RELEASING MILL POTENTIAL

OR,

OPTIMISING MILL PERFORMANCE

OPTIMISING MILL PERFORMANCE ---

BASED ON THE PREMISE ---

‘YOU CANNOT MANAGE WHAT YOU DON’T MEASURE’

(Attributed to American management guru Peter Drucker, 1909- 2005)

LONG TERM PERFORMANCE DETERIORATION BROADLY RESULTS FROM CHANGES MADE OVER TIME IN RESPONSE TO:

- VARIATIONS IN WHEAT QUALITY,
- CHANGING FLOUR SPECIFICATIONS,
- VARIATIONS IN OVERALL OR INDIVIDUAL FLOUR STREAM QUALITY,
- VARIATIONS IN PRODUCT DISTRIBUTION RESULTING FROM BREAK ROLL FLUTING DETERIORATION,
- DETERIORATION IN EQUIPMENT FUNCTIONALITY,
- PERSISTANT OPERATIONAL PROBLEMS OR,
- POOR QUALITY OR UNTIMELY MAINTENANCE.

SUCH CHANGES MIGHT INCLUDE:

- ADJUSTMENTS TO PNEUMATIC LIFT SETTINGS MADE TO OVERCOME LIFT CAPACITY PROBLEMS.
- CHANGES TO SIEVE APERTURES,
- ALTERATIONS TO THE FLOW DIAGRAM ,
- ADVERSE MODIFICATIONS TO MACHINERY OR,
- CHANGES TO BREAK RELEASE SETTINGS.

OFTEN IT SEEMS THAT LEGITIMATE CHANGES MADE TO CORRECT A SPECIFIC PROBLEM ARE NOT REVERSED ONCE THAT PROBLEM DISAPPEARS AND THIS APPLIES IN PARTICULAR TO CHANGES MADE TO CORRECT VARIATIONS IN INDIVIDUAL OR MAIN STREAM FLOUR QUALITY.

A MILL SURVEY INVOLVES:

- Measuring the mass flow rate of every mill stream,
- Recording the power consumption of all roller mill main drive motors,
- Recording the power consumption of main fan motors, air pressures and valve settings of the Pneumatic Conveying and Aspiration Systems,
- Reviewing the quality of every mill stream,
- Analysing sifter overtails to measure sifter performance and
- Measuring the various quality parameters of every flour stream.

CRITICAL MEASUREMENT OBJECTIVES

TO PROVIDE THE INFORMATION THAT WILL FACILITATE MECHANICAL AND TECHNICAL CHANGES TO THE MILL IN ORDER TO ENSURE:

- **THAT THE MILL IS IN BALANCE.**
- **THAT EVERY FLOUR STREAM IS OF AN APPROPRIATE QUALITY.**
- **THAT EVERY ITEM OF EQUIPMENT AND EVERY FUNCTION WITHIN THE PLANT IS PERFORMING AT OPTIMAL LEVEL.**

PREPARING FOR A MILL SURVEY

- ALL BREAK ROLL FLUTING MUST BE IN GOOD CONDITION.
- THE MILL FLOW DIAGRAM MUST HAVE BEEN THOROUGHLY CHECKED FOR ACCURACY AND UPDATED.
- THE HUMAN RESOURCES REQUIRED FOR SAMPLING ALL MILL STREAMS, WEIGHING THE COLLECTED SAMPLES, RECORDING THE RESULTS AND EXTRACTING SMALLER SAMPLES FOR SUBSEQUENT ANALYSIS MUST BE ASSESSED AND PLANNED FOR.
- AN ORDER OF SAMPLING, STARTING FROM THE TAIL OF THE MILL AND PROGRESSING BACK TOWARDS B1 (1^{ST} BREAK) MUST BE ESTABLISHED, AND THE DOCUMENTATION PREPARED FOR RECORDING THE WEIGHED SAMPLE RESULTS, IN THAT ORDER.
- A POINT FOR COLLECTING EVERY STREAM SAMPLE MUST BE DETERMINED AND LABELLED, TAKING INTO ACCOUNT ACCESSIBILITY AND SAFETY.

PLANT: XYZ Milling Pty Ltd **DATE:**

STREAM MEASUREMENT SEQUENCE FOR THE MILL SURVEY

PASSAGE	STREAM NO.	STREAM	SAMPLING TIME (SECONDS	TEST WEIGHT (KGS)	HOURLY RATE (KGS/HR)	TEST SCREEN MESH NO	MICRONS	O'TAILS %	THRUS %
SIFTER R7	1	TO FLOUR			#DIV/0!	12N	112		
	2	TO POLLARD			#DIV/0!	12N	112		
	3	TO FLOUR			#DIV/0!				
SIFTER R6	4	TO FLOUR			#DIV/0!	12N	112		
	5	TO T3			#DIV/0!	64GG	265		
	6	TO R7			#DIV/0!				
SIFTER T3	7	TO FLOUR			#DIV/0!	12N	112		
	8	TO POLLARD			#DIV/0!	60GG	280		
	9	TO R7			#DIV/0!				
SIFTER R5	10	TO FLOUR			#DIV/0!	12N	112		
	11	TO T3			#DIV/0!	64GG	265		
	12	TO R6			#DIV/0!				
SIFTER T2	13	TO FLOUR			#DIV/0!	11N	118		
	14	TO FLOUR			#DIV/0!	11N	118		
	15	TO T3			#DIV/0!	60GG	280		
	16	TO R5			#DIV/0!				
SIFTER R4	17	TO FLOUR			#DIV/0!	11N	118		
	18	TO T2			#DIV/0!	64GG	265		
	19	TO R5			#DIV/0!				
SIFTER R3	20	TO FLOUR			#DIV/0!	10N	132		
	21	TO FLOUR			#DIV/0!	11N	118		
	22	TO T2			#DIV/0!	64GG	265		
	23	TO R4			#DIV/0!				
BFR5	24	TO R5			#DIV/0!	5N	200		
	25	TO FLOUR			#DIV/0!				
BF5	26	TO BROLL			#DIV/0!				
	27	TO BFR5			#DIV/0!				
BRAN GRADER	28	TO CSE BRAN OR BROLL			#DIV/0!				
	29	TO BF5			#DIV/0!				

FURTHER DOCUMENTATION MUST BE PREPARED AS FOLLOWS:

- A SURVEY SPREAD SHEET MUST BE CREATED, INTO WHICH DETAILS OF ALL SIFTER PASSAGES IS RECORDED INCLUDING DATA ON SEPARATIONS MADE, THE NUMBER OF SIEVES ALLOCATED TO EACH SEPARATION AND THE SIEVE APERTURES USED.
- A SIMILAR SECTION FOR RECORDING PURIFIER DETAILS SHOULD BE INCLUDED.
- A DOCUMENT FOR RECORDING THE DETAILS OF EACH ROLL PASSAGE INCLUDING ROLL SURFACE ALLOCATION, MOTOR SIZES, THE CURRENT MOTOR LOADING (AMPS) AND THE FEED RATE TO EACH PASSAGE AS MEASURED DURING THE SURVEY.
- A DOCUMENT (PREFERABLY SCHEMATIC) SHOWING THE BASIC CONFIGURATION OF THE PNEUMATIC SYSTEM AND FOR RECORDING THE SETTINGS OF BOTH THE MAIN VALVE AND INDIVIDUAL LIFT AIR CONTROL VALVES, AIR PRESSURES MEASURED AT CERTAIN CRITICAL POINTS IN THE SYSTEM, MAIN FAN MOTOR DETAILS AND THE CURRENT MOTOR LOADINGS.

