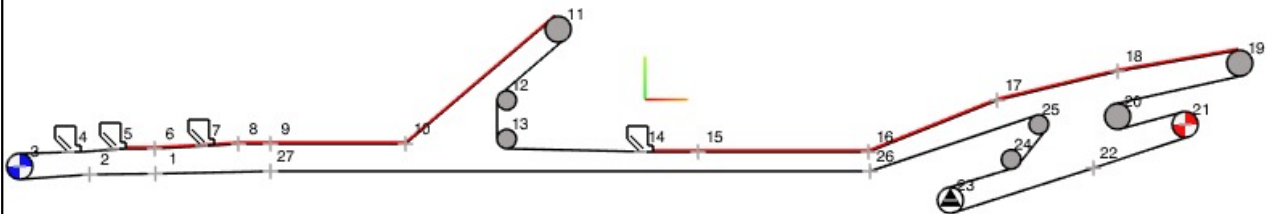


Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph



Conveyor Material

Material	Iron ore Lump or Fines	Surcharge Angle	15 °
Low Bulk Density	1860 kg/m3	Angle of Repose	34 °
High Bulk Density	2400 kg/m3	Material Lump size	32 mm

Conveyor Data

Conveying Distance	879.47 m	Design Capacity	9400 tonnes/hr
Nett Lift / Lower(-)	26.34 m	Belt Speed	5.1 m/s

Belt Details

Belt Width	1600 mm	Calculated Belt % Full	101.01 %
Belt Class & Run Safety Factor	ST2240 8.3	Top Cover Thickness	13 mm
Belt Rated Tension	334 kN/m	Bottom Cover Thickness	5 mm
Belt Total Length	2301.1 m	Belt Mass	58 kg

Belt Tensions and Power Calculations Visco

Effective Tens. Fully Loaded	310.19 kN	Belt Power - Empty Belt	189.37 kW
Maximum Tension Tmax	431.92 kN	Belt Power - Inclines Loaded	1581.84 kW
Minimum Tension Tmin	122.58 kN	Belt Power - Declines Loaded	392 kW
Sag Tension 1.5%	69.87 kN	Belt Power - Fully Loaded	1581.96 kW
Takeup Type	Horizontal Gravity	Drive Efficiency	95.00 %
Takeup Mass	25000 kg	Absorbed Power Fully Loaded	1665.23 kW
Takeup Pulley Belt Tension	122.58 kN	Installed Motor Power	1600 kW

Carry and Return Idlers

Carry Idler Trough Angle	35 °	Return Idler Trough Angle	0 °
Carry Idler Spacing	1.5 m	Return Idler Spacing	3 m
Carry Idler No Rolls x Dia	3 x 152 mm	Return Idler No Rolls x Dia	1 x 152 mm

Dynamics and Miscellaneous Data

Startup Factor - Fully Loaded	140.00 %	CEMA Temperature Factor Kt	1
Startup Factor - Empty	140.00 %	Total Braking Torque LSS	30.00 kNm
Starting Time - Fully Loaded	34.08 sec	Stop Time - Loaded, Braking	9.63 sec
Starting Time - Empty	3.56 sec	Stop Time - Loaded, Coasting	11.76 sec

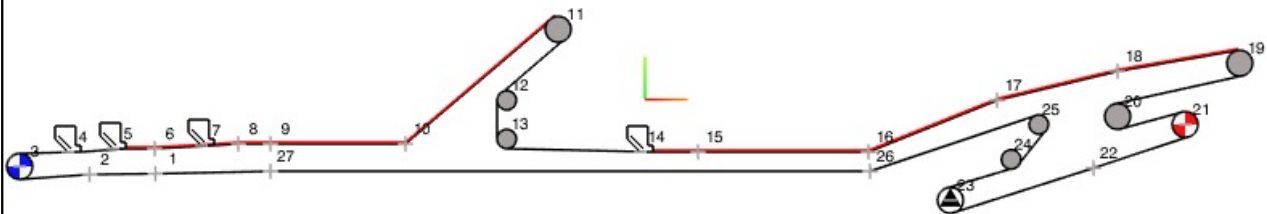
Designers Comments

C212 at 9400tph discharging to Stacker in fully extended position less 200m separation distance from reclaimer also reclaiming at 9400tph.

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
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C212 Case 3 - Stacking Reclaiming 9400tph

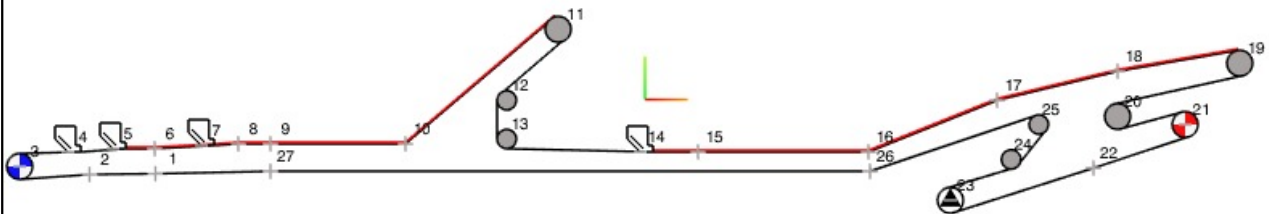

Station / Section

Station	Description	Section Length m	Section Lift m	X co-ord m	Y co-ord m	Z co-ord m	Capacity tph	Ten Adj. kN	Idler Spacing m	Skirt Length m	No. of Scrapers	Friction Factor Input
1	Int. Pt	10.00	0.00	20.00	0.00	8.52	0		1			0.00000
2	Int. Pt	10.00	-0.54	10.00	0.00	8.52	0		1			0.00000
3	Brake Tail Brake	6.45	-0.19	0.00	0.00	8.40	0		1.5			0.00000
4	Hopper C214	5.62	0.20	6.44	0.00	8.63	0		0.4	5.60		0.00000
5	Hopper C200	7.31	0.26	12.05	0.00	8.84	9400		0.4	7.30		0.00000
6	Int. Pt	37.65	1.36	19.35	0.00	9.10	9400		1.5	2.10		0.00000
7	Hopper C215	7.74	0.30	56.98	0.00	10.46	9400		0.4	7.00		0.00000
8	Int. Pt	22.24	0.79	64.71	0.00	10.76	9400		1.5			0.00000
9	Int. Pt T.P.B	608.66	0.00	86.93	0.00	11.55	9400		1.5			0.00000
10	Int. Pt	59.05	14.53	695.59	0.00	11.55	9400		1.5			0.00000
11	Head Tripper Head	13.71	-3.73	752.96	0.00	25.60	0		3		2	0.00000
12	Bend Tripper Bend 1	8.00	-8.00	740.00	0.00	21.00	0		3			0.00000
13	Bend Tripper Bend 2	237.54	-1.05	740.00	0.00	13.00	0		1.5			0.00000
14	Hopper Reclaimer	4.46	0.00	977.54	0.00	11.55	9400		1.5			0.00000
15	Int. Pt T.P.C	48.48	0.00	982.00	0.00	11.55	9400		1.5			0.00000
16	Int. Pt IP	53.95	6.11	1030.48	0.00	11.55	9400		1.5			0.00000
17	Int. Pt T.P.D	8.80	0.15	1084.09	0.00	17.66	9400		1.5			0.00000
18	Int. Pt	21.14	2.84	1092.89	0.00	17.81	9400		1.5			0.00000
19	Head Head	20.23	-2.17	1113.89	0.00	20.15	0		3		2	0.00000
20	Bend HT Bend	5.01	0.51	1093.89	0.00	16.98	0		3			0.00000
21	Drive Drive	14.16	-1.58	1099.00	0.00	16.40	0		3			0.00000
22	Int. Pt	8.68	-1.00	1085.00	0.00	14.22	0		3			0.00000
23	Takeup Takeup	3.58	0.46	1076.33	0.00	13.67	0		3			0.00000
24	Bend LT Bend 1	3.45	1.46	1079.88	0.00	14.97	0		3			0.00000
25	Bend LT Bend2	52.79	-5.77	1083.00	0.00	16.43	0		3			0.00000
26	Int. Pt	943.55	0.09	1030.48	0.00	11.06	0		3			0.00000
27	Int. Pt	66.98	-2.64	86.93	0.00	11.15	0		3		2	0.00000
Totals:		2289.22	2.39					0.00		22.00	6.00	

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C212 Case 3 - Stacking Reclaiming 9400tph



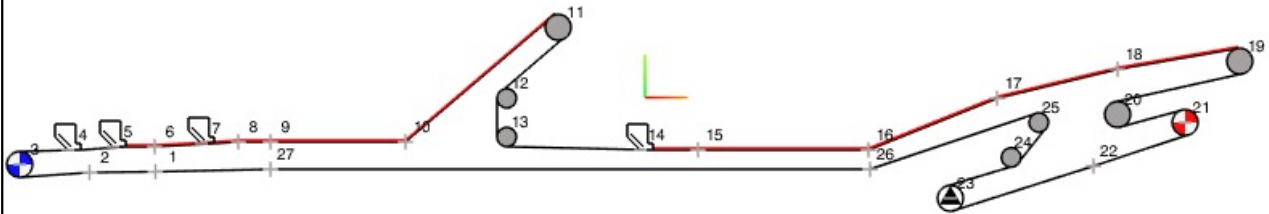
Drive Torque Start-up Factor Loaded	140.00 %	Takeup Pulley Belt Tension	122.58 kN
Drive Torque Start-up Factor Empty	140.00 %	Takeup Mass	25000 kg

