

IET 319
Quality Control
Group Project

Lowell D. Outland
Jonathan Wallingford
Tim Beam

Introduction

The facility we chose is a 100% recycled cardboard paper mill located along the Ohio River in northern Kentucky, and the paper machine manufactures a sheet that is 289 inches wide. The mill produces approximately 1400 tons of recycled linerboard per day to be sent to box manufacturers to be made into packaging for consumers to purchase products from. There are no boxes made at this facility, just the brown cardboard paper linerboard used to make boxes.

Rationale

The strength test that we observed was called “ring crush”, which tests how many boxes can be stacked one on top of another without failure of the box being observed.

Therefore this is a test of Quality and reliability.

Procedures

- Condition weight is the weight of 1000 sheets, measuring 12 inches by 12 inches square at 7% moisture. This is controlled by a Measurex scanning system.
- The paper is tested in three positions; Front, Middle, and Back. Each position has 8 samples taken from the reel for a total of 24 samples for the entire reel.

Theory

- Statistical data is essential in analyzing, predicting with confidence, and heading off potential problems that may occur in the process that affect the product being manufactured in any industry.

Statistical data

				Front		Middle		Back	
	<u>REEL #S</u>		START	AVG	R-BAR	AVG	R-BAR	AVG	R-BAR
1	867	877	24-Mar-10	78.09	11.32	79.38	7.97	76.98	11.54
2	879	888	24-Mar-10	82.24	15.46	84.73	11.04	81.28	12.02
3	890	900	24-Mar-10	73.50	11.16	74.77	10.71	73.86	12.86
4	902	911	25-Mar-10	76.88	9.93	76.98	7.99	75.00	6.48
5	913	923	25-Mar-10	72.65	11.87	75.06	9.54	72.39	10.97
6	926	935	25-Mar-10	75.69	9.84	75.78	10.34	74.19	9.87
7	938	947	25-Mar-10	74.82	10.76	77.30	11.51	75.14	12.07
8	950	978	26-Mar-10	76.13	10.04	78.52	10.41	75.98	8.66
9	980	990	26-Mar-10	73.21	14.52	76.20	11.04	72.97	13.04
10	992	998	29-Mar-10	71.34	7.78	73.26	7.69	72.45	9.54
11	2	12	29-Mar-10	71.29	7.87	72.84	6.01	72.92	9.80
12	535	544	30-Mar-10	73.48	8.15	75.07	9.99	75.09	9.92
13	953	962	2-Apr-10	72.16	9.71	73.64	7.90	74.61	9.25
14	957	966	2-Apr-10	74.83	9.28	77.43	8.66	75.71	9.18
15	445	454	2-Apr-10	74.08	12.52	78.71	8.90	77.23	9.60
16	138	147	2-Apr-10	73.69	9.14	75.93	10.85	74.49	10.31
			Average	74.6	10.6	76.6	9.4	75.0	10.3

RING CRUSH TRIAL DATA

					RING CRUSH TRIAL				
DATA B									
			90 DEG		85 DEG		80 DEG		75 DEG
			70		66		74		79
			72		76		72		77
			69		75		76		75
			68		68		73		78
			74		76		71		74
AVERAGE			70.6		72.2		73.2		76.6
ST DEV			2.41		4.82		1.92		2.07
MAX.			74		76		76		79
MIN.			68		66		71		74
RANGE			6		10		5		5
+2 sig			75.42		81.83		77.05		80.75
-2 sig			65.78		62.57		69.35		72.45