SURVEY INPUT AND SIFTER PERFORMANCE CALCULATIONS

Plant: XYZ Milling | **Date:**

Passage	1 Bk	Set Release:	46%	Actual Release:	45%								No. of Scalping Separations:	2
Feed Source	Stock Quantity kgs/hr	Destinations	Screen Mesh No.	Screen Aperture (microns)	No. of Sieves	Nett m2 Per Sieve	Total Nett Area m2	Sample No.	Feed to Sieve kgs/hr	Overtails kgs/hr	Throughs kgs/hr	Throughput Rate kgs/hr/m2	Standard Throughput kgs/hr/m2	Actual/Std Throughput (%)	% Throughs in Overtails
Wheat	5031	2 bk	12w	1800	5	0.3376	1.688	60	4959	2143	2817	1669	2200	76%	20.0%
0	0	Siz	24w	845	5	0.2783	1.3915	61	2817	562	2254	1620	1600	101%	9.0%
0	0	Flour	9n	150	4	0.2783	1.1132	64	2254	2004	250	225	150	150%	0.0%
0	0	Ac	64w	285	5	0.2783	1.3915	62	2004	1277	727	523	415	126%	14.0%
0	0	BM	0	0	0	0	0	63	0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
Total Input	5031	Total Sieves			19	Total m2	5.6								

Passage	2nd Bk	Set Release	62%	Actual Release:	52%								No. of Scalping Separations:	2
Feed Source	Stock Quantity kgs/hr	Destinations	Screen Mesh No.	Screen Aperture (microns)	No. of Sieves	Nett m2 Per Sieve	Total Nett Area m2	Sample No.	Feed to Sieve kgs/hr	Overtails kgs/hr	Throughs kgs/hr	Throughput Rate kgs/hr/m2	Standard Throughput kgs/hr/m2	Actual/Std Throughput (%)	% Throughs in Overtails
1Bk	2143	3rd cse	12w	1800	5	0.3376	1.688	54	2238	530	1707	1011	1800	56%	26.0%
Pneu. Filter	12	3rd fine	26w	765	5	0.2783	1.3915	55	1707	537	1170	841	700	120%	34.0%
0	0	flour	10n	132	5	0.2783	1.3915	58	1170	825	345	248	146	170%	0.0%
0	0	Af	70w	260	5	0.2783	1.3915	56	825	429	396	285	244	117%	32.0%
0	0	Bm	0	0	0	0	0	57	0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
Total Input	2155	Total Sieves			20	Total m2	5.9								

Passage	3rd Bk	Set Release	0%	Actual Release:	22%								No. of Scalping Separations:	2
Feed Source	Stock Quantity kgs/hr	Destinations	Screen Mesh No.	Screen Aperture (microns)	No. of Sieves	Nett m2 Per Sieve	Total Nett Area m2	Sample No.	Feed to Sieve kgs/hr	Overtails kgs/hr	Throughs kgs/hr	Throughput Rate kgs/hr/m2	Standard Throughput kgs/hr/m2	Actual/Std Throughput (%)	% Throughs in Overtails
2nd Bk	530	4th Cse	14w	1540	3	0.3375	1.0125	44	1388	486	902	891	1465	61%	41.0%
2nd Bk	537	4th Fine	36w	555	5	0.2783	1.3915	45	902	595	307	220	879	25%	14.0%
Sizing	251	B2	70w	260	4	0.2783	1.1132	46	307	138	169	151	244	62%	36.0%
0	0	D	8N	180	6	0.2783	1.6698	47	169	35	134	80	122	66%	64.0%
0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.0%
Total Input	1318	Total Sieves			18	Total m2	5.2								

Rollermill loadings calculations

Passage	Roller Mill Allocation	Roll Surface (mm)	Stock qty (kg/hr)	average loading (kg/hr/mm)	std loading (kg/hr/mm)	actual vs std (%)	Motor Sizes (KW) 1	2	3	4	Motor Loading (amps) 1	2	3	4
1st break	1/2 x 1000mm	1000	5031.0	5.03	5.4	93%	37.0				72.0			
2nd break	1/2 x 1000mm	1000	2143.0	2.14	3.6	60%	30.0				62.0			
3rd break coarse	1/2 x 1200mm	1200	530.0	0.44	1.6	28%	15.0				15.0			
3rd break fine	1/2 x 1200mm	1200	788.0	0.66	1.6	41%	7.5				11.8			
4th break coarse	1 x 1000mm	2000	486.0	0.24	0.9	27%	7.5	7.5			10.0	11.6		
4th break fine	1/2 x 1000mm	1000	625.0	0.63	0.9	69%	7.5				12.7			
Sizing	1/2 x 1000mm	1000	562.0	0.56	1.1	51%	11.0				12.0			
Ac	1 x 1000mm	2000	1277.0	0.64	0.8	80%	15.0	15.0			14.6	16.2		
BM	1 x 1000mm	2000	1424.0	0.71	0.8	89%	7.5	7.5			10.0	8.8		
Af	1 x 1000mm	2000	563.0	0.28	0.8	35%	11.0	11.0			12.4	11.3		
B	1 x 1000mm	2000	670.0	0.34	0.8	42%	7.5	7.5			10.6	11.0		
B2	1/2 x 1000mm	1000	350.0	0.35	0.8	44%	11.0				16.1			
C	1 x 1000mm	2000	333.0	0.17	0.7	24%	5.5	5.5			9.8	9.9		
D	1 x 1000mm	2000	708.0	0.35	0.7	51%	5.5	5.5			10.5	8.0		
E	1/2 x 1000mm	1000	379.0	0.38	0.7	54%	4.0				8.1			
F	1/2 x 1000mm	1000	263.0	0.26	0.6	44%	5.5				8.1			
G	1/2 x 1000mm	1000	200.0	0.20	0.6	33%	5.5				6.4			

Total roll surface	24400.0
Mill capacity (T/24 hrs wheat)	120.7
Roll surface(mm/100kg/24hrs)	20.21

PNEUMATIC SYSTEM SURVEY (INCORPORATING A LOW PRESSURE FAN)

PLANT: (Name of Plant) **DATE:** 0/0/0

SYSTEM NO: 1 of 1

	Test Point E	10	**mm H2O**
LOW PRESSURE FAN.	**MFR.:**	**Ipsco**	
	MODEL:	**NYB 228 ACF**	
	Motor KW:	**15**	
	Current Load:		**Amperes**
	Test Point D	-148	**mm H2O**
FILTER.	**MFR.:**	**Simon**	
	MODEL:	**RJ 36/90**	
	C	-15 to -20	mm H2O
HIGH PRESSURE FAN.	**MFR.:**	**Alldays & Onions Ltd**	
	MODEL:	**11/48 HPSP**	
	KW	**75**	
	Test Point B	-980	**mm H2O**
	MAIN VALVE SETTING	85	**Degrees Open**
	Test Point A	-935	**mm H2O**

LIFT NO.	PASSAGE	LIFT SIZE	VALVE SETTING	VALVE SETTING	LIFT SIZE	PASSAGE	LIFT NO.
1	1bk Purifier	108mm	55	50	120mm	2bk 1	18
2	2bk Purifier	108mm	45	50	120mm	2bk 2	19
3	1bk	120mm	90	80	108mm	3bk	20
4	1bk	120mm	90	50	108mm	4bk	21
5	Choke Mixer	55mm	80	55	96mm	2A	22
6	1 Siz	85mm	90	45	96mm	1A	23
7	3 Siz	73mm	50	80	63mm	F	24
8	G	68mm	50	40	102mm	1B	25
9	2 Siz	69mm	90	70	63mm	B2	26
10	BMR	63mm	90				
11	to BR2 (FBF)	55mm	90				
12	to BR1 (CBF)	53mm	75				
13	Pollard	63mm	70				
14	2B	102mm	70				
15	C	96mm	30				
16	E	96mm	40				
17	D	96mm	30				

Mill Survey. Plant Set-up and Grist Details

Plant and Location:	XYZ Milling Pty Ltd		
Date of Survey:			
Supervisor:			
Wheat cleaning capacity:			tonnes per hour
Conditioning times:	1st conditioning:		hours
	2nd conditioning:		hours
	3rd conditioning:		hours
Mill capacity: Wheat to 1st break:			tonnes per hr
		0.0	tonnes per 24hrs

