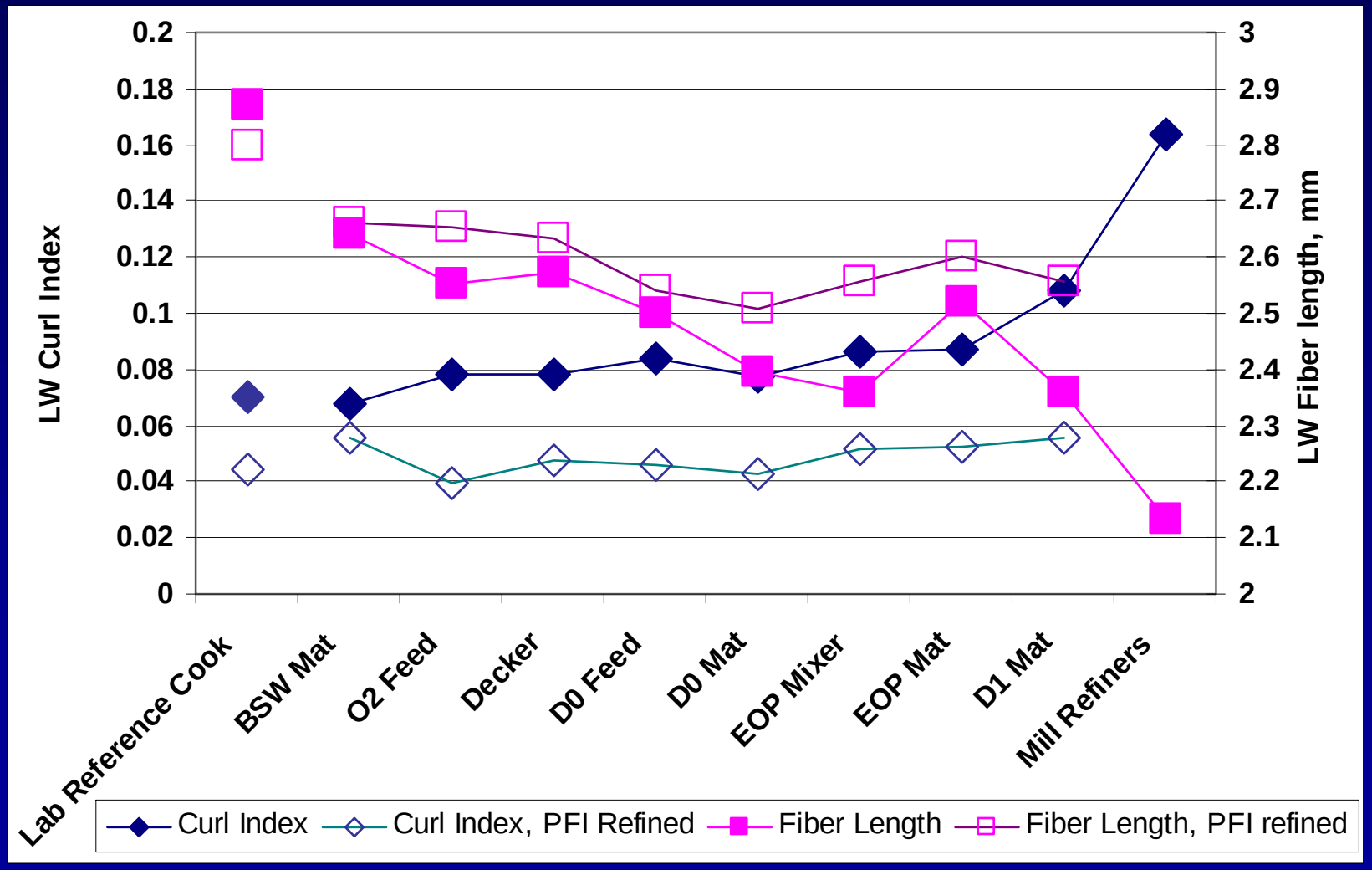
Strength Profiling Kraft ECF Mill

Fiber Length and Curl from OD(EOP)D Pulps



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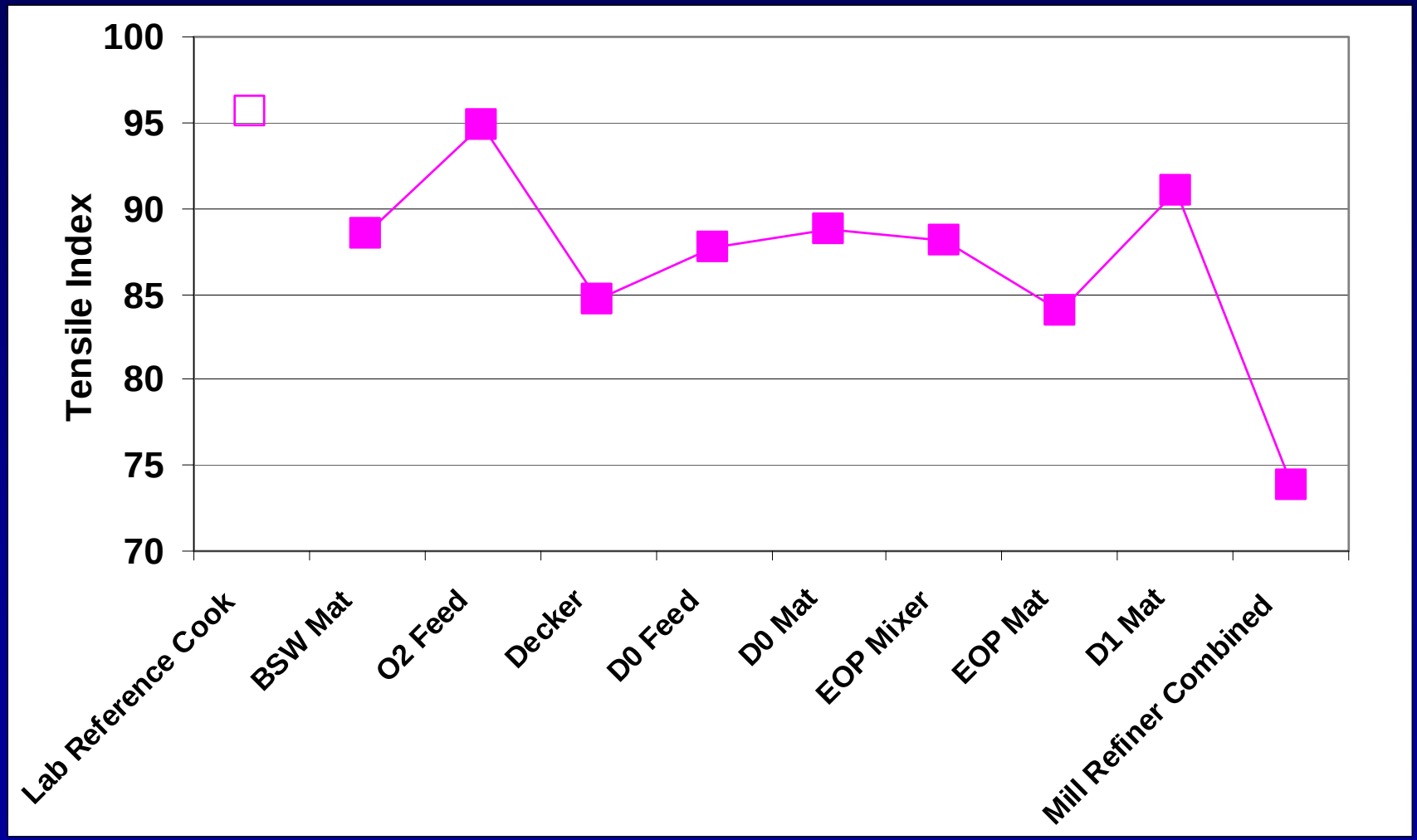