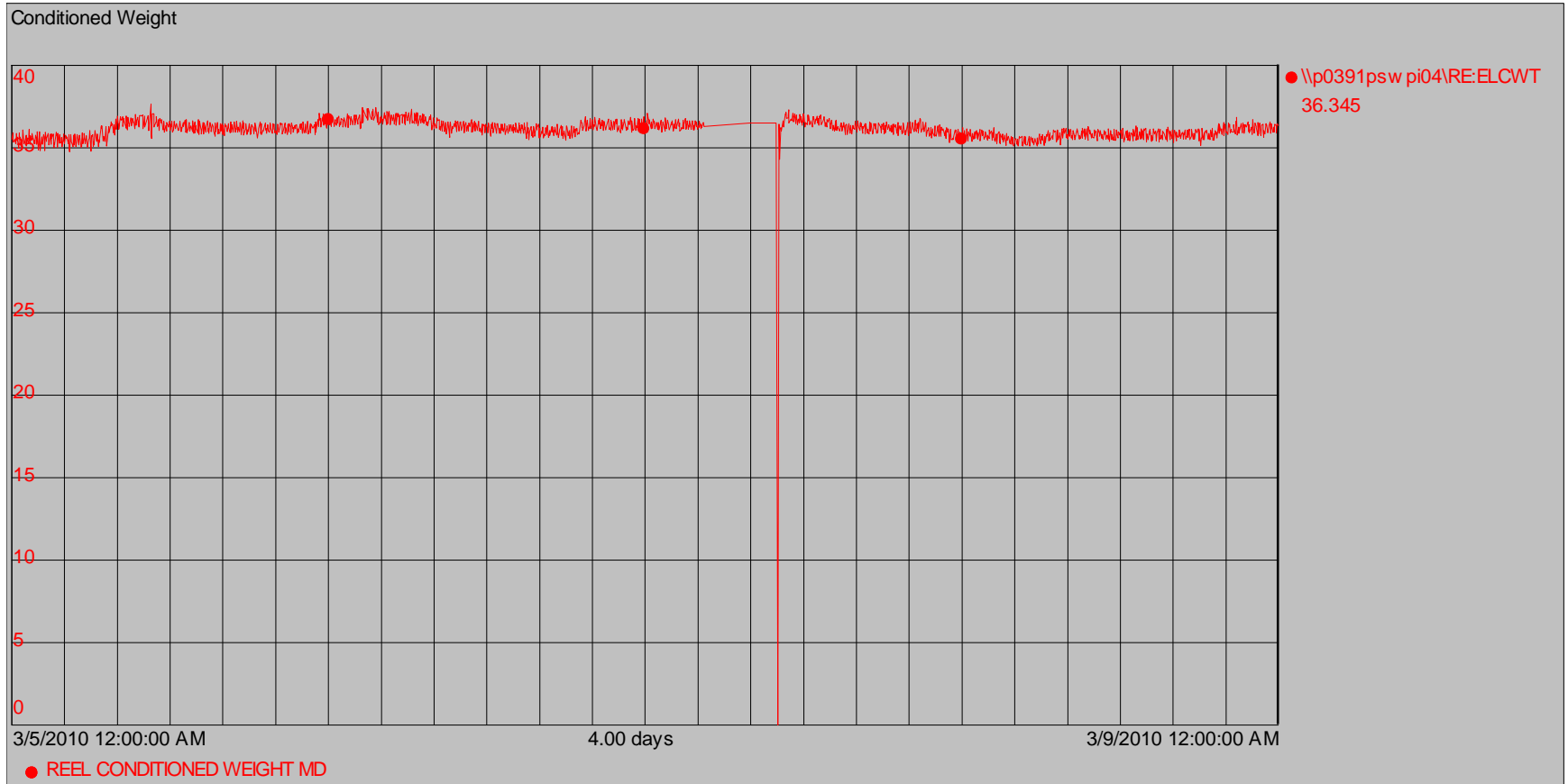
Data "C"

DATA C			CUT TOP SIDE UP			CUT BASE SIDE UP
			70			67
			73			71
			73			70
			72			69
			76			69
AVERAGE			72.8			69.2
ST DEV			2.41			2.41
MAX.			76			71
MIN.			70			67
RANGE			6			4
+2 sig			77.62			74.02
-2 sig			67.98			64.38