Grist Composition, percentage and variety/type:	0.00%	
	0.00%	
	0.00%	
	0.00%	

Wheat to 1st break:	Moisture %	
	Protein %	
	Hectolitre weight (kg)	

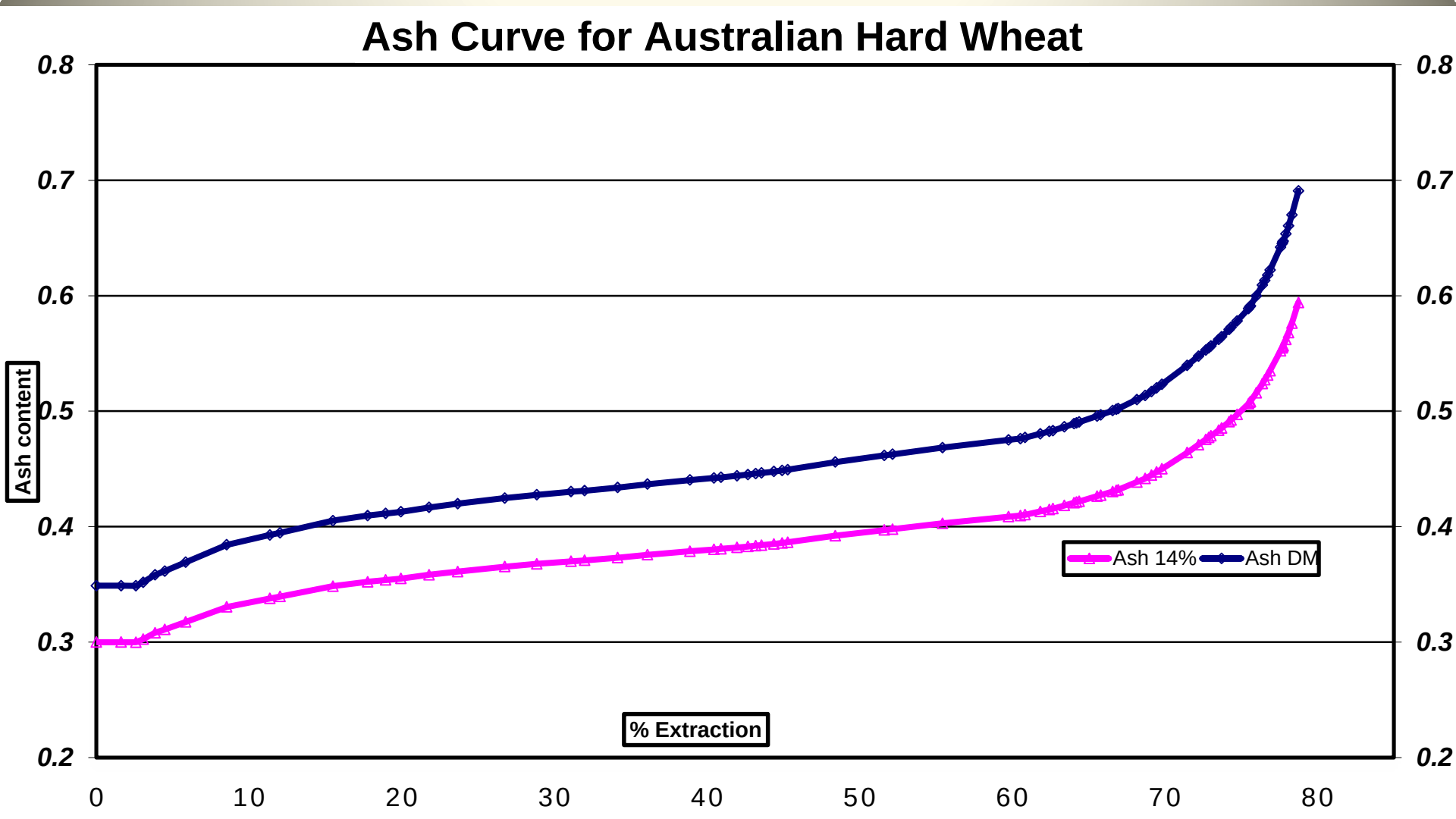
Extraction rate achieved, based on:	
a) Clean wheat to 1st break	
b) Total finished products (incl. screenings)	
c) Total finished products (excl.screenings)	

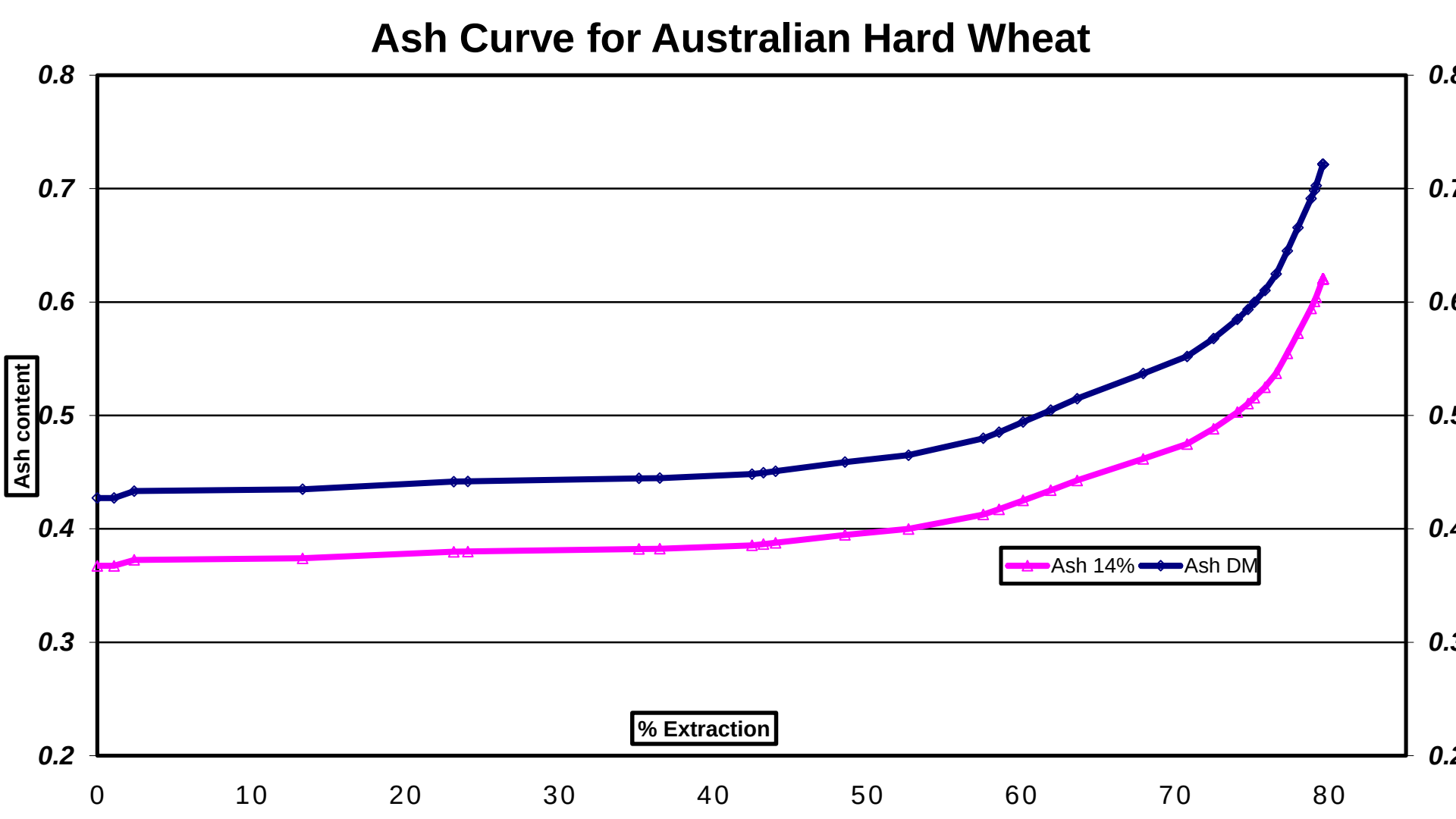
Flour quality results:	Moisture:	
	Protein:	
	Ash:	
	Lightness index:	