Drive / Brake Number	Running		Starting		Braking	
	Fully Loaded	Empty Belt	Fully Loaded	Empty Belt	Fully Loaded	Empty Belt
Drive No. 1 Type: Drive	Drive					
Pulley No. 21 Lagging Type:	Ceramic					
Wrap Angle	180	180	180	180	180	180
Co-efficient of Friction	0.35	0.35	0.45	0.45	0.45	0.45
Drive Factor Cw	0.499	0.499	0.321	0.321	0.321	0.321
Calculated Belt Tension T1	kN 431.92	159.87	526.16	417.21	167.10	156.91
Calculated Belt Tension T2	kN 123.92	123.92	123.67	121.54	126.97	126.22
Minimum Required T2	kN 153.69	17.94	129.20	94.91	12.88	9.85
Surplus T2 Tension (T1-T2)	kN -29.77	105.98	-5.53	26.63	114.09	116.37
Additional Takeup Mass Required	6071 kg		Limiting Case: Running Full			
Required Friction Factor	0.400		Warning: Insufficient Drive Traction			
Required Wrap Angle	204.4 °					
Drive No. 2 Type: Brake	Tail Brake					
Pulley No. 3 Lagging Type:	Rubber					
Wrap Angle	180	180	180	180	180	180
Co-efficient of Friction	0.25	0.25	0.35	0.35	0.35	0.35
Drive Factor Cw	0.838	0.838	0.499	0.499	0.499	0.499
Calculated Belt Tension T1	kN 129.46	129.46	141.04	240.34	88.49	98.61
Calculated Belt Tension T2	kN 130.56	130.57	142.28	242.80	157.74	167.98
Minimum Required T2	kN 0.92	0.93	0.62	1.23	34.56	34.62
Surplus T2 Tension (T1-T2)	kN 128.54	128.53	140.42	239.11	53.93	63.99

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Drive Torque Start-up Factor Loaded	140 %	Takeup Pulley Belt Tension	122.58 kN
Drive Torque Start-up Factor Empty	140 %	Takeup Mass	25000 kg

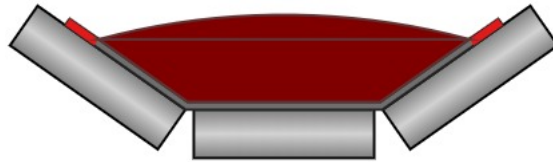
Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
1 Int. Pt	129.48	129.48	129.48	129.48	140.79	237.81	89.46	99.34	96.71	118.90
2 Int. Pt	129.62	129.62	129.62	129.62	141.07	239.23	89.13	99.12	96.46	118.92
3 Brake	129.46	129.46	129.46	129.46	141.04	240.34	88.49	98.61	95.92	118.63
4 Hopper	130.52	130.53	130.52	130.52	142.32	243.59	157.39	167.71	96.31	119.48
5 Hopper	130.83	130.84	130.83	130.83	142.75	244.99	157.30	167.72	96.29	119.69
6 Int. Pt	151.82	131.25	151.82	149.87	164.45	246.81	175.79	167.74	115.24	119.96
7 Hopper	165.78	132.46	165.78	152.61	181.74	252.27	177.98	167.77	119.56	120.75
8 Int. Pt	173.43	132.90	173.43	158.15	190.14	254.20	182.98	167.79	125.04	121.05
9 Int. Pt	180.54	133.60	180.54	158.85	199.21	257.42	183.13	167.79	126.45	121.50
10 Int. Pt	253.80	140.56	253.80	165.79	326.28	333.12	66.01	155.62	43.83	121.75
11 Head	341.63	149.49	341.63	174.71	419.33	348.70	135.38	162.70	116.55	130.03
12 Bend	343.52	149.95	343.52	175.35	421.61	352.99	135.85	162.10	117.27	130.12
13 Bend	341.69	146.70	341.69	172.27	420.05	352.33	133.06	158.12	114.66	126.61
14 Hopper	346.44	150.04	346.44	175.79	427.80	384.30	127.24	153.50	110.75	127.16
15 Int. Pt	360.23	150.09	360.23	189.16	441.98	384.86	139.63	153.41	123.40	127.16
16 Int. Pt	365.32	150.64	365.32	189.71	451.35	390.87	129.56	152.44	116.08	127.18
17 Int. Pt	405.06	154.73	405.06	193.79	495.86	401.05	152.43	154.84	142.00	130.67
18 Int. Pt	406.83	154.92	406.83	193.98	498.41	402.24	151.44	154.75	141.51	130.76
19 Head	424.84	156.77	424.84	195.83	518.29	406.47	162.84	155.93	154.11	132.38
20 Bend	428.28	158.23	428.28	197.56	522.20	412.48	164.60	156.12	156.17	133.39
21 Drive	431.92	159.87	431.92	199.48	526.16	417.21	167.10	156.91	158.88	134.74
22 Int. Pt	123.10	123.10	123.10	123.10	123.02	122.26	125.58	124.97	125.13	123.76
23 Takeup	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58

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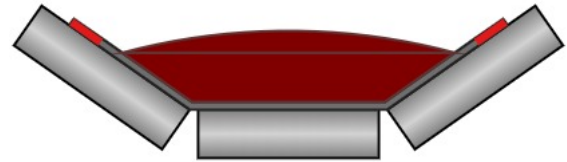
Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
24 Bend	123.91	123.91	123.91	123.91	124.13	126.02	123.12	123.32	123.26	123.70
25 Bend	125.81	125.81	125.81	125.81	126.21	129.70	124.37	124.72	124.63	125.43
26 Int. Pt	123.89	123.89	123.89	123.89	124.99	134.43	120.00	120.96	120.71	122.86
27 Int. Pt	129.34	129.34	129.34	129.34	139.98	231.20	91.71	101.00	98.53	119.39
Minimum Tension	122.58	122.58	122.58	122.58	122.58	122.26	66.01	98.61	43.83	118.63
Maximum Tension	431.92	159.87	431.92	199.48	526.16	417.21	183.13	167.79	158.88	134.74
Effective Tension	310.19	37.13	310.16	76.86						
Ave.Belt Tension	200.05	134.58	200.05	148.30	232.89	255.71	119.20	136.19	104.95	122.75
Belt Elong. m	0.678	0.118	0.678	0.235	0.959	1.154	-0.014	0.131	-0.136	0.016
T/up Travel m	0.339	0.059	0.339	0.117	0.480	0.577	-0.007	0.066	-0.068	0.008

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Low Bulk Density: 1860 kg/m3



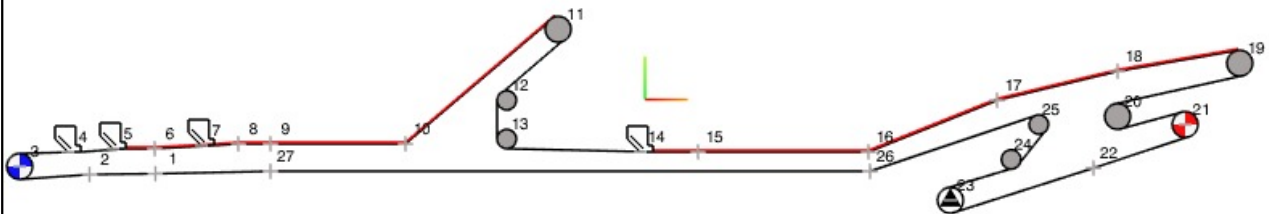
High Bulk Density: 2400 kg/m3

Conveyed Material		Belt Speed & Capacity	
Material Description	Iron ore Lump or Fines	Belt Speed	5.1 m/s
Low Bulk Density	1860 kg/m3	Belt Design Capacity Input	9400 tonnes/hr
High Bulk Density	2400 kg/m3	Section Loading Max Capacity	9400 tonnes/hr
Surcharge Angle	15 °	Carry Idler Trough Angle	35 °
Angle of Repose	34 °	Belt Dimensions	
Material Lump Size	32 mm	Top Cover Thickness	13 mm
Belt Make & Class		Bottom Cover Thickness	5 mm
Belt Category	Bridgestone Steel	Belt Carcass Thickness	6.6 mm
Belt Description	Bridgestone	Belt Total Thickness	24.6 mm
Belt Class / Plies	ST2240	Total Belt (Tape) Length	2301.1 m
Belt Reinforcement Fibre	Steel	Time for 1 Revolution	451.2 sec
Belt Width	1600 mm	Belt Load Area & Capacity at 1860kg/m3	
Belt Modulus	168000 kN/m	Minimum Rec. Edge Distance	111 mm
Cord Diameter	6.6 mm	Actual Edge Distance	112 mm
Cord Pitch	17.3 mm	Load Burden Depth	312 mm
Number of Cords	90	Load Burden Width	1230 mm
Belt Tensions		Belt Load Area at Minimum Recommended Edge Distance	0.2725 m2
Belt Rated Tension / m width	334 kN/m	Belt Load Area utilised at Low Bulk Density	0.2753 m2
Calculated Tension / m width	269.9 kN/m	Belt Actual % Full at Low BD	101.0 %
Belt Rated Tension for width	534.4 kN	Belt Load Area & Capacity at 2400 kg/m3	
Calculated Max Run Tension	431.9 kN	Minimum Recommended Edge Distance	111 mm
Minimum Tension Tmin	122.6 kN	Actual Edge Distance High BD	186 mm
Allowable Tension Rise, Starting	150 %	Belt Load Area Utilised at High Bulk Density	0.2133 m2
Allowable Belt Tension, Starting	801.6 kN	Belt Actual % Full at High BD	78.3 %
Actual Belt Tension, Starting	526.2 kN	Flooded Belt Capacity at 2400 kg/m3	
Belt and Material Mass		Flooded Belt Load Area at Zero Edge Distance	0.3811 m2
Belt Top Cover Mass	23.5 kg/m	Flooded Belt Capacity	16792 tonnes/hr
Belt Bottom Cover Mass	9.0 kg/m	Flooded Belt Material Mass	914.6 kg/m
Belt Carcass Mass	25.5 kg/m		
Belt Mass Wb (per linear m)	58.0 kg/m		
Material Mass Wm (per linear m)	512.0 kg/m		
Total Mass (Wb + Wm)	570.0 kg/m		
Total Belt Mass (Wb x L)	133,464 kg		