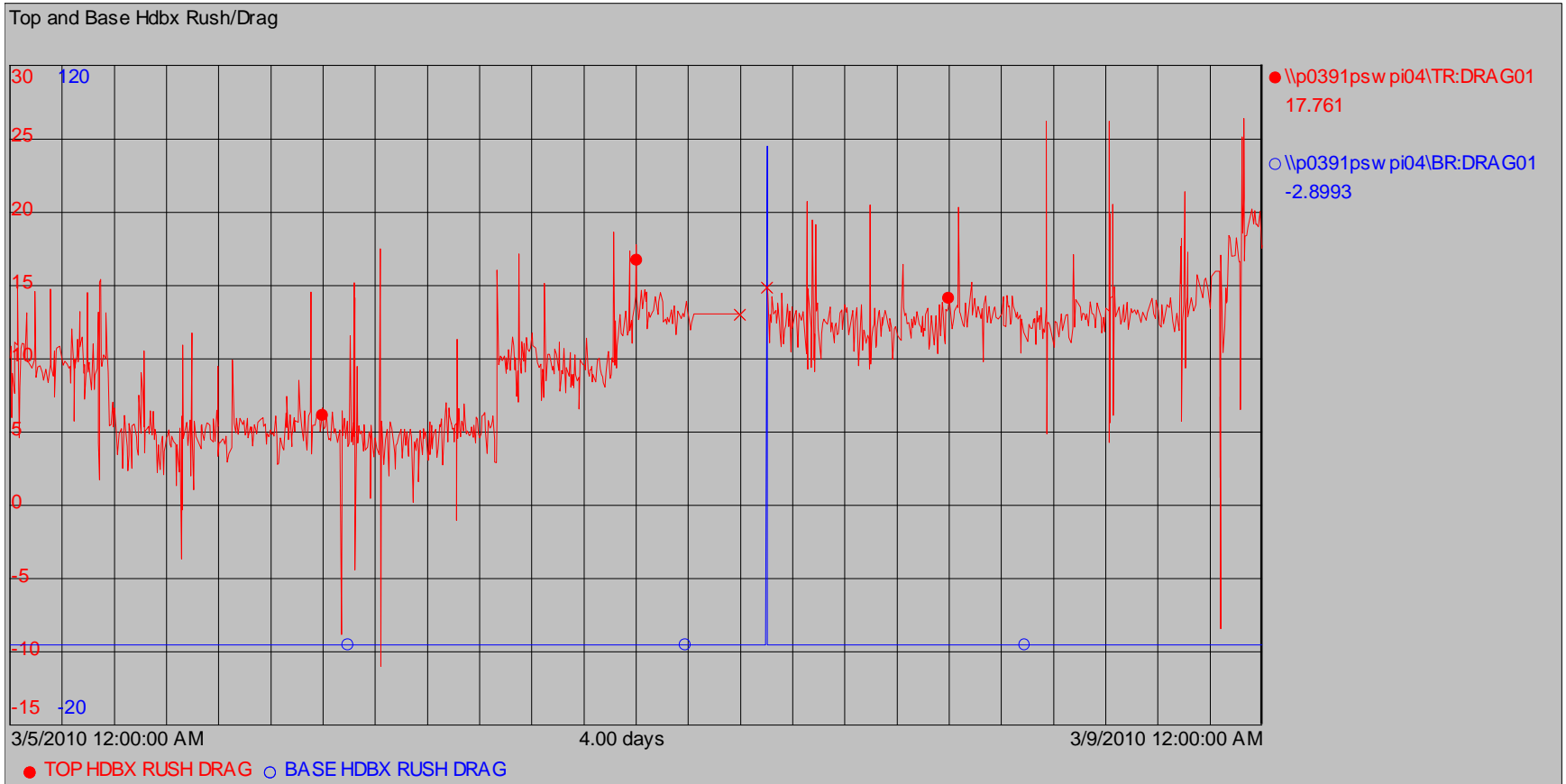
Data "D"

DATA D			DARK STRIPE				LIGHT STRIPE
			73				76
			73				75
			77				68
			77				72
			75				70
AVERAGE			75				72.2
ST DEV			2.00				3.35
MAX.			77				76
MIN.			73				68
RANGE			4				8
+2 sig			79.00				78.89
-2 sig			71.00				65.51