Strength Profiling Kraft ECF Mill

Tensile Index of OD(EOP)D Pulps



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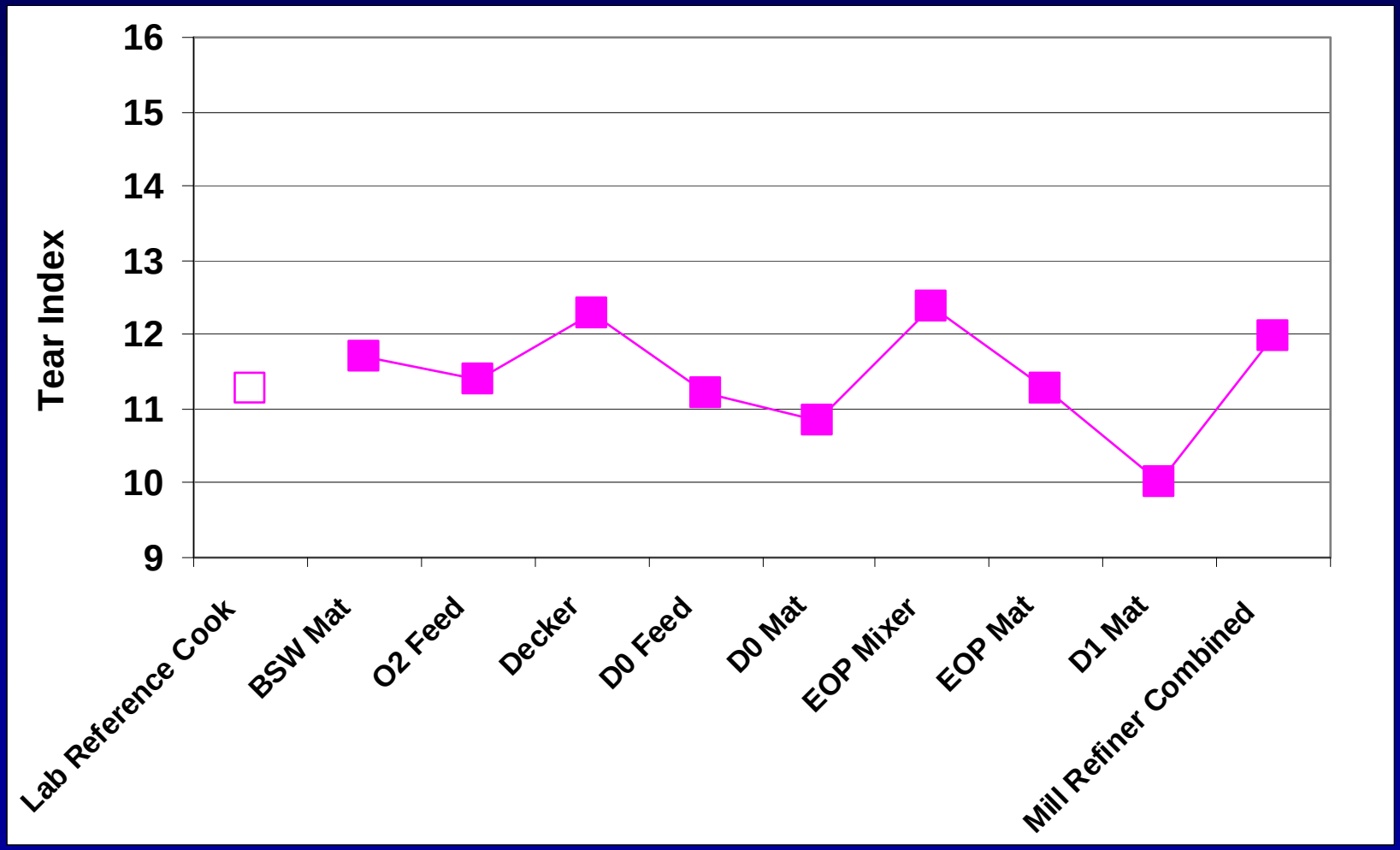
Strength Profiling Kraft ECF Mill