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Allowable Belt Sag % Running	1.5 %	Takeup Pulley Belt Tension	122.58 kN
Allowable Belt Sag % Start / Stop	5 %	Takeup Mass	25000 kg

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
1 Int. Pt	129.48	129.48	129.48	129.48	140.79	237.81	89.46	99.34	96.71	118.90
Idler Spacing m	1.00									
Belt Sag %	0.05	0.05	0.05	0.05	0.05	0.03	0.08	0.07	0.07	0.06
2 Int. Pt	129.62	129.62	129.62	129.62	141.07	239.23	89.13	99.12	96.46	118.92
Idler Spacing m	1.00									
Belt Sag %	0.05	0.05	0.05	0.05	0.05	0.03	0.08	0.07	0.07	0.06
3 Brake	129.46	129.46	129.46	129.46	141.04	240.34	88.49	98.61	95.92	118.63
Idler Spacing m	1.50									
Belt Sag %	0.08	0.08	0.08	0.08	0.08	0.04	0.12	0.11	0.11	0.09
4 Hopper	130.52	130.53	130.52	130.52	142.32	243.59	157.39	167.71	96.31	119.48
Idler Spacing m	0.40									
Belt Sag %	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02
5 Hopper	130.83	130.84	130.83	130.83	142.75	244.99	157.30	167.72	96.29	119.69
Idler Spacing m	0.40									
Belt Sag %	0.21	0.02	0.21	0.02	0.20	0.01	0.18	0.02	0.29	0.02
6 Int. Pt	151.82	131.25	151.82	149.87	164.45	246.81	175.79	167.74	115.24	119.96
Idler Spacing m	1.50									
Belt Sag %	0.69	0.08	0.69	0.07	0.64	0.04	0.60	0.06	0.91	0.09
7 Hopper	165.78	132.46	165.78	152.61	181.74	252.27	177.98	167.77	119.56	120.75
Idler Spacing m	0.40									
Belt Sag %	0.17	0.02	0.17	0.02	0.15	0.01	0.16	0.02	0.23	0.02
8 Int. Pt	173.43	132.90	173.43	158.15	190.14	254.20	182.98	167.79	125.04	121.05
Idler Spacing m	1.50									
Belt Sag %	0.60	0.08	0.60	0.07	0.55	0.04	0.57	0.06	0.84	0.09

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Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
9 Int. Pt	180.54	133.60	180.54	158.85	199.21	257.42	183.13	167.79	126.45	121.50
Idler Spacing m	1.50									
Belt Sag %	0.58	0.08	0.58	0.66	0.53	0.04	0.57	0.06	0.83	0.09
10 Int. Pt	253.80	140.56	253.80	165.79	326.28	333.12	66.01	155.62	43.83	121.75
Idler Spacing m	1.50									
Belt Sag %	0.41	0.08	0.41	0.06	0.32	0.03	1.59	0.07	2.39	0.09
11 Head	341.63	149.49	341.63	174.71	419.33	348.70	135.38	162.70	116.55	130.03
Idler Spacing m	3.00									
Belt Sag %	0.06	0.14	0.06	0.12	0.05	0.06	0.16	0.13	0.18	0.16
12 Bend	343.52	149.95	343.52	175.35	421.61	352.99	135.85	162.10	117.27	130.12
Idler Spacing m	3.00									
Belt Sag %	0.06	0.14	0.06	0.12	0.05	0.06	0.16	0.13	0.18	0.16
13 Bend	341.69	146.70	341.69	172.27	420.05	352.33	133.06	158.12	114.66	126.61
Idler Spacing m	1.50									
Belt Sag %	0.03	0.07	0.03	0.06	0.03	0.03	0.08	0.07	0.09	0.08
14 Hopper	346.44	150.04	346.44	175.79	427.80	384.30	127.24	153.50	110.75	127.16
Idler Spacing m	1.50									
Belt Sag %	0.30	0.07	0.30	0.60	0.24	0.03	0.82	0.07	0.95	0.08
15 Int. Pt	360.23	150.09	360.23	189.16	441.98	384.86	139.63	153.41	123.40	127.16
Idler Spacing m	1.50									
Belt Sag %	0.29	0.07	0.29	0.55	0.24	0.03	0.75	0.07	0.85	0.08
16 Int. Pt	365.32	150.64	365.32	189.71	451.35	390.87	129.56	152.44	116.08	127.18
Idler Spacing m	1.50									
Belt Sag %	0.29	0.07	0.29	0.06	0.23	0.03	0.81	0.07	0.90	0.08
17 Int. Pt	405.06	154.73	405.06	193.79	495.86	401.05	152.43	154.84	142.00	130.67
Idler Spacing m	1.50									
Belt Sag %	0.26	0.07	0.26	0.06	0.21	0.03	0.69	0.07	0.74	0.08
18 Int. Pt	406.83	154.92	406.83	193.98	498.41	402.24	151.44	154.75	141.51	130.76
Idler Spacing m	1.50									
Belt Sag %	0.26	0.07	0.26	0.05	0.21	0.03	0.69	0.07	0.74	0.08
19 Head	424.84	156.77	424.84	195.83	518.29	406.47	162.84	155.93	154.11	132.38
Idler Spacing m	3.00									
Belt Sag %	0.05	0.14	0.05	0.11	0.04	0.05	0.13	0.14	0.14	0.16

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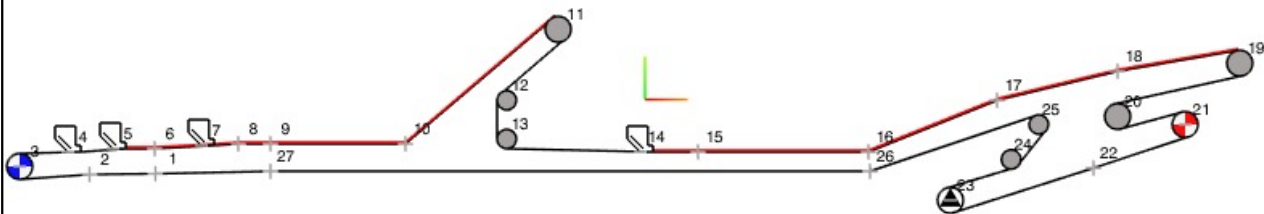
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
20 Bend	428.28	158.23	428.28	197.56	522.20	412.48	164.60	156.12	156.17	133.39
Idler Spacing m	3.00									
Belt Sag %	0.05	0.13	0.05	0.11	0.04	0.05	0.13	0.14	0.14	0.16
21 Drive	431.92	159.87	431.92	199.48	526.16	417.21	167.10	156.91	158.88	134.74
Idler Spacing m	3.00									
Belt Sag %	0.05	0.13	0.05	0.11	0.04	0.05	0.13	0.14	0.13	0.16
22 Int. Pt	123.10	123.10	123.10	123.10	123.02	122.26	125.58	124.97	125.13	123.76
Idler Spacing m	3.00									
Belt Sag %	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
23 Takeup	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58	122.58
Idler Spacing m	3.00									
Belt Sag %	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
24 Bend	123.91	123.91	123.91	123.91	124.13	126.02	123.12	123.32	123.26	123.70
Idler Spacing m	3.00									
Belt Sag %	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
25 Bend	125.81	125.81	125.81	125.81	126.21	129.70	124.37	124.72	124.63	125.43
Idler Spacing m	3.00									
Belt Sag %	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17
26 Int. Pt	123.89	123.89	123.89	123.89	124.99	134.43	120.00	120.96	120.71	122.86
Idler Spacing m	3.00									
Belt Sag %	0.17	0.17	0.17	0.17	0.17	0.16	0.18	0.18	0.18	0.17
27 Int. Pt	129.34	129.34	129.34	129.34	139.98	231.20	91.71	101.00	98.53	119.39
Idler Spacing m	3.00									
Belt Sag %	0.16	0.16	0.16	0.16	0.15	0.09	0.23	0.21	0.22	0.18
Minimum Tension	122.58	122.58	122.58	122.58	122.58	122.26	66.01	98.61	43.83	118.63
Maximum Sag %	0.69	0.17	0.69	0.66	0.64	0.17	1.59	0.21	2.39	0.18