			Test Screen	*u*
Break release settings:	1st break	0.00%		
	2nd break	0.00%		
	3rd break (C)	0.00%		
	3rd break (F)	0.00%		

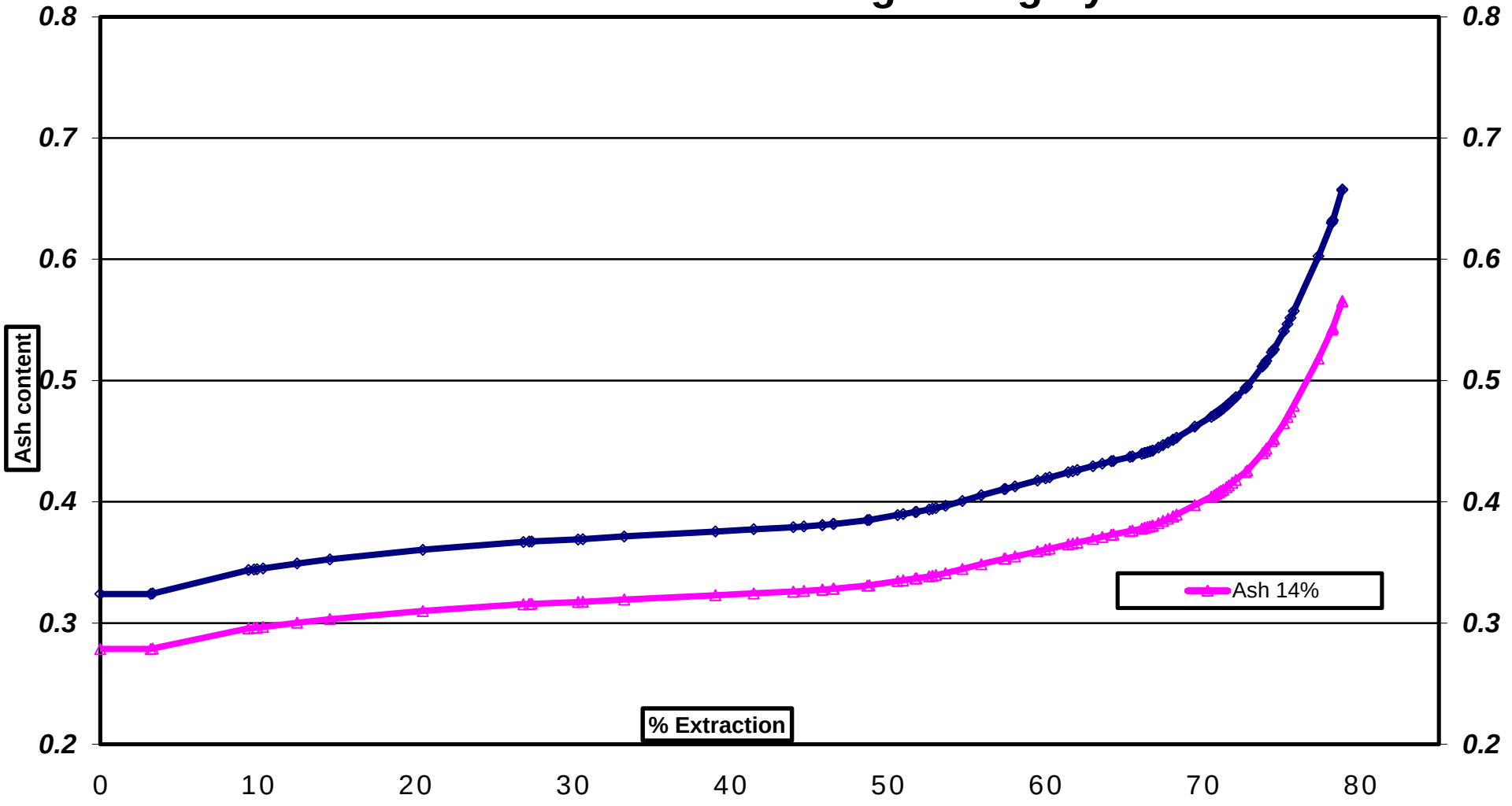
POST-SURVEY ANALYTICAL TASKS

- The sieve analysis of every sifter overtail stream using the same aperture as used in the sifter separation.
- The Moisture, Protein, Starch Damage, Ash and Lightness Index of all flour streams.
- The creation of an Ash Curve.
- A visual assessment of all mill stocks set out for inspection during the survey.
- Pekar tests on all flour streams.


Ash Curve for Australian Hard Wheat
0.8
0.7
0.6
0.5
0.4
0.3
0.2
Ash content
Ash 14%
Ash DM
% Extraction
0
10
20
30
40
50
60
70
80


Ash Curve for Australian Hard Wheat
0.8
0.7
0.6
0.5
0.4
0.3
0.2
Ash content
Ash 14%
Ash DM
% Extraction
0
10
20
30
40
50
60
70
80

Ash Curve for DNS: Long Milling System



POST SURVEY ACTIONS FOR PERFORMANCE OPTIMISATION

1) **REVIEW RESULTS WITH EMPHASIS ON:**
   a) WHETHER THE LOADINGS ON ROLLERMILLS AND PURIFIERS ARE APPROPRIATE AND BALANCED,
   b) THE EFFICIENCY OF SIFTER SEPARATIONS,
   c) INDIVIDUAL FLOUR STREAM QUALITY,
   d) THE RELATIVE COMPATABILITY OF VARIOUS FEEDS TO ROLL PASSAGES,

1) **MAKE CHANGES, STARTING AT THE HEAD OF THE MILL, TO ACHIEVE:**
   a) BALANCED LOADINGS TO ROLLERMILLS AND PURIFIERS FROM SIFTERS BY, FOR EXAMPLE, CHANGES TO SIEVE APERTURES OR BREAK RELEASE SETTINGS.
   b) A REDUCTION IN THE PERCENTAGE OF FINES IN SIFTER OVERTAILS WHERE THEY ARE FOUND TO BE EXCESSIVE,
   c) THE OPTIMUM QUALITY OF FLOUR RELEASED FROM EACH PASSAGE.

SOME IMPORTANT FEATURES OF PLANT DESIGN AND OPERATION.

- ACCURATE AND STABLE STREAM SPLITTING DEVICES WHEREVER REQUIRED AND PLANT DESIGN THAT MINIMISES THE NEED FOR STREAM SPLITTING DEVICES.
- RELIABLE AND STABLE ROLLER MILL AND PURIFIER FEED MECHANISMS THAT DON'T 'HUNT'.
- MULTIPLE FLOUR SEPARATIONS WITHIN SIFTERS TO CATER FOR,

  FIRSTLY, THE PRODUCTION OF:

  - SPECIALITY FLOURS, EG. LOW ASH, LOW PROTEIN OR LOW STARCH DAMAGE FLOURS,

  AND SECONDLY, VARIABLE THROUGHPUT RATES RESULTING FROM:

  - WHEAT QUALITY AND MOISTURE VARIATIONS,
  - VARIATIONS IN TEMPERATURE AND HUMIDITY AFFECTING YIELD AND QUALITY,

- 2 WAY VALVES ON FLOUR STREAMS AND ALTERNATIVE DESTINATIONS TO FACILITATE THE FOREGOING.
- A BREAK RELEASE TESTING PROTOCOL THAT ENSURES RELIABILITY AND REPEATABILITY BETWEEN OPERATIVES.