Tear Index of Mill OD(EOP)D Pulps



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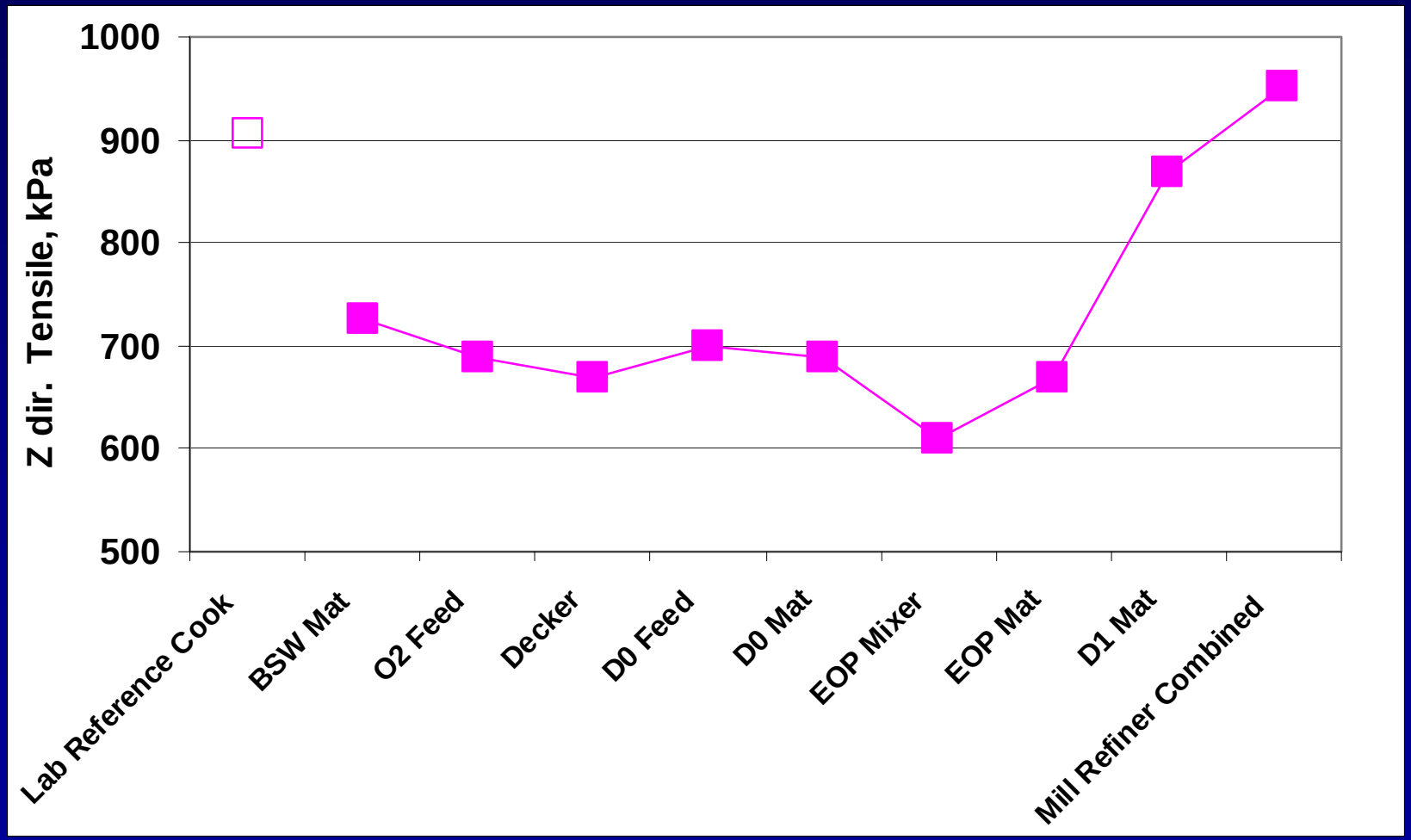
Strength Profiling Kraft ECF Mill