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph



Run Fully Loaded

Takeup Mass **25000 kg** Takeup Pulley Belt Tension **122.58 kN**

Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scrapper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN								
1 Int. Pt	10.00	0.00	129.48	129.48							0.14	0.0164
2 Int. Pt	10.00	-0.54	129.62	129.62							-0.16	0.0164
3 Brake	6.45	-0.19	129.46	130.56	1.09	0.00					-0.04	0.0148
4 Hopper	5.62	0.20	130.52	130.52							0.31	0.0265
5 Hopper	7.30	0.26	130.83	130.83			13.32	5.32			2.36	0.0193
6 Int. Pt	37.65	1.36	151.82	151.82					1.53		12.43	0.0220
7 Hopper	7.74	0.30	165.78	165.78					5.10		2.55	0.0181
8 Int. Pt	22.23	0.79	173.43	173.43							7.11	0.0210
9 Int. Pt	608.66	0.00	180.54	180.54							73.26	0.0208
10 Int. Pt	59.05	14.53	253.80	253.80							87.83	0.0198
11 Head	13.71	-3.73	341.63	344.31	2.68					1.26	-2.05	0.0085
12 Bend	8.00	-8.00	343.52	346.21	2.69						-4.52	0.0085
13 Bend	237.54	-1.05	341.69	344.36	2.68						2.08	0.0146
14 Hopper	4.46	0.00	346.44	346.44			13.32				0.47	0.0182
15 Int. Pt	48.48	0.00	360.23	360.23							5.09	0.0181
16 Int. Pt	53.95	6.11	365.32	365.32							39.74	0.0180
17 Int. Pt	8.80	0.15	405.06	405.06							1.77	0.0179
18 Int. Pt	21.14	2.84	406.83	406.83							18.01	0.0177
19 Head	20.23	-2.17	424.84	428.14	3.30					1.26	-1.12	0.0084
20 Bend	5.01	0.51	428.28	431.60	3.32						0.32	0.0084
21 Drive	14.16	-1.58	431.92	123.92	2.19	308.00					-0.82	0.0084
22 Int. Pt	8.68	-1.00	123.10	123.10							-0.52	0.0086
23 Takeup	3.58	0.46	122.58	123.63	1.04						0.28	0.0086
24 Bend	3.45	1.46	123.91	124.96	1.05						0.85	0.0086

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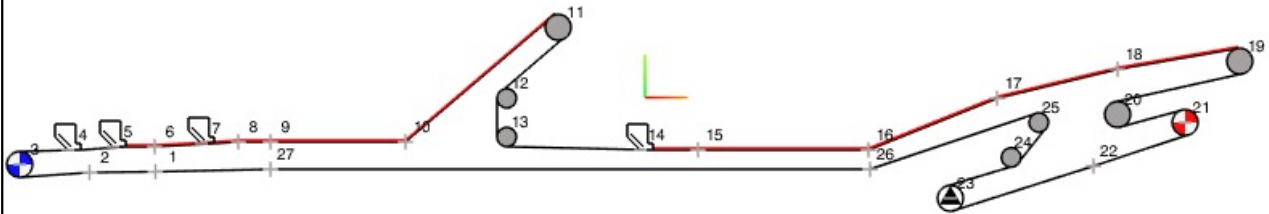
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Station	Section Length m	Section Lift m	Tensions			Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN	CEMA-5(1) Tp Pulley kN							
25 Bend	52.79	-5.77	125.81	126.87	1.07						-2.98	0.0086
26 Int. Pt	943.55	0.09	123.89	123.89							5.45	0.0086
27 Int. Pt	66.98	-2.64	129.34	129.34					1.26		-1.12	0.0086
Totals					21.11	308.00	0.00	26.63	11.95	3.78	246.72	
Maximum Tension			431.92	kN	Total Effective Tension			310.19	kN			
Minimum Tension			122.58	kN	Total Belt Power			1581.97	kW			
Average Tension Fully Loaded			200.05	kN	Belt Modulus			168000	kN/m			
Average Tension Belt Stationary			120.85	kN	Total Belt Length			2301.10	m			
Average Tension Difference			79.20	kN	Belt Elastic Elongation			0.678	m			
					Takeup Movement			0.339	m			

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph



Run Empty

Takeup Mass **25000 kg** Takeup Pulley Belt Tension **122.58 kN**

Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scrapper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN								
1 Int. Pt	10.00	0.00	129.48	129.48							0.14	0.0164
2 Int. Pt	10.00	-0.54	129.62	129.62							-0.16	0.0164
3 Brake	6.45	-0.19	129.46	130.57	1.10	0.00					-0.04	0.0148
4 Hopper	5.62	0.20	130.53	130.53							0.31	0.0265
5 Hopper	7.30	0.26	130.84	130.84							0.41	0.0265
6 Int. Pt	37.65	1.36	131.25	131.25							1.21	0.0148
7 Hopper	7.74	0.30	132.46	132.46							0.44	0.0265
8 Int. Pt	22.23	0.79	132.90	132.90							0.70	0.0148
9 Int. Pt	608.66	0.00	133.60	133.60							6.96	0.0148
10 Int. Pt	59.05	14.53	140.56	140.56							8.93	0.0148
11 Head	13.71	-3.73	149.49	150.74	1.26					1.26	-2.05	0.0086
12 Bend	8.00	-8.00	149.95	151.22	1.26						-4.52	0.0086
13 Bend	237.54	-1.05	146.70	147.93	1.24						2.11	0.0148
14 Hopper	4.46	0.00	150.04	150.04							0.05	0.0148
15 Int. Pt	48.48	0.00	150.09	150.09							0.55	0.0148
16 Int. Pt	53.95	6.11	150.64	150.64							4.09	0.0148
17 Int. Pt	8.80	0.15	154.73	154.73							0.19	0.0148
18 Int. Pt	21.14	2.84	154.92	154.92							1.85	0.0148
19 Head	20.23	-2.17	156.77	158.09	1.31					1.26	-1.12	0.0086
20 Bend	5.01	0.51	158.23	159.55	1.33						0.32	0.0086
21 Drive	14.16	-1.58	159.87	123.92	1.18	35.95					-0.82	0.0086
22 Int. Pt	8.68	-1.00	123.10	123.10							-0.52	0.0086
23 Takeup	3.58	0.46	122.58	123.63	1.04						0.28	0.0086
24 Bend	3.45	1.46	123.91	124.96	1.05						0.85	0.0086

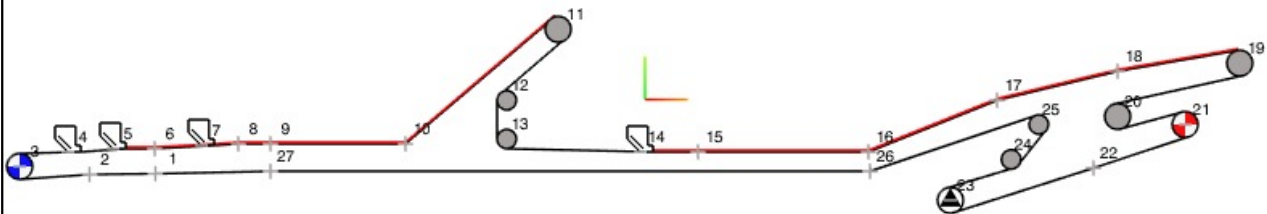
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Station	Section Length m	Section Lift m	Tensions			Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN	CEMA-5(1) Tp Pulley kN							
25 Bend	52.79	-5.77	125.81	126.87	1.07						-2.98	0.0086
26 Int. Pt	943.55	0.09	123.89	123.89							5.45	0.0086
27 Int. Pt	66.98	-2.64	129.34	129.34					1.26		-1.12	0.0086
Totals					11.84	35.95	0.00		3.78		21.51	
Maximum Tension			159.87	kN	Total Effective Tension						37.13	kN
Minimum Tension			122.58	kN	Total Belt Power						189.37	kW
Average Tension Empty			134.58	kN	Belt Modulus						168000	kN/m
Average Tension Belt Stationary			120.85	kN	Total Belt Length						2301.10	m
Average Tension Difference			13.73	kN	Belt Elastic Elongation						0.118	m
					Takeup Movement						0.059	m