SO, WHY GO TO ALL THIS TROUBLE?

- TO MINIMISE UNPRODUCTIVE DOWNTIME.
- TO RESTORE AND/OR OPTIMISE PLANT CAPACITY.
- TO MINIMISE POWER CONSUMPTION.
- TO ENSURE PRODUCT SPECIFICATIONS ARE MET MORE PRECISELY AND CONSISTANTLY.
- TO REDUCE WHEAT COSTS PER TONNE OF FLOUR PRODUCED.

AND, BY INVOLVING AS MANY PRODUCTION PERSONEL AS POSSIBLE IN THE PROCESS:

- PROVIDE ADDITIONAL TRAINING THROUGH AN ‘EXPERIENCIAL LEARNING’ PROCESS.
- PUT OPERATIVES AND PRODUCTION MANAGEMENT PERSONEL TRULY IN TOUCH WITH THEIR MILL.

RESULTING IN:

- INCREASED MOTIVATION TO ACHIEVE THE HIGHEST LEVEL OF PERFORMANCE FROM THEIR PLANT.
- A SENSE OF BELONGING AND PRIDE IN THEIR PLANT AND ITS SUPERIOR PERFORMANCE.

ESTIMATING THE VALUE OF REDUCED WHEAT USAGE

- A REDUCTION IN WHEAT USAGE RESULTS IN AN EQUIVALENT REDUCTION IN MILLMIX PRODUCTION.
- EXAMPLE:
  - MILL CAPACITY 144,000T/ANNUM
  - CURRENT GRIST RATE; 1.21
  - TARGET GRIST RATE:; 1.20
  - REDUCTION PER TONNE OF FLOUR PRODUCED = 0.01T OF WHEAT
  - REDUCTION IN WHEAT USED: 1440 TONNES
  - REDUCTION IN MILLMIX PRODUCTION (SALES): 1440 TONNES
- DOLLAR VALUE TO BUSINESS = 1440 X DIFFERENCE IN VALUE BETWEEN AVG. WHEAT COST AND AVG. MILLMIX SELLING PRICE.
- THIS DIFFERENCE IS BASED ON THE RELATIVE NUTRITIONAL VALUES OF THE TWO COMMODITIES.
- MILLMIX IS BROADLY CONSIDERED TO HAVE 2/3RDS THE NUTRITIONAL VALUE OF WHEAT AND HENCE 2/3RDS THE DOLLAR VALUE OF SUCH WHEAT, OR NUTRITIONALLY EQUIVALENT GRAIN.
- NOTE THAT THE WHEAT YOU ARE PURCHASING MAY BE SIGNIFICANTLY MORE EXPENSIVE THAN THE LOWEST COST WHEAT OR EQUIVALENT (EG. SORGHUM) ON THE MARKET.

EXAMPLE

Current Details:

- Annual Sales: 144,000 tonnes per annum.
- Mill Capacity: 480 T/24 Hours of Wheat (20 TPH of wheat)
- Clean Wheat Extraction: 78.5%.
- Current Grist Rate of 1.219, (Dirty Wheat Extraction Rate: 82.01%)

Improved Performance Details:

- Clean Wheat Extraction increased to 80.0%.
- As a result, Grist Rate reduced to 1.19, (Dirty Wheat Extraction lifted to 83.57%)

PLANT: XYZ Milling Co. Pty Ltd Date:

FLOUR SALES: 144,000 TONNES PER ANNUM

CURRENT PERFORMANCE MEASUREMENTS

100.179 T OF WHEAT PURCHASED @ : 1.79 % SCRGS 10.65 % MOIST.

Cost/tonne: $300.00

DIRTY WHEAT
100.000 TONNES

INTAKE CLEANING
0.18 %SCRGS

CLEANING PLANT
1.61 %SCRGS

CLEAN WHEAT
98.389 TONNES

SCREENINGS
1.790 TONNES

CONDITION TO:
16.00 % MOIST.

WHEAT TO 1 BREAK
104.655 TONNES

MILLING PROCESS
78.50 % EXTR.

MILLING LOSS
2.84 %

FLOUR
82.155 TONNES

MILLMIX
19.529 TONNES

Price/tonne: $185.00
Value/T flr: $48.01

TOTAL FINISHED PRODUCTS
103.473 TONNES

PROPOSED PERFORMANCE IMPROVEMENTS

100.179 T OF WHEAT PURCHASED @ : 1.79 % SCRGS 10.65 % MOIST.

Cost/tonne: $300.00

DIRTY WHEAT
100.000 TONNES

INTAKE CLEANING
0.18 %SCRGS

CLEANING PLANT
1.61 %SCRGS

CLEAN WHEAT
98.389 TONNES

SCREENINGS
1.790 TONNES

CONDITION TO:
16.00 % MOIST.

WHEAT TO 1 BREAK
104.655 TONNES

MILLING PROCESS
80.00 % EXTR.

MILLING LOSS
2.84 %

FLOUR
83.724 TONNES

MILLMIX
17.959 TONNES

Price/tonne $185.00
Value/T flr: $43.64

TOTAL FINISHED PRODUCTS
103.473 TONNES

EXTRACTION RATE CALCULATIONS. Flour produced, expressed as a % of:		
1.DIRTY WHEAT PURCHASED.		82.01%
	Cost:	$365.82
2. GRIST RATE.		1.219401
3. DIRTY WHEAT USED. (DIRTY WHEAT WEIGHER)		82.15%
4. WHEAT REC'D CORRECTED TO 0% SCRGS.AND	10.00 % MOIST	84.11%
5. CLEAN, CONDITIONED WHEAT. (1ST BREAK WEIGHER)		78.50%
6. TOTAL FINISHED PRODUCTS EXCL. SCRGS.(FIN. PRODS. WEIGHERS)		80.79%
7. TOTAL FINISHED PRODUCTS INCL. SCRGS.(FIN. PRODS. WEIGHERS)		79.40%
COST OF WHEAT PER TONNE OF FLOUR (after value of Millmix deducted)		$321.84

EXTRACTION RATE CALCULATIONS. Flour produced, expressed as a % of:		
1. DIRTY WHEAT PURCHASED.		83.57%
	Cost:	$358.96
2. GRIST RATE.		1.196537
3. DIRTY WHEAT USED. (DIRTY WHEAT WEIGHER)		83.72%
4. WHEAT REC'D CORRECTED TO 0% SCRGS.AND	10.00 % MOIST	85.71%
5. CLEAN, CONDITIONED WHEAT. (1ST BREAK WEIGHER)		80.00%
6. TOTAL FINISHED PRODUCTS EXCL. SCRGS.(FIN. PRODS. WEIGHERS)		82.34%
7. TOTAL FINISHED PRODUCTS INCL. SCRGS.(FIN. PRODS. WEIGHERS)		80.91%
COST OF WHEAT PER TONNE OF FLOUR (after value of Millmix deducted)		$319.28
REDUCTION IN WHEAT COSTS PER ANNUM:		$369,480

PLANT: XYZ Milling Co. Pty Ltd

Date:

FLOUR SALES: 144,000 TONNES PER ANNUM

CURRENT PERFORMANCE MEASUREMENTS

100.179 T OF WHEAT PURCHASED @ : 1.79 % SCRGS 10.65 % MOIST.

Cost/tonne: $320.00

DIRTY WHEAT 100.000 TONNES

INTAKE CLEANING 0.18 %SCRGS

CLEANING PLANT 1.61 %SCRGS

CLEAN WHEAT 98.389 TONNES

SCREENINGS 1.790 TONNES

CONDITION TO: 16.00 % MOIST.

WHEAT TO 1 BREAK 104.655 TONNES

MILLING PROCESS 77.50 % EXTR.