Z Direction Tensile Strength of Mill OD(EOP)D Pulps



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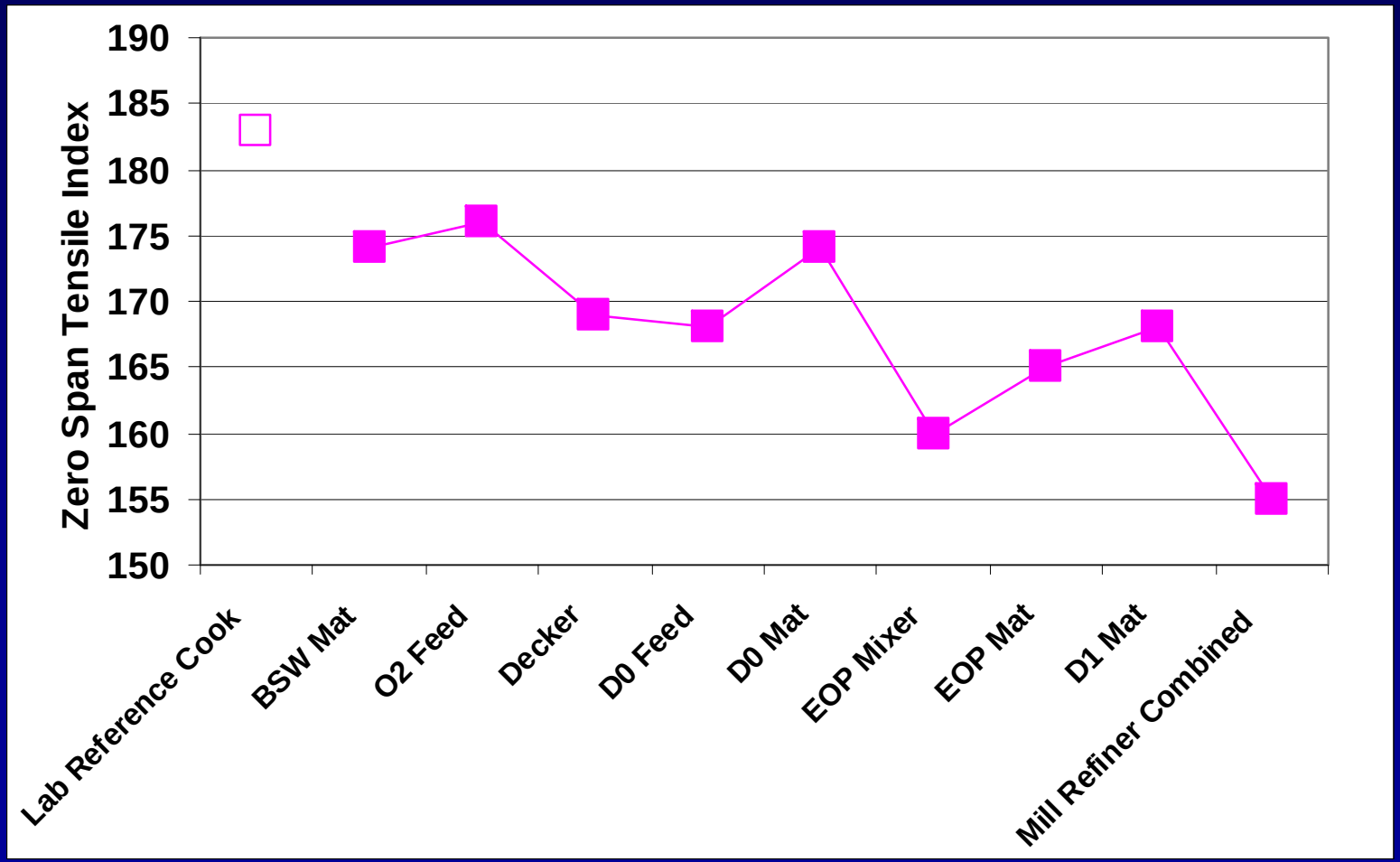
Strength Profiling Kraft ECF Mill

Zero Span Tensile Index of OD(EOP)D Pulps



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Strength Profiling Kraft ECF Mill

Loss in Zero Span Tensile Index of OD(EOP)D Pulps

Composite Sample (PFI refined)	Loss
Lab Reference Cook	0.0%
BSW Mat	4.9%
O_2 Feed	3.8%
Decker	7.7%
D_0 Feed	8.2%
D_0 Mat	4.9%
EOP Mixer	12.6%
EOP Mat	9.8%
D_1 Mat	8.2%
Mill Refiner Combined	15.3%