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph



Run Inclines Loaded

Takeup Mass	25000 kg	Takeup Pulley Belt Tension	122.58 kN
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Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scrapper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN								
1 Int. Pt	10.00	0.00	129.48	129.48							0.14	0.0164
2 Int. Pt	10.00	-0.54	129.62	129.62							-0.16	0.0164
3 Brake	6.45	-0.19	129.46	130.56	1.09	0.00					-0.04	0.0148
4 Hopper	5.62	0.20	130.52	130.52							0.31	0.0265
5 Hopper	7.30	0.26	130.83	130.83				13.32	5.32		2.36	0.0193
6 Int. Pt	37.65	1.36	151.82	151.82					1.53		12.43	0.0220
7 Hopper	7.74	0.30	165.78	165.78					5.10		2.55	0.0181
8 Int. Pt	22.23	0.79	173.43	173.43							7.11	0.0210
9 Int. Pt	608.66	0.00	180.54	180.54							73.26	0.0208
10 Int. Pt	59.05	14.53	253.80	253.80							87.83	0.0198
11 Head	13.71	-3.73	341.63	344.31	2.68					1.26	-2.05	0.0085
12 Bend	8.00	-8.00	343.52	346.21	2.69						-4.52	0.0085
13 Bend	237.54	-1.05	341.69	344.36	2.68						2.08	0.0146
14 Hopper	4.46	0.00	346.44	346.44				13.32			0.47	0.0182
15 Int. Pt	48.48	0.00	360.23	360.23							5.09	0.0181
16 Int. Pt	53.95	6.11	365.32	365.32							39.74	0.0180
17 Int. Pt	8.80	0.15	405.06	405.06							1.77	0.0179
18 Int. Pt	21.14	2.84	406.83	406.83							18.01	0.0177
19 Head	20.23	-2.17	424.84	428.14	3.30					1.26	-1.12	0.0084
20 Bend	5.01	0.51	428.28	431.60	3.32						0.32	0.0084
21 Drive	14.16	-1.58	431.92	123.92	2.17	308.00					-0.82	0.0084
22 Int. Pt	8.68	-1.00	123.10	123.10							-0.52	0.0087
23 Takeup	3.58	0.46	122.58	123.63	1.04						0.28	0.0087
24 Bend	3.45	1.46	123.91	124.96	1.05						0.85	0.0086

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Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

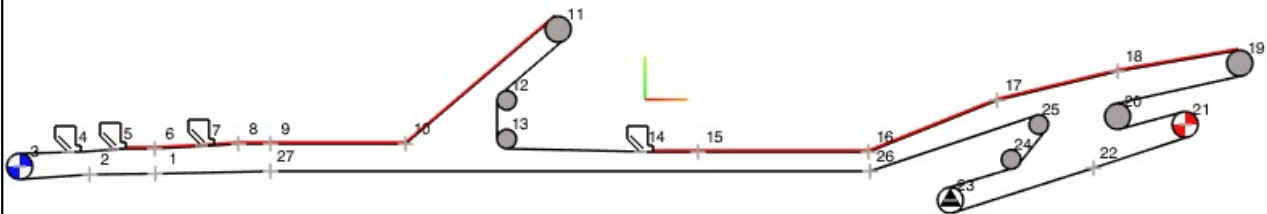
Station	Section Length m	Section Lift m	Tensions			Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scrapper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN	CEMA-5(1) Tp Pulley kN							
25 Bend	52.79	-5.77	125.81	126.87	1.07						-2.98	0.0086
26 Int. Pt	943.55	0.09	123.89	123.89							5.45	0.0086
27 Int. Pt	66.98	-2.64	129.34	129.34					1.26		-1.12	0.0086
Totals					21.08	308.00	0.00	26.63	11.95	3.78	246.72	
Maximum Tension			431.92	kN	Total Effective Tension			310.16	kN			
Minimum Tension			122.58	kN	Total Belt Power			1581.84	kW			
Average Tension Incl. Loaded			200.05	kN	Belt Modulus			168000	kN/m			
Average Tension Belt Stationary			120.85	kN	Total Belt Length			2301.10	m			
Average Tension Difference			79.20	kN	Belt Elastic Elongation			0.678	m			
					Takeup Movement			0.339	m			

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Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph



Run Declines Loaded

Takeup Mass **25000 kg** Takeup Pulley Belt Tension **122.58 kN**

Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scrapper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN								
1 Int. Pt	10.00	0.00	129.48	129.48							0.14	0.0164
2 Int. Pt	10.00	-0.54	129.62	129.62							-0.16	0.0164
3 Brake	6.45	-0.19	129.46	130.56	1.09	0.00					-0.04	0.0148
4 Hopper	5.62	0.20	130.52	130.52							0.31	0.0265
5 Hopper	7.30	0.26	130.83	130.83			13.32	5.32			0.41	0.0265
6 Int. Pt	37.65	1.36	149.87	149.87					1.53		1.21	0.0148
7 Hopper	7.74	0.30	152.61	152.61					5.10		0.44	0.0264
8 Int. Pt	22.23	0.79	158.15	158.15							0.70	0.0148
9 Int. Pt	608.66	0.00	158.85	158.85							6.94	0.0148
10 Int. Pt	59.05	14.53	165.79	165.79							8.92	0.0147
11 Head	13.71	-3.73	174.71	176.14	1.43					1.26	-2.05	0.0086
12 Bend	8.00	-8.00	175.35	176.79	1.44						-4.52	0.0086
13 Bend	237.54	-1.05	172.27	173.68	1.41						2.11	0.0147
14 Hopper	4.46	0.00	175.79	175.79			13.32				0.05	0.0147
15 Int. Pt	48.48	0.00	189.16	189.16							0.55	0.0147
16 Int. Pt	53.95	6.11	189.71	189.71							4.08	0.0147
17 Int. Pt	8.80	0.15	193.79	193.79							0.19	0.0147
18 Int. Pt	21.14	2.84	193.98	193.98							1.85	0.0147
19 Head	20.23	-2.17	195.83	197.42	1.59					1.26	-1.12	0.0085
20 Bend	5.01	0.51	197.56	199.16	1.60						0.32	0.0085
21 Drive	14.16	-1.58	199.48	123.92	1.31	75.55					-0.82	0.0085
22 Int. Pt	8.68	-1.00	123.10	123.10							-0.52	0.0087
23 Takeup	3.58	0.46	122.58	123.63	1.04						0.28	0.0086
24 Bend	3.45	1.46	123.91	124.96	1.05						0.85	0.0086

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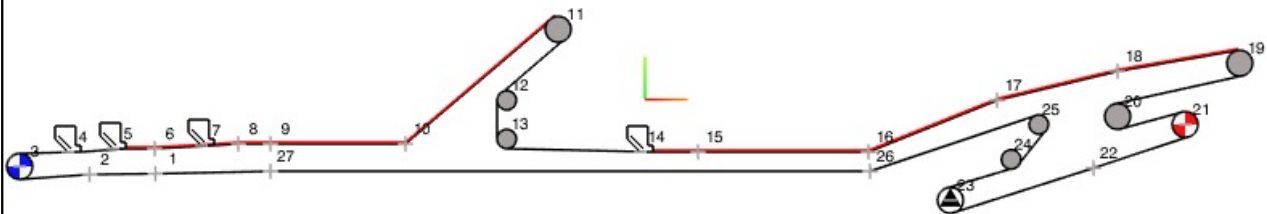
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Station	Section Length m	Section Lift m	Tensions			Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN	CEMA-5(1) Tp Pulley kN							
25 Bend	52.79	-5.77	125.81	126.87	1.07						-2.98	0.0086
26 Int. Pt	943.55	0.09	123.89	123.89							5.45	0.0086
27 Int. Pt	66.98	-2.64	129.34	129.34					1.26		-1.12	0.0086
Totals					13.03	75.55	0.00	26.63	11.95	3.78	21.47	
Maximum Tension			199.48	kN	Total Effective Tension			76.86	kN			
Minimum Tension			122.58	kN	Total Belt Power			392.00	kW			
Average Tension Decl Loaded			148.30	kN	Belt Modulus			168000	kN/m			
Average Tension Belt Stationary			120.85	kN	Total Belt Length			2301.10	m			
Average Tension Difference			27.45	kN	Belt Elastic Elongation			0.235	m			
					Takeup Movement			0.118	m			