MILLING LOSS 2.84 %

FLOUR 81.108 TONNES

MILLMIX 20.575 TONNES

Price/tonne $180.00

Value/T flr: $49.63

TOTAL FINISHED PRODUCTS 103.473 TONNES

PROPOSED PERFORMANCE IMPROVEMENTS

100.179 T OF WHEAT PURCHASED @ : 1.79 % SCRGS 10.65 % MOIST.

Cost/tonne: $320.00

DIRTY WHEAT 100.000 TONNES

INTAKE CLEANING 0.18 %SCRGS

CLEANING PLANT 1.61 %SCRGS

CLEAN WHEAT 98.389 TONNES

SCREENINGS 1.790 TONNES

CONDITION TO: 16.00 % MOIST.

WHEAT TO 1 BREAK 104.655 TONNES

MILLING PROCESS 81.00 % EXTR.

MILLING LOSS 2.84 %

FLOUR 84.771 TONNES

MILLMIX 16.912 TONNES

Price/tonne $180.00

Value/T flr: $39.71

TOTAL FINISHED PRODUCTS 103.473 TONNES

EXTRACTION RATE CALCULATIONS. Flour produced, expressed as a % of:		
1.DIRTY WHEAT PURCHASED.		80.96%
	Cost:	$395.24
2. GRIST RATE.		1.235135
3. DIRTY WHEAT USED. (DIRTY WHEAT WEIGHER)		81.11%
4. WHEAT REC'D CORRECTED TO 0% SCRGS.AND	10.00 % MOIST	83.04%
5. CLEAN, CONDITIONED WHEAT. (1ST BREAK WEIGHER)		77.50%
6. TOTAL FINISHED PRODUCTS EXCL. SCRGS.(FIN. PRODS. WEIGHERS)		79.77%
7. TOTAL FINISHED PRODUCTS INCL. SCRGS.(FIN. PRODS. WEIGHERS)		78.39%
COST OF WHEAT PER TONNE OF FLOUR (after value of Millmix deducted)		$349.58

EXTRACTION RATE CALCULATIONS. Flour produced, expressed as a % of:		
1. DIRTY WHEAT PURCHASED.		84.62%
	Cost:	$378.16
2. GRIST RATE.		1.181765
3. DIRTY WHEAT USED. (DIRTY WHEAT WEIGHER)		84.77%
4. WHEAT REC'D CORRECTED TO 0% SCRGS.AND	10.00 % MOIST	86.79%
5. CLEAN, CONDITIONED WHEAT. (1ST BREAK WEIGHER)		81.00%
6. TOTAL FINISHED PRODUCTS EXCL. SCRGS.(FIN. PRODS. WEIGHERS)		83.37%
7. TOTAL FINISHED PRODUCTS INCL. SCRGS.(FIN. PRODS. WEIGHERS)		81.93%
COST OF WHEAT PER TONNE OF FLOUR (after value of Millmix deducted)		$342.25

REDUCTION IN WHEAT COSTS PER ANNUM: $1,055,173

SUMMARY

UNDERTAKING A FULL MILL SURVEY INVOLVES:

- THE MEASUREMENT AND RECORDING OF PRODUCT FLOWRATES, THROUGHOUT THE PLANT,
- RECORDING THE POWER CONSUMPTION OF ROLLERMILLS AND THE PNEUMATIC CONVEYING SYSTEM, AND
- THE MEASUREMENT OF THE EFFICIENCY BEING ACHIEVED IN EVERY SIFTER SEPARATION.

THE SURVEY FACILITATES:

- A QUALITATIVE ASSESSEMENT OF THE COMPATABILITY OF FEEDS TO EACH PURIFIER AND ROLL PASSAGE,
- A QUALITATIVE ASSESSMENT OF EVERY FLOUR STREAM,
- A QUANTITATIVE ASSESSMENT OF LOADINGS TO ROLLERMILLS AND PURIFIERS,
- A QUANTATIVE ASSESSMENT OF SIEVING EFFICIENCY AND,
- CONSIDERATION OF THE CHANGES NEEDED TO CORRECT IMBALANCE AND INEFFICIENT PERFORMANCE THROUGHOUT THE MILL, PARTICULARLY IN RESPECT TO SIEVING EFFICIENCY.

AND ENABLES:

- A METHODICAL COURSE OF ACTION FOR CORRECTING INEFFICIENCIES, IMBALANCE, TECHNICAL ANOMOLIES AND PRODUCT STREAM AND FLOUR QUALITY ISSUES.

IN ORDER TO ACHIEVE:

- THE HIGHEST LEVEL OF PLANT RELIABILITY,
- MINIMUM POWER CONSUMPTION,
- MAXIMUM FLOUR YIELD,
- FLOUR QUALITY MORE PRECISELY AND CONSISTANTLY MEETING SPECIFICATION.

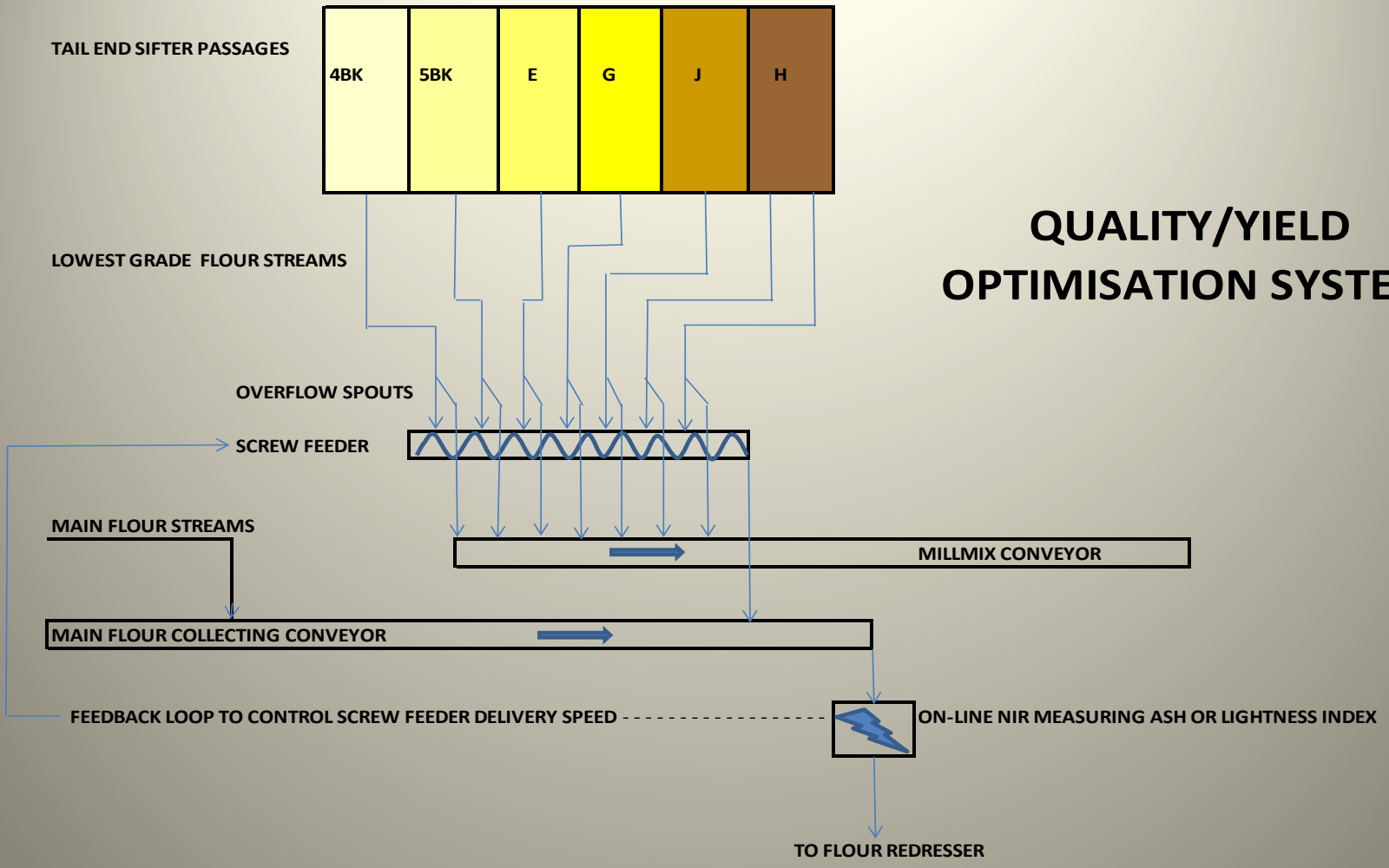
‘YOU CANNOT MANAGE WHAT YOU DON’T MEASURE’