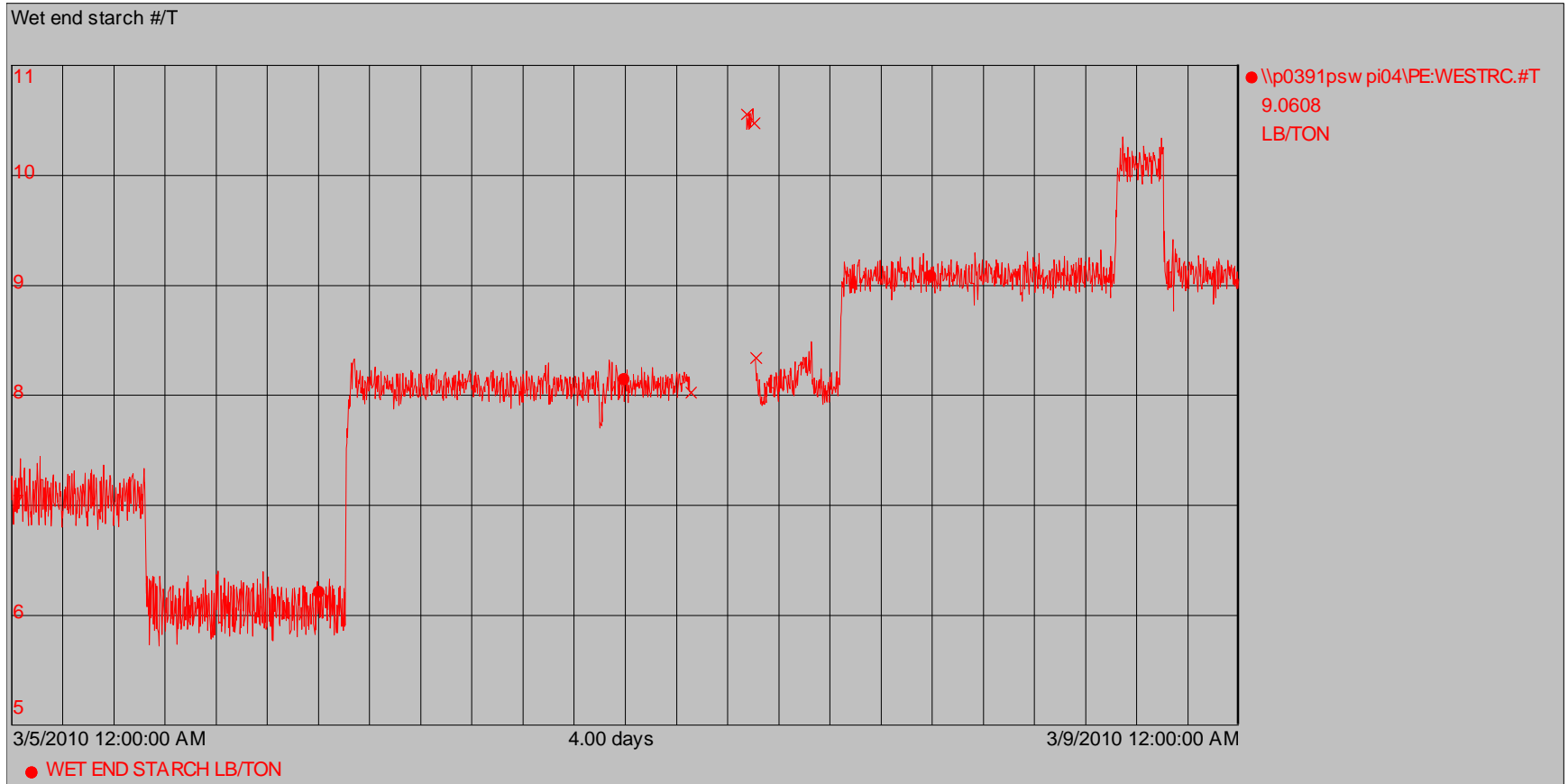
Reel condition weight



RushDrag



Starch lb/ton graph



Discussion and Recommendations

Once the sample data were taken over a period of time and a period of reels, then the data can be processed and a target value can be appropriated for the product being sold. This facility uses a 95% confidence interval to sell its product and has set the value of 74 as its target for selling the L 70 grade of paper. Retest values are in place to insure Quality Control, as well as reject values. The range helps determine variability in the product and assists in determining what changes to any of the components may be necessary to enhance product quality.

As you can see, statistical data is very important to the overall success in the paper making industry to assist in eliminating off quality paper, and controlling the variability in the process. Statistical data is essential in analyzing, predicting with confidence, and heading off potential problems that may occur in the process that affect the product being manufactured in any industry.