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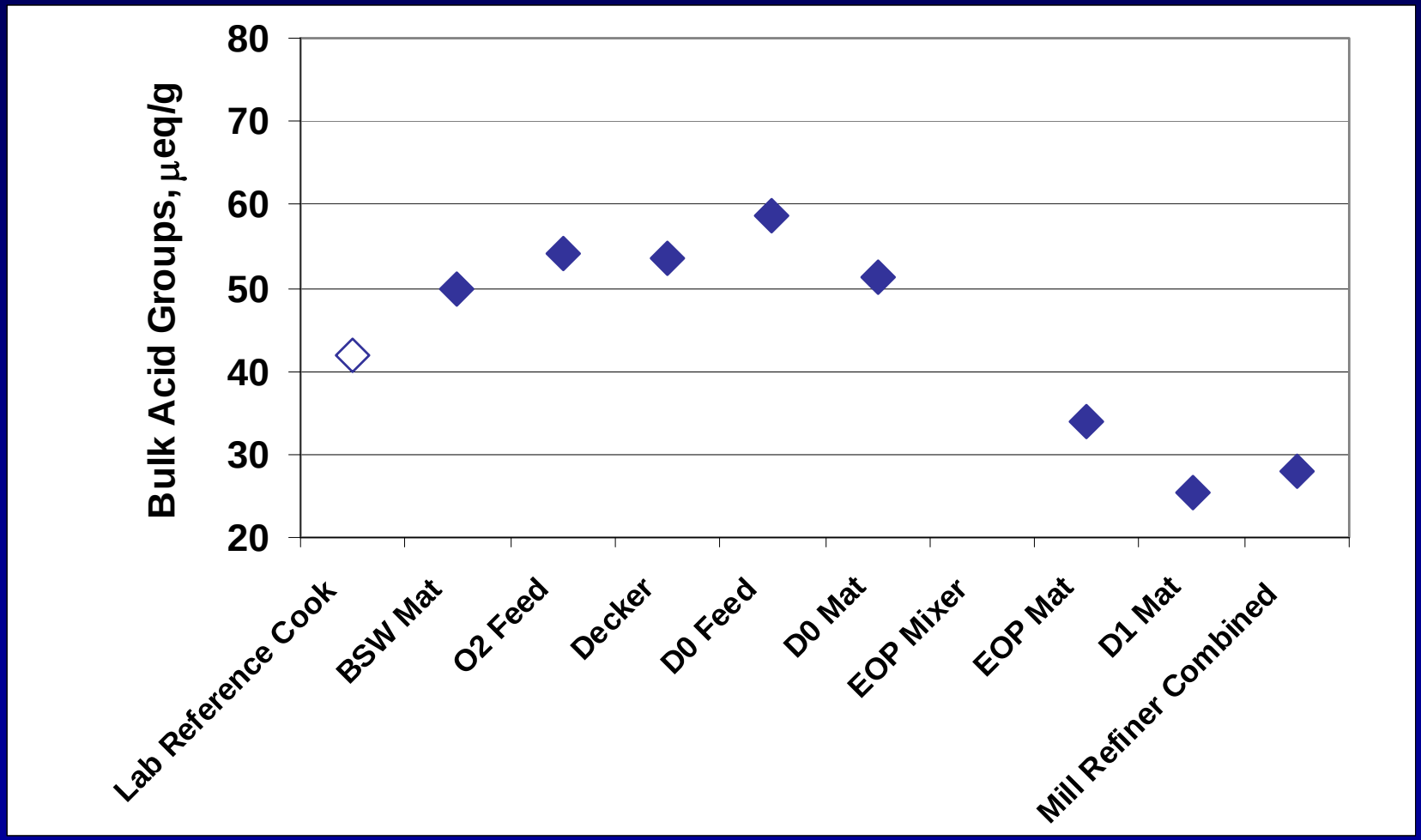
Strength Profiling Kraft ECF Mill

Bulk Acid Content of OD(EOP)D Pulps



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Strength Profiling Kraft ECF Mill

Carbohydrate Analysis of Mill Chips/Pulps

	Carbohydrates, % (oven dry basis)					Acid	
Sample I. D.	Arabinan	Xylan	Mannan	Galactan	Glucan	Insoluble	Total %
SW Chips	1.1	3.9	12.4	1.4	44.3	29.4	92.5
Lab Reference Cook	0.5	5.7	7.0	0.3	80.6	3.4	97.5
BSW Mat	0.5	5.7	6.9	0.3	81.0	3.8	98.2

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Strength Profiling Kraft ECF Mill

Hardwood Kraft Pulp Mill

- **Batch Digesters, medium-consistency OD(EOP)D bleach lines with wash presses, 2 fiberlines**
- **Average chip specific gravity 0.43**
- **Average bleached fiber coarseness 0.62 mg/m**

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Strength Profiling Kraft ECF Mill

Chip Samples

Sample Round	Specifc Gravity	-3 mm fines	+3mm pins	+7mm accepts	+8mm slots overthick	+45 mm oversize	bark
1	0.434	0.57%	5.24%	86.4%	5.42%	2.11%	0.31%
2	0.438	0.50%	3.67%	87.9%	4.73%	2.88%	0.31%
3	0.434	0.42%	4.08%	87.9%	4.99%	2.14%	0.52%
4	0.433	0.38%	3.33%	88.1%	5.61%	2.55%	

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Strength Profiling Kraft ECF Mill

Reference Cooks for Mill Chips

AA (%)	Sulfidity (%)	Liquor to wood	H-Factor	Residual AA (g/l)	Screened Yield (%)	Total Yield (%)	Kappa Number
19	35	4 to 1	809	24.37	46.95	47.07	14.8

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Strength Profiling Kraft ECF Mill

Mill Individual Round Samples

Sample Round	Brown Stock Kappa No.	Brown Stock Avg. Fiber Length, mm	Brown Stock Avg. Fiber Curl	Brown Stock Fiber Coarseness, mg/m	O2 Stage Kappa No.	D2 Avg. Fiber Curl	D2 Avg. Fiber Length, mm	D2 Brightness
1	13.6	0.749	0.036	0.066	9	0.673	0.091	90.18
2	18.8	0.750	0.043	0.074	10.3	0.649	0.095	89.61
3	13.1	0.765	0.038	0.076	6.1	0.651	0.099	90.09
4	12.9	0.798	0.029	0.06	6.5	0.696	0.056	88.97