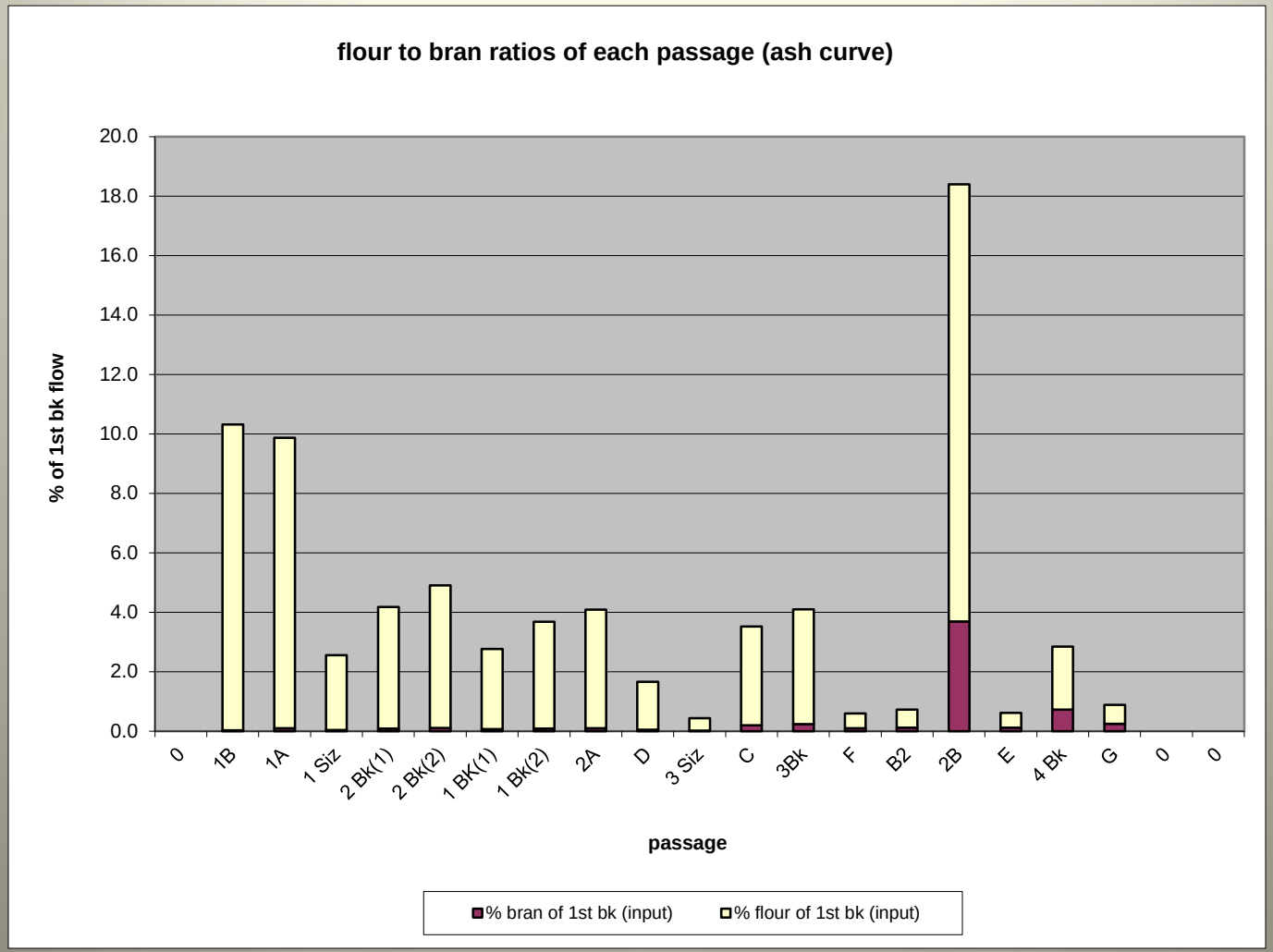
ADDITIONAL MATERIAL FOR DISCUSSION

COMPARISON OF BREAK RELEASE TEST RESULTS BETWEEN DIFFERENT OPERATORS, EACH USING THEIR OWN TECHNIQUE.

MILLER:	1ST BK		2ND BK	
	LH END	RH END	LH END	RH END
a	33.10%	32.70%	55.70%	55.40%
b	30.60%	27.50%	53.00%	52.80%
c	29.00%	27.00%	52.00%	53.00%
d	32.60%	30.60%	55.80%	55.20%
e	32.10%	31.20%	54.30%	56.10%
f	39.70%	35.80%	60.30%	57.30%
RANGE:	10.70%	8.80%	8.30%	4.50%

QUALITY/YIELD OPTIMISATION SYSTEM




flour to bran ratios of each passage (ash curve)
% of 1st bk flow
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
1B
1A
1 Siz
2 Bk(1)
2 Bk(2)
1 BK(1)
1 Bk(2)
2A
D
3 Siz
C
3Bk
F
B2
2B
E
4 Bk
G
0
0
passage
% bran of 1st bk (input)
% flour of 1st bk (input)

FLUTING FORMULA

FOR CALCULATING THE NUMBER OF FLUTES PER CENTIMETRE, GIVEN:

(A) THE SCREEN APERTURE OVER WHICH THE FEED HAS PASSED.
(B) THE FLUTE ANGLES TO BE USED.

INPUTS:

CONSTANT 'K':	2.5000
PARTICLE DIAMETER 'D':	1.000

RECOMMENDED FLUTES PER CENTIMETRE: 3.8 = 9.652 fl./inch

(Assuming Land = 5% of Pitch)

CONSTANTS 'K':

FLUTE ANGLES:	K'
25 X 60	2.1012
30 X 60	2.1547
40 X 60	2.2954
30 X 65	2.4409
45 X 65	2.6763
40 X 65	2.5817
21 X 67	2.5001
25 X 67	2.5368
40 X 70	3.0112
70 x 70	4.2975

CALCULATION OF CONSTANT 'K'

CONSTANT	K	2.504667	
FLUTE ANGLES	P1:	35	0.611
	P2:	65	1.134

TABLE OF MESH APERTURES

MESH NUMBER	APERTURE (MICRONS)	MESH NUMBER	APERTURE (MICRONS)	MESH NUMBER	APERTURE (MICRONS)
10W	2195	10GG		3N	300
12W	1800	12GG	1800	4N	280
14W	1540	14GG	1600	5N	250
16W	1315	15GG	1400	6N	212
18W	1175	16GG	1320	7N	200
20W	1035	18GG	1180	8N	180
22W	920	19GG	1120	8.5N	160
24W	845	20GG	1000	9N	150
26W	765	22GG	950	9.5N	140
28W	715	23GG	900	10N	132
30W	655	24GG	850	10.5N	125
32W	620	26GG	800	11N	118
34W	595	27GG	750	12N	112
36W	555	28GG	710	12.5N	106
38W	515	30GG	670	13N	100
40W	485	31GG	630	14N	95
42W	450	32GG	600	14.5	90
44W	445	34GG	560	15N	85
46W	420	36GG	530	17N	80
48W	395	38GG	500	20N	75
50W	375	40GG	475	21N	71
52W	355	42GG	450	25N	63
54W	350	44GG	425		
56W	330	45GG	400		
58W	325	46GG	390		
60W	310	47GG	375		
62W	300	48GG	369		
64W	285	50GG	355		
66W	280	52GG	335		
68W	270	54GG	315		
70W	260	56GG	307		
80W	215	58GG	291		
88W	200	60GG	280		
100W	165	62GG	275		
		64GG	265		
		66GG	250		
		68GG	243		
		70GG	236		
		72GG	224		
		74GG	212		