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph

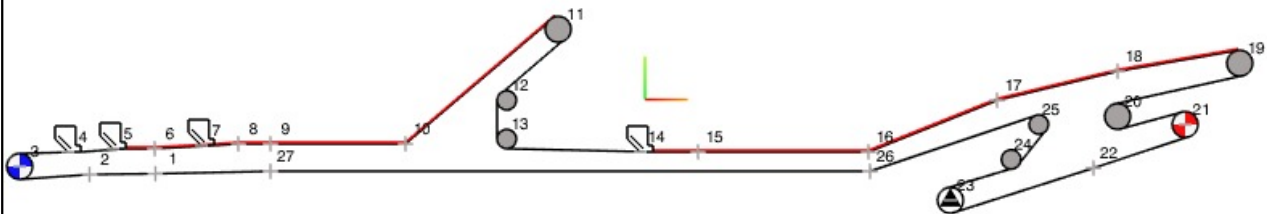


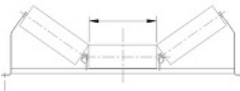

System Masses		Input Data	
Mass of Belt	133,479 kg	Belt Speed	5.1 m/s
Mass of Material	450,275 kg	Belt Rated Tension	334 kN/m
Carry Idler Equivalent Mass	25,241 kg	Allowable Belt Start Tension Rise	150 %
Return Idler Equivalent Mass	10,925 kg	Drive Inertia	200.22 kg-m ²
Pulley Equivalent Mass	13,739 kg	Total Braking Torque	30.00 kNm
Drive Equivalent Mass	81,902 kg	Start Up Factor - Full	140 %
Total System Equivalent Mass	715,561 kg	Start Up Factor - Empty	140 %
Conveyor load inertia at HSS	1,749.27 kgm ²		
Tensions and Accelerating Forces		Installed Power	1600 kW
Effective Tension Fully Loaded	310.19 kN	Drive Efficiency (Average)	95.00 %
Effective Tension Empty	37.13 kN	Stopping Times & Deceleration Rates	
Total Braking Force	68.65 kN	Stopping Time Loaded Braking	9.63 s
Tension Available to Accelerate conveyor		Stopping Time Loaded Coasting	11.76 s
Accelerating Tension - Loaded	107.07 kN	Stopping Time Empty Braking	12.79 s
Accelerating Tension - Empty	380.12 kN	Stopping Time Empty Coasting	36.44 s
Starting Times & Acceleration Rates		Deceleration - Loaded Braking	-0.53 m/s ²
Starting Time - Fully Loaded	34.08 s	Deceleration - Loaded Coasting	-0.43 m/s ²
Starting Time - Empty	3.56 s	Deceleration - Empty Braking	-0.40 m/s ²
Acceleration Rate - Loaded	0.15 m/s ²	Deceleration - Empty Coasting	-0.14 m/s ²
Acceleration Rate - Empty	1.43 m/s ²	Stopping distances & Discharge Volumes	
Belt Tension Rise Starting / Braking		Stopping Distance Loaded Braking	24.56 m
Max Belt Tension Start / Brake	526.16 kN	Stopping Distance Loaded Coasting	30 m
Belt Width	1600 mm	Stopping Distance Empty Braking	32.61 m
Max Belt Tension / Width	328.85 kN/m	Stopping Distance Empty Coasting	92.91 m
Belt Rated Tension / Width	334 kN/m		
Actual Max Tension Start/Brake	98.5 %	Discharge Mass Braking	12,576 kg
Allowable Tension Rise Start/Brake	150 %	Discharge Mass Coasting	15,360 kg
		Discharge Volume Braking	6.76 m ³
		Discharge Volume Coasting	8.26 m ³

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph

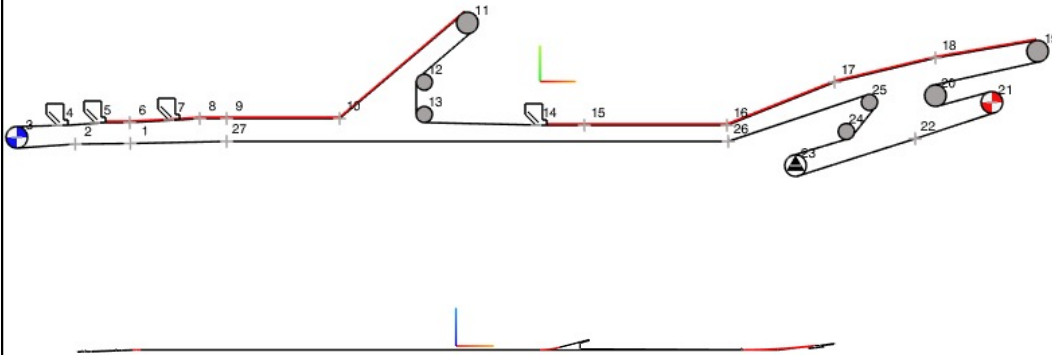


		Carry Side Idlers	Return Side Idlers
Idler Category		Prok Carry	Prok Flat Return
Idler Description		Series 55 3 Roll Carry 152 Plain Inline	Series 35 1 Roll Flat Return 152 Dia
Idler Design Belt Width		1600 mm	1600 mm
Idler Series		55	35
Drawing Number			
Nominal Idler Spacing		1.5 m	3 m
Total Number of Idlers		809	382
Troughing Angle		35 deg	0 deg
Idler Shaft Diameter		45 mm	40 mm
Idler Bearing Diameter		45 mm	30 mm
Number of Idler Rolls		3	1
Idler Centre Roll Diameter		152 mm	152 mm
Idler Wing Roll Diameter		152 mm	152 mm
Idler Rotation Speed		641 rpm	641 rpm
Centre Roll Face Width		569 mm	1852 mm
Wing Roll Face Width		569 mm	1852 mm
Roll Bearing Centres		471.9 mm	1777.4 mm
Shaft Support Centres		595.5 mm	1878 mm
Idler Support Fixing Width		2000 mm	2000 mm
Idlerset Rotating Mass		31.2 kg	28.6 kg
Idlerset Total Mass		115 kg	54 kg
Idler Vertical Misalignment Allowance		3.8 mm	15 mm
Dynamic Load Factor		1.36	1.40
Belt Deviation Load		700 N	1400 N
Total Load on Centre Roll		7999 N	4475 N
Type of Bearing		Ball	Ball
Bearing Designation		6309	6306
Bearing Dynamic Load Rating C		52,700 N	28,100 N
Bearing L10h Life		59,494 hrs	51,500 hrs
Allowable Shaft deflection At Bearing		8 min	10 min
Actual Shaft deflection At Bearing	WARNING	4.74 min	13.03 min

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C212 Case 3 - Stacking Reclaiming 9400tph



Belt Width	1600 mm	% Belt Mass for Lift off Calculation	75 %
Belt Mass - New Belt	58.00 kg/m	Curve Tension Safety Factor	1
Top Cover Mass - New Belt	23.50 kg/m	Average Drive Torque safety Factor - Loaded	140 %
Bottom Cover Mass	9.04 kg/m	Average Drive Torque safety Factor - Empty	140 %
Worn Belt Mass	43.5 kg/m	Belt Modulus	168,000 kN/m
Reduction of Top Cover Mass	61.7 %	Belt Rated Tension	Running: 334 kN/m Starting: 534.4 kN
Conveyed Material Mass	511.98 kg/m	Allowable Edge Tension	Running: 105 % Starting: 150 %

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
1	Int. Pt			129.48		129.48		140.79		237.81		89.46		99.34		
2	Int. Pt	Convex		129.62		129.62		141.07		239.23		89.13		99.12		

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Station / Section Information				Running				Starting				Braking				Minimum Required Radius m	
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty			
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m		
					127		127		130		170		116		119	439	
					266		266		239		129		439		378		
					Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
					Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	
					-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
3	Brake				129.46		129.46		141.04		240.34		88.49		98.61		
4	Hopper				130.52		130.53		142.32		243.59		157.39		167.71		
5	Hopper	9,400			130.83		130.84		142.75		244.99		157.30		167.72		
6	Int. Pt	9,400			151.82		131.25		164.45		246.81		175.79		167.74		
7	Hopper	9,400			165.78		132.46		181.74		252.27		177.98		167.77		
8	Int. Pt	9,400			173.43		132.90		190.14		254.20		182.98		167.79		
9	Int. Pt	Convex	9,400	300	180.54		133.60		199.21		257.42		183.13		167.79	256	
						144		128		151		180		145		139	
						178		256		159		119		175		194	
						205.57		205.57		205.57		205.57		205.57		205.57	
						386.11	72 %	339.17	63 %	404.78	76 %	462.99	87 %	388.7	73 %	373.36	70 %
						112.02		202.12		130.69		188.9		114.61		99.27	
10	Int. Pt	Concave	9,400	120	253.80		140.56		326.28		333.12		66.01		155.62		
						595		329		765		781		155		365	781
						81		146		63		62		311		132	
						89		65		117		120		55		68	
11	Head				341.63		149.49		419.33		348.70		135.38		162.70		
12	Bend				343.52		149.95		421.61		352.99		135.85		162.10		

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Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
13	Bend			341.69		146.70		420.05		352.33		133.06		158.12		
14	Hopper	9,400		346.44		150.04		427.80		384.30		127.24		153.50		
15	Int. Pt	9,400		360.23		150.09		441.98		384.86		139.63		153.41		
16	Int. Pt	Concave	9,400	950	365.32		150.64	451.35		390.87		129.56		152.44		
		Min Concave Lift Off Radius			856		353	1058		916		304		357	1058	
		Min Edge Tension Radius			56		136	46		53		159		135		
		Max Centre Tension Radius			140		67	249		161		63		67		
17	Int. Pt	Convex	9,400	40	405.06		154.73	495.86		401.05		152.43		154.84		
		Min Edge Tension Radius			351		135	839		342		134		135	839	
		Max Buckling Radius			72		214	58		73		218		214		
		Belt Edge Tension Rise at Curve kN			1541.77		1541.77	1541.77		1541.77		1541.77		1541.77		
		Total Edge Tension at Curve kN and %			1946.83	364 %	1696.51	317 %	2037.64	381 %	1942.82	364 %	1694.2	317 %	1696.61	317 %
		Centre Tension at Curve kN			-108.86		668.66	-18.06		-112.88		-361.5		-359.09		
18	Int. Pt	Concave	9,400	20	406.83		154.92	498.41		402.24		151.44		154.75		
		Min Concave Lift Off Radius			954		363	1168		943		355		363	1168	
		Min Edge Tension Radius			51		133	41		51		136		133		
		Max Centre Tension Radius			177		67	437		172		67		67		
19	Head			424.84		156.77		518.29		406.47		162.84		155.93		
20	Bend			428.28		158.23		522.20		412.48		164.60		156.12		
21	Drive			431.92		159.87		526.16		417.21		167.10		156.91		
22	Int. Pt			123.10		123.10		123.02		122.26		125.58		124.97		
23	Takeup			122.58		122.58		122.58		122.58		122.58		122.58		
24	Bend			123.91		123.91		124.13		126.02		123.12		123.32		