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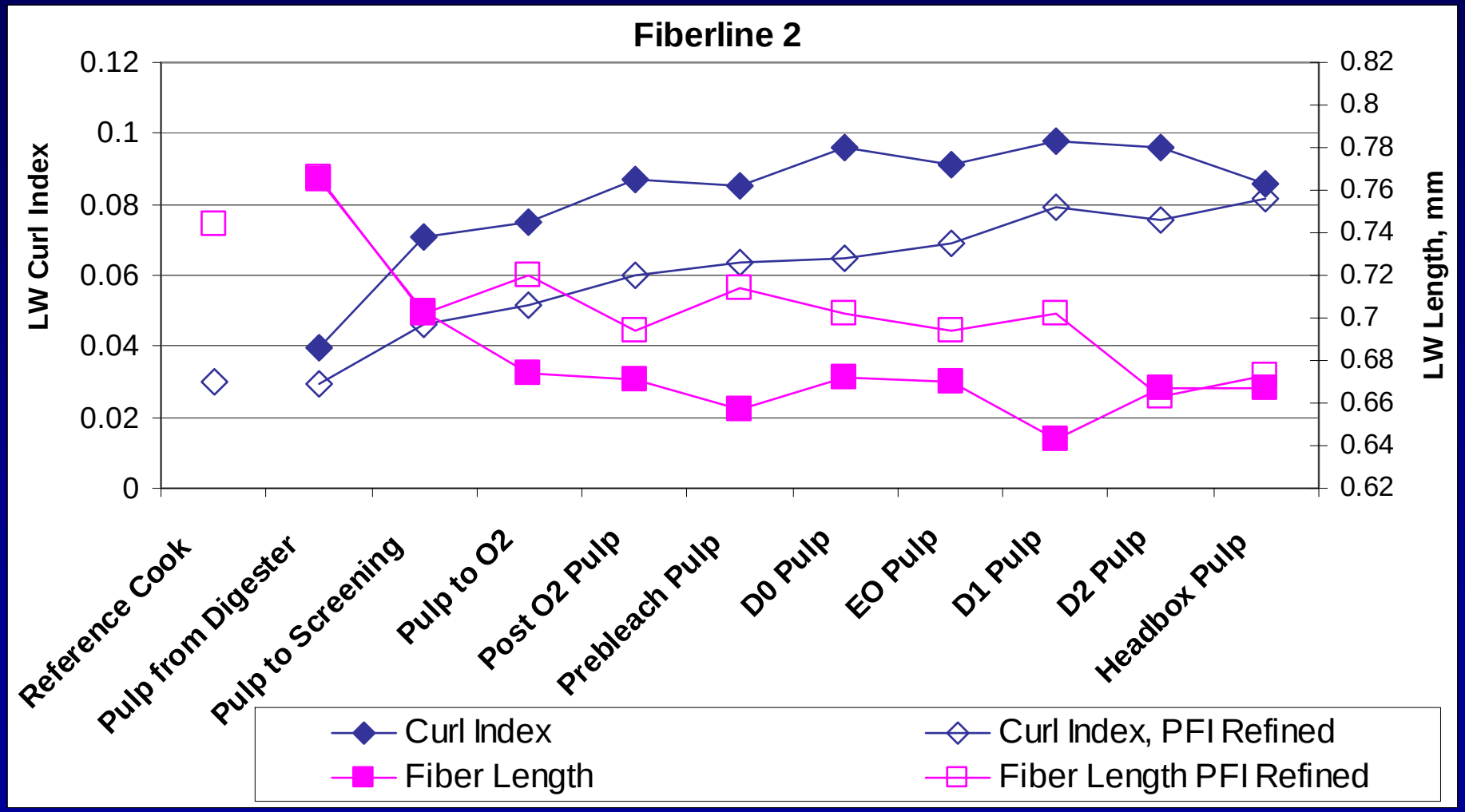
Strength Profiling Kraft ECF Mill