MILL SURVEY SIFTER OVERTAILS ANALYSIS. **SURVEY DATE:** 0/0/2008

Passage	Stock Destination	Sample No.	Sifter Cover	Aperture u	Test Sieve	Aperture u	Overtails Gms	Throughs Gms	Throughs %	Comments
K	Pollard	1	66gg	255	66gg	255			#DIV/0!	
	Flr	2	12n	112		0				
	Flr	3	11n	118		0				
	Pollard	4	11n	118	11n	118			#DIV/0!	
	Pollard/Flr	5		0	11n	118			#DIV/0!	
				0						
J	Pollard	6	54gg	310	54gg	310			#DIV/0!	
	Flr	7	12n	112		0				
	Flr	8	11n	118		0				
	K	9	10n	132	10n	132			#DIV/0!	
	K/Flr	10		0	11n	118			#DIV/0!	
H	J	11	66gg	12n	66gg	255			#DIV/0!	
	Flr	12	11n	118		0				
	Flr	13	12n	112		0				
	K	14	10n	132	10n	132			#DIV/0!	
	K/Flr	15		0	12n	112			#DIV/0!	
G	J	16	60gg	280	60gg	280			#DIV/0!	
	Flr	17	11n	118		0				
	Flr	18	12n	112		0				
	H	19	10n	132	10n	132			#DIV/0!	
	H/Flr	20		0	12n	112			#DIV/0!	
BMR 5	Flr	21	12n	112		0				
	Fine Bran	22	47gg	375	47gg	375			#DIV/0!	
	Flr	23	11n	118		0				
	J	24	74gg	212	74gg	212			#DIV/0!	
	H	25		0	11n	118			#DIV/0!	

WEEKLY PRODUCTION REPORT for WK ENDING:

INPUT DATA:

RAW MATERIAL

ITEM NO.	RAW MATERIAL USAGE	TONNES
1	DIRTY WHEAT (INCL SCREENINGS)	1,079.46
2a	CLEAN WHEAT TO 1ST BREAK (hard / durum)	1,015.90
2b	CLEAN WHEAT TO 1ST BREAK (soft / non durum)	105.01
2c	CLEAN WHEAT TO 1ST BREAK (total grists)	**1,120.90**
3a	FLOUR RE-TIP (hard / durum)	0.00
3b	FLOUR RE-TIP (soft / non durum)	0.00
3c	FLOUR RE-TIP (total grists)	**0.00**

PRODUCTION

	PRODUCTS NAME	TONNES	FLOUR CONVERSION FACTOR	FLOUR EQUIVALENT (TONNES)
	HARD WHEAT			
4a	FLOUR 1	805.42	1	805.42
5a	FLOUR 2	8.48	1	8.48
6a	FLOUR 3	3.00	1	3.00
7a	CO-PRODUCT 1	6.59	1	6.59
8a	CO-PRODUCT 2		1	0.00
9a	CO-PRODUCT 3		1	0.00
10a			**TOTAL HARD FLOUR :**	**823.49**
	SOFT WHEAT			
4b	FLOUR 1	88.00	1	88.00
5b	FLOUR 2		1	0.00
6b	FLOUR 3		1	0.00
7b	CO-PRODUCT 1		1	0.00
8b	CO-PRODUCT 2		1	0.00
9b	CO-PRODUCT 3		1	0.00
10b			**TOTAL SOFT FLOUR :**	**88.00**
10c	**TOTAL GRISTS**		**TOTAL ALL FLOURS**	**911.49**
11	MILLMIX	180.00		
12	COARSE BRAN			
13	FINE BRAN			
14	MEAL PREMIX	11.69		
15	GERM			
16	SCREENINGS	12.72		
17	**TOTAL FINISHED PRODUCTS :**	**1,115.90**		

18a	ACTUAL RUNNING TIME (EXCL TIME LOST) (hard wheat grists)	101.59	HOURS
18b	ACTUAL RUNNING TIME (EXCL TIME LOST) (soft wheat grists)	13.12	HOURS
19	TIME LOST DUE TO STOPPAGES (over all grists)	5.50	HOURS
20	TOTAL POWER CONSUMED	0.00	KWH
20A	POWER FACTOR	0.00	
21	TOTAL MAN/HRS EMPLOYED	268.01	HOURS
22A	AVERAGE RAW WHEAT MOISTURE	10.90	%
22B	AVERAGE FLOUR MOISTURE	14.00	%
22C	AVERAGE MILL MIX MOISTURE	13.60	%
22D	AVERAGE FINISHED PRODUCTS MOISTURE	13.93	%
23A	% hard / durum RUN THROUGH MILL	0.90	
23B	NUMBER OF LTI'S IN THE "MILL AREA"		
23C	average % starch in millmix (bran)		%
23D	average % starch in millmix (pollard)		%
23E	average % starch in millmix (total)		%
23F	AVERAGE MOISTURE AT FIRST BREAK (HARD GRISTS)	16.50	%
23G	AVERAGE MOISTURE AT FIRST BREAK (SOFT GRISTS)	14.80	%
23H	AVERAGE MOISTURE AT FIRST BREAK (total grists)	16.34	%

WEEKLY PRODUCTION REPORT for WK ENDING: 0.00

PERFORMANCE CALCULATIONS

ITEM NO.		RESULTS	
24	DIRTY WHEAT EXTRACTION	84.44%	OF WHEAT FROM SILO
25	GRIST RATE	1.18	DW TO FLOUR RATIO
26	CLEAN DRY WHEAT EXTRACTION (WHEAT MOISTURE CORRECTED TO 10%)	86.21%	
27a	CLEAN WHEAT EXTRACTION (hard wheat flours)	81.06%	
27b	CLEAN WHEAT EXTRACTION (soft wheat flours)	83.81%	
27c	CLEAN WHEAT EXTRACTION (average, all flours)	81.32%	
28	TOTAL FIN. PROD. EXTRACTION (average, all flours) (EXCLUDING SCREENINGS)	82.62%	
29	TOTAL FIN. PROD. EXTRACTION (average, all flours) (INCLUDING SCREENINGS)	81.68%	
30	PERCENTAGE SCREENINGS	1.18%	OF WHEAT FROM SILO
31	THEORETICAL 1 BK MOISTURE	15.10%	
32	MOISTURE GAIN	3.38%	ON WHEAT PURCHASED
33	MILLING LOSS	1.58%	OF WHEAT TO 1ST BREAK
34	POWER CONSUMPTION	0.00	KWH/ TONNE OF FLOUR
35	MAN/HRS/TONNE OF FLOUR	0.29	MAN/HRS/TONNE OF FLOUR
36a	AVERAGE PRODUCTION RATE (hard wheat flours)	8.11	TPH FLOUR
36b	AVERAGE PRODUCTION RATE (soft wheat flours)	6.71	TPH FLOUR
36c	AVERAGE PRODUCTION RATE (all flours) (EXCL LOST TIME)	7.95	TPH FLOUR
37	MILL CAPACITY ACHIEVED (EXCL LOST TIME)	234.52	T/24 HRS WHEAT
38	PRODUCTION EFFICIENCY RATE	95.42%	OF PLANNED RUN TIME