Vertical Curve Radius Calculations
Helix Technologies Pty Ltd

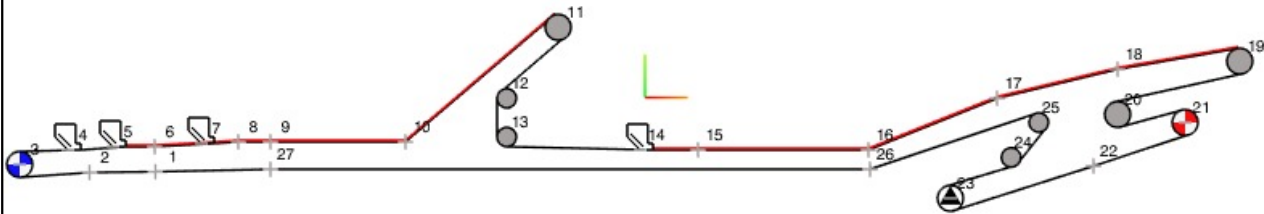
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
25 Bend				125.81		125.81		126.21		129.70		124.37		124.72		
26 Int. Pt	Concave		950	123.89		123.89		124.99		134.43		120.00		120.96		
	Min Concave Lift Off Radius				290		290		293		315		281		284	
	Min Edge Tension Radius				166		166		164		153		171		170	
	Max Centre Tension Radius				0		0		0		0		0		0	
27 Int. Pt	Convex		300	129.34		129.34		139.98		231.20		91.71		101.00		
	Min Edge Tension Radius				0		0		0		0		0		0	
	Max Buckling Radius				0		0		0		0		0		0	
	Belt Edge Tension Rise at Curve kN			Flat Belt		Flat Belt		Flat Belt		Flat Belt		Flat Belt		Flat Belt		
	Total Edge Tension at Curve kN and %				%		%		%		%		%		%	
	Centre Tension at Curve kN															

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C212 Case 3 - Stacking Reclaiming 9400tph



Viscoelastic Calculations Input Data

Belt Rubber Description	Rubber description ...	Carry Idler Centre Roll Dia	152 mm
Top Cover Dynamic Modulus E'	6 N/mm2	Carry Idler Centre Roll Drag	1.5 N
Top Cover Dynamic Loss Factor Tan(delta)	0.13	Carry Idler Wing Roller Dia	152 mm
Belt Top Cover Temperature	30 deg C	Carry Idler Wing Roller Dia	1.5 N
Rolling Resistance Factor Top: 0.072 Bottom: 0.072		Return Idler Centre Roll Dia	152 mm
Bottom Cover Dynamic Modulus E	6 N/mm2	Return Idler Centre Roll Drag	2 N
Bottom Cover Dynamic Loss Factor Tan(delta)	0.13	Return Idler Wing Roll Dia	152 mm
Belt Bottom Cover Temperature	30 deg C	Return Idler Wing Roll Drag	0 N
Belt & Material Flexure Adjustment Factor	1	Idlerset Skew Angle	0.1 deg
Belt has Turnover on return run	No	Idlerset Forward Tilt Angle	0.05 deg

Station	Section Length m	Idler Spacing m	Loaded										Empty friction factor f
			Total Loaded friction factor f	Indentation factor fi	Indentation factor %	Freq- uency rad/s	Matl. & Belt Flexure friction fm	Flexure friction %	Idler Drag factor fr	Idler Drag factor %	Idler Skew & Tilt friction ft	Idler Skew & Tilt friction %	
1 Int. Pt	10.00	1.00	0.0164	0.00700	42.6	2443	0.00044	2.7	0.00791	48.1	0.00109	6.6	0.0164
2 Int. Pt	10.00	1.00	0.0164	0.00700	42.6	2443	0.00044	2.7	0.00791	48.1	0.00109	6.6	0.0164
3 Brake	6.45	1.50	0.0148	0.00802	54.1	2134	0.00044	3.0	0.00527	35.6	0.00109	7.3	0.0148
4 Hopper	5.62	0.40	0.0265	0.00516	19.5	3316	0.00044	1.7	0.01978	74.7	0.00109	4.1	0.0265
5 Hopper	7.30	0.40	0.0193	0.00854	44.3	1291	0.00783	40.7	0.00201	10.4	0.00088	4.6	0.0265
6 Int. Pt	37.65	1.50	0.0220	0.01327	60.2	831	0.00734	33.3	0.00054	2.4	0.00088	4.0	0.0148
7 Hopper	7.74	0.40	0.0181	0.00854	47.2	1291	0.00666	36.8	0.00201	11.1	0.00088	4.9	0.0265
8 Int. Pt	22.23	1.50	0.0210	0.01327	63.2	831	0.00631	30.1	0.00054	2.6	0.00088	4.2	0.0148
9 Int. Pt	608.66	1.50	0.0208	0.01327	63.9	831	0.00609	29.3	0.00054	2.6	0.00088	4.3	0.0148
10 Int. Pt	59.05	1.50	0.0198	0.01327	66.9	831	0.00514	25.9	0.00054	2.7	0.00088	4.5	0.0148
11 Head *	13.71	3.00	0.0085	0.00655	77.2	1312	0.00015	1.7	0.00117	13.8	0.00061	7.2	0.0086
12 Bend *	8.00	3.00	0.0085	0.00655	77.4	1312	0.00013	1.6	0.00117	13.8	0.00061	7.2	0.0086
13 Bend	237.54	1.50	0.0146	0.00802	55.0	2134	0.00020	1.4	0.00527	36.2	0.00109	7.4	0.0148
14 Hopper	4.46	1.50	0.0182	0.01327	72.9	831	0.00351	19.3	0.00054	3.0	0.00088	4.9	0.0148
15 Int. Pt	48.48	1.50	0.0181	0.01327	73.2	831	0.00343	18.9	0.00054	3.0	0.00088	4.9	0.0148
16 Int. Pt	53.95	1.50	0.0180	0.01327	73.5	831	0.00336	18.6	0.00054	3.0	0.00088	4.9	0.0148
17 Int. Pt	8.80	1.50	0.0179	0.01327	74.2	831	0.00319	17.9	0.00054	3.0	0.00088	4.9	0.0148
18 Int. Pt	21.14	1.50	0.0177	0.01327	74.8	831	0.00306	17.2	0.00054	3.0	0.00088	5.0	0.0148
19 Head *	20.23	3.00	0.0084	0.00655	77.6	1312	0.00011	1.3	0.00117	13.9	0.00061	7.2	0.0086
20 Bend *	5.01	3.00	0.0084	0.00655	77.6	1312	0.00011	1.3	0.00117	13.9	0.00061	7.2	0.0086
21 Drive *	14.16	3.00	0.0084	0.00655	77.6	1312	0.00011	1.3	0.00117	13.9	0.00061	7.2	0.0086
22 Int. Pt *	8.68	3.00	0.0086	0.00655	75.8	1312	0.00031	3.6	0.00117	13.6	0.00061	7.1	0.0086

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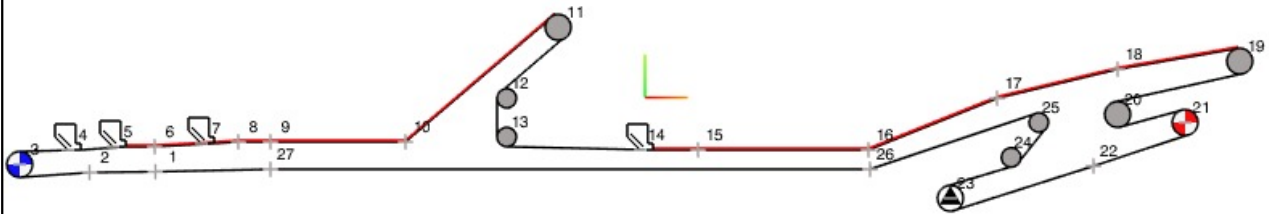
Station	Section Length m	Idler Spacing m	Loaded										Empty
			Total Loaded friction factor f	Indent factor fi	Indent factor %	Freq- uency rad/s	Matl. & Belt Flexure friction fm	Flexure friction %	Idler Drag factor fr	Drag factor %	Idler Skew & Tilt Tilt friction ft	Tilt friction %	Empty friction factor f
23 Takeup*	3.58	3.00	0.0086	0.00655	75.8	1312	0.00031	3.6	0.00117	13.6	0.00061	7.1	0.0086
24 Bend *	3.45	3.00	0.0086	0.00655	75.8	1312	0.00031	3.6	0.00117	13.6	0.00061	7.1	0.0086
25 Bend *	52.79	3.00	0.0086	0.00655	75.8	1312	0.00030	3.5	0.00117	13.6	0.00061	7.1	0.0086
26 Int. Pt *	943.55	3.00	0.0086	0.00655	75.8	1312	0.00030	3.5	0.00117	13.6	0.00061	7.1	0.0086
27 Int. Pt *	66.98	3.00	0.0086	0.00655	75.9	1312	0.00030	3.5	0.00117	13.6	0.00061	7.1	0.0086