Fiber Length and Curl from OD(EOP)D Pulps



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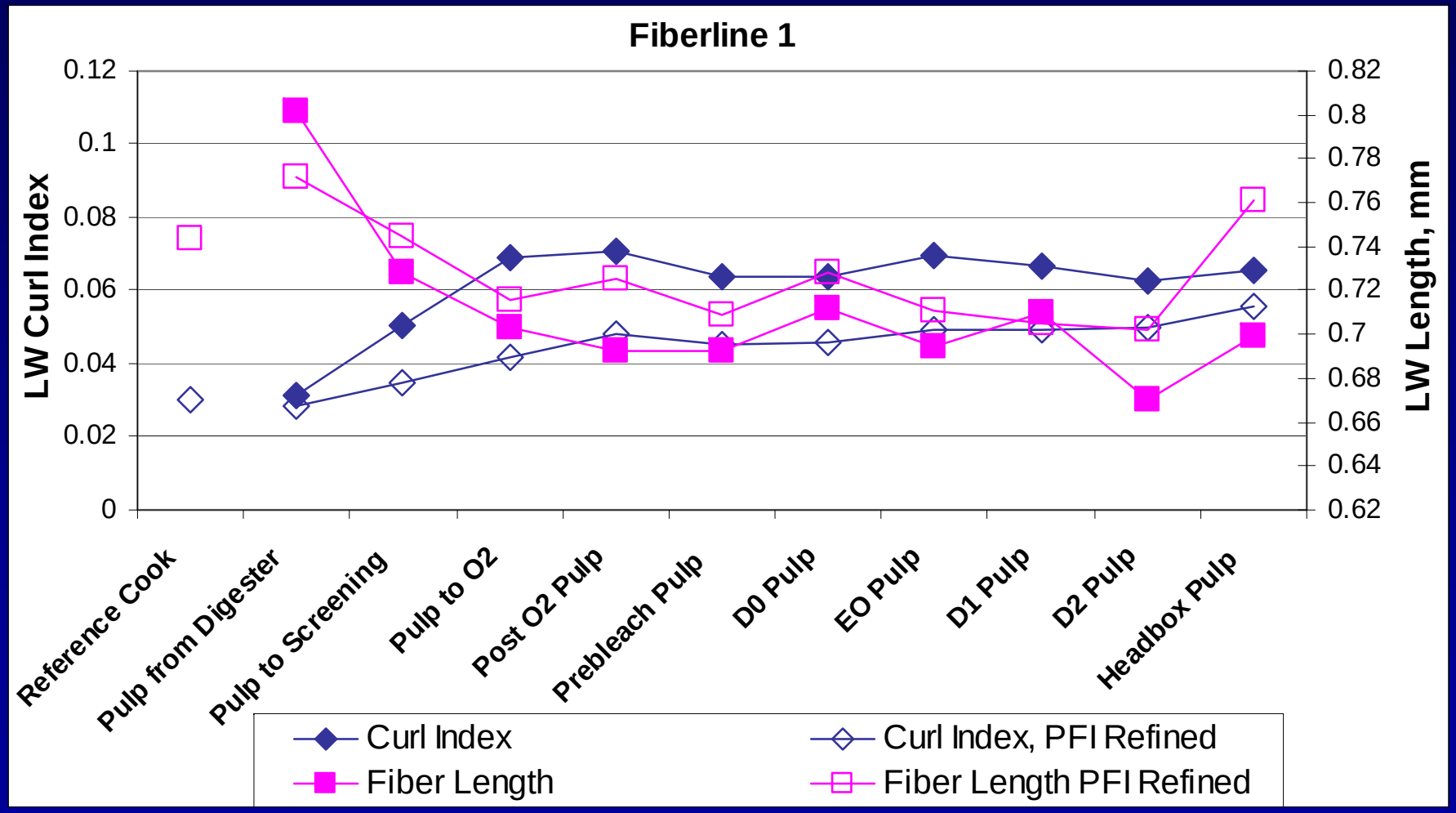
Strength Profiling Kraft ECF Mill

Fiber Length and Curl from OD(EOP)D Pulps



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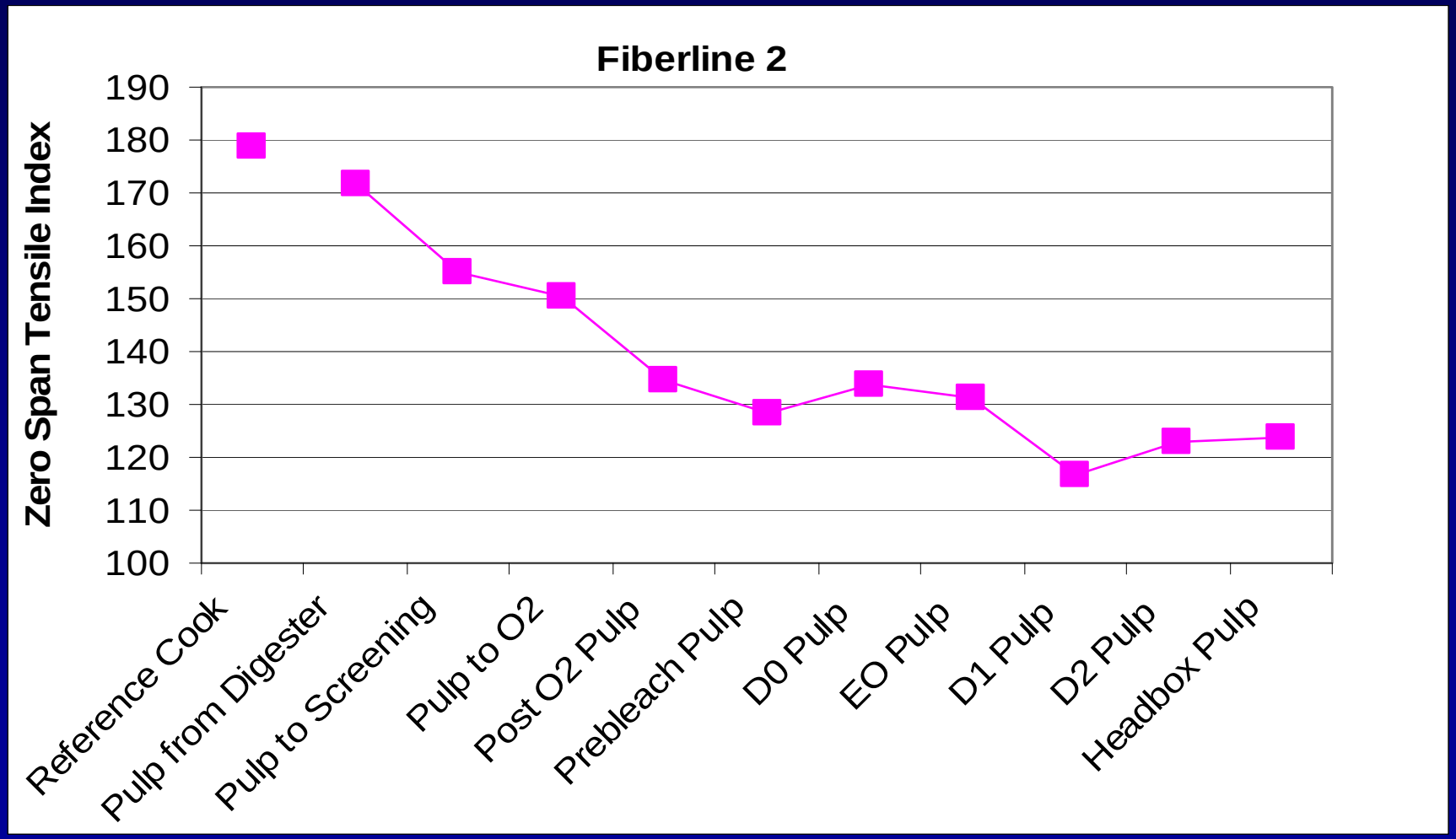
Strength Profiling Kraft ECF Mill

Zero Span Tensile Index for Mill Pulps



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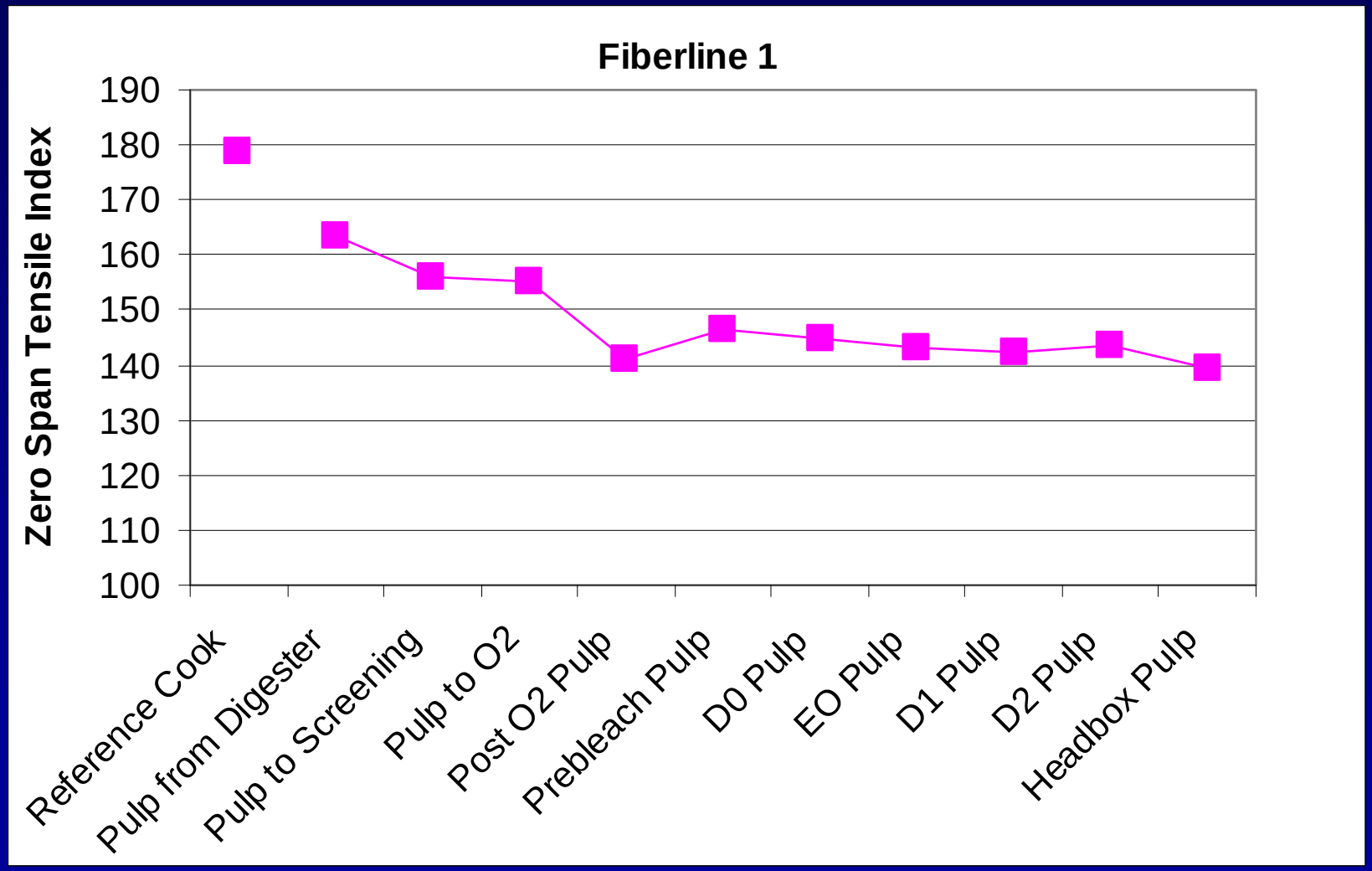
Strength Profiling Kraft ECF Mill

Fiber Length and Curl from OD(EOP)D Pulps



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Strength Profiling Kraft ECF Mill

Loss in Zero Span Tensile Index of OD(EOP)D Pulps

Composite Sample (PFI refined)	Fiberline 2	Fiberline 1
Reference Cook	0%	0%
Pulp from Digester	4.0%	8.6%
Pulp to Screening	13.2%	12.8%
Pulp to O_2	15.8%	13.3%
Post O_2 Pulp	24.7%	21.1%
Prebleach Pulp	28.3%	18.2%
D_0 Pulp	25.3%	19.0%
EO Pulp	26.6%	19.9%
D_1 Pulp	34.7%	20.4%
D_2 Pulp	31.2%	19.8%
Headbox Pulp	30.9%	22.1%

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