* Indicates Return conveyor section

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C212 Case 3 - Stacking Reclaiming 9400tph



Running Fully Loaded Belt Resonance

Carry Roll Diameter	152 mm	Belt Speed	5.1 m/s
Return Roll Diameter	152 mm	Takeup Mass	25000 kg
		Belt Resonance +/- Tolerance	2 %

<u>Station / Section</u>		Start Belt Tension kN	End Belt Tension kN	Belt Transverse Wave Frequency Range		Idler Roll Excitation Frequency Hz	Section Idler Spacing m	Critical Idler Spacing Start m	Critical Idler Spacing End m	Idler Spacing Within +/- 2% m	Mode
Station	Description			Hz	to Hz						
1	Int. Pt	129.48	129.62	23.35	23.36	10.68	1	2.19	2.19	OK	
2	Int. Pt	129.62	129.46	23.36	23.35	10.68	1	2.19	2.19	OK	
3	Brake Tail Brake	130.56	130.52	15.63	15.63	10.68	1.5	2.2	2.2	OK	
4	Hopper C214	130.52	130.83	58.61	58.68	10.68	0.4	2.2	2.2	OK	
5	Hopper C200	130.83	151.82	16.79	18.41	10.68	0.4	0.63	0.69	OK	
6	Int. Pt	151.82	165.78	4.91	5.18	10.68	1.5	0.69	0.73	OK	
7	Hopper C215	165.78	173.43	19.41	19.94	10.68	0.4	0.73	0.75	OK	
8	Int. Pt	173.43	180.54	5.32	5.45	10.68	1.5	0.75	0.76	Warning	2
9	Int. Pt T.P.B	180.54	253.8	5.45	6.62	10.68	1.5	0.76	0.93	Warning	2
10	Int. Pt	253.8	341.63	6.62	7.81	10.68	1.5	0.93	1.1	OK	
11	Head Tripper Head	344.31	343.52	12.79	12.77	10.68	3	3.59	3.59	OK	
12	Bend Tripper Bend 1	346.21	341.69	12.82	12.74	10.68	3	3.6	3.58	OK	
13	Bend Tripper Bend 2	344.36	346.44	25.57	25.65	10.68	1.5	3.59	3.6	OK	
14	Hopper Reclaimer	346.44	360.23	7.87	8.04	10.68	1.5	1.1	1.13	OK	
15	Int. Pt T.P.C	360.23	365.32	8.04	8.1	10.68	1.5	1.13	1.14	OK	
16	Int. Pt IP	365.32	405.06	8.1	8.56	10.68	1.5	1.14	1.2	OK	
17	Int. Pt T.P.D	405.06	406.83	8.56	8.58	10.68	1.5	1.2	1.21	OK	
18	Int. Pt	406.83	424.84	8.58	8.78	10.68	1.5	1.21	1.23	OK	
19	Head Head	428.14	428.28	14.27	14.27	10.68	3	4.01	4.01	OK	
20	Bend HT Bend	431.6	431.92	14.33	14.33	10.68	3	4.02	4.03	OK	
21	Drive Drive	123.92	123.1	7.61	7.58	10.68	3	2.14	2.13	OK	
22	Int. Pt	123.1	122.58	7.58	7.57	10.68	3	2.13	2.13	OK	
23	Takeup Takeup	123.63	123.91	7.6	7.61	10.68	3	2.14	2.14	OK	
24	Bend LT Bend 1	124.96	125.81	7.64	7.67	10.68	3	2.15	2.15	OK	
25	Bend LT Bend2	126.87	123.89	7.7	7.61	10.68	3	2.16	2.14	OK	
26	Int. Pt	123.89	129.34	7.61	7.78	10.68	3	2.14	2.18	OK	
27	Int. Pt	129.34	129.48	7.78	7.78	10.68	3	2.19	2.19	OK	

Project	Demo 08 C212 Design Review	Client	ABC Iron
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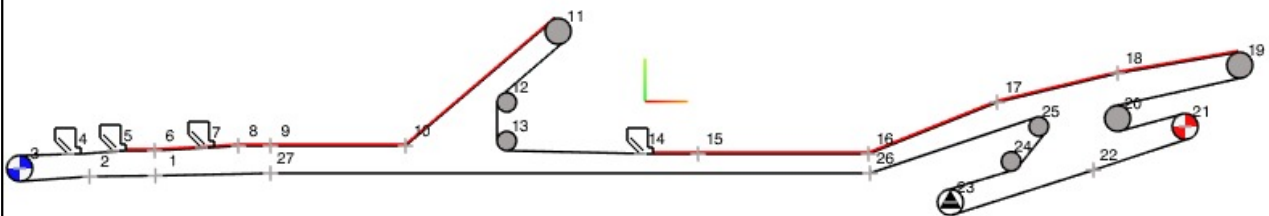
<u>Station / Section</u>		Start Belt Tension	End Belt Tension	Belt Transverse Wave Frequency Range	Idler Roll Excitation Frequency	Section Idler Spacing	Critical Idler Spacing Start	Critical Idler Spacing End	Idler Spacing Within +/- 2%	Mode
Station	Description	kN	kN	Hz to Hz	Hz	m	m	m		

All Figures are Running Fully Loaded Scenario

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C212 Case 3 - Stacking Reclaiming 9400tph



Takeup Travel

Takeup Type	Horizontal Gravity
Takeup Mass Calculation Method	Manual
Takeup Mass Step Increment	1000 kg
Max number of calc Increments	100
Takeup Mass kg (manual input)	25,000 kg
Takeup Tension (manual input)	122.58 kN
Takeup Mass calculated	25,000 kg

Takeup Travel Estimate

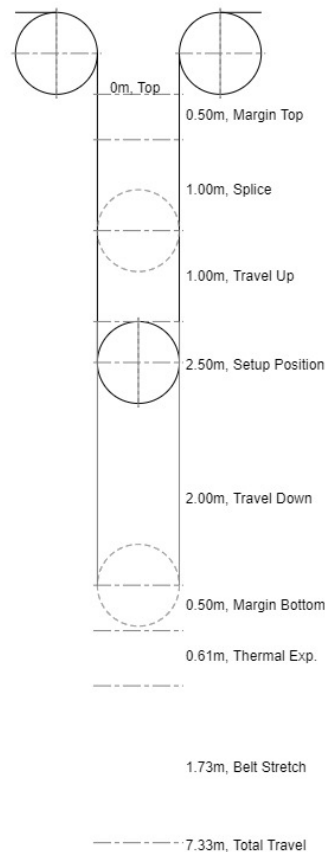
Safety Margin Top	+	0.50 m
Belt Splice Allowance	+	1.00 m
Dynamic Travel Up	+	1.00 m
Dynamic Travel Down	+	2.00 m
Safety Margin Bottom	+	0.50 m

Thermal Expansion Distance

Minimum Site Temperature	0 °C	
Maximum Site Temperature	45 °C	
Belt Expansion Coefficient mm per °C	0.0000117 mm/°C	
Total Belt Length	2301.10 m	
Thermal Expansion Distance	+	0.606 m

Permanent Belt Stretch

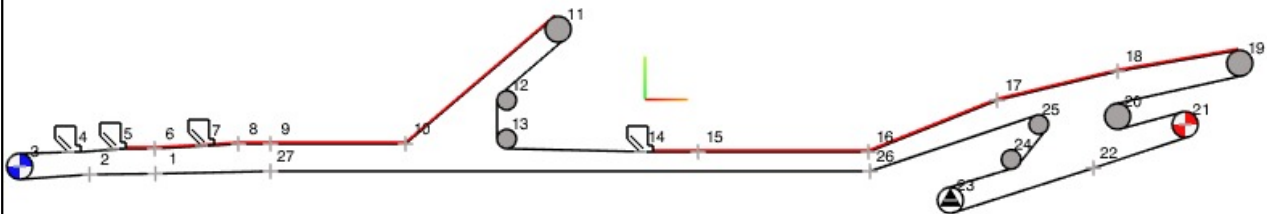
Permanent Stretch Co-efficient % of belt Length	0.15 %	
Permanent Belt Stretch Distance	+	1.726 m
Total Takeup Travel Distance	=	7.33 m



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C212 Case 3 - Stacking Reclaiming 9400tph



Drive Number	2	Brake	Pulley Number	3
Drive Description	Brake		Pulley Condition	Moist
Load Share on Drive Pulley	0 %		Pulley Lagging Type	Rubber
Starting Torque Factor Fully Loaded	150 %		Belt Wrap Angle	180 °
Starting Torque Factor Empty	150 %		Coefficient of Friction Running	0.25
Number of Motors on Drive Pulley	1		Drive Factor Cw Running	0.84
Motor Description	No motor - brake only		Coefficient of friction Starting	0.35
Motor Power Rating	0 kW		Drive Factor Cw Starting	0.50
Motor Voltage	0 V		Pulley and Shaft Dimensions	
Gearbox Description			Pulley Shell Diameter	850 mm
Drive Efficiency	100 %		Pulley Lagging Thickness	12 mm
Fluid Coupling			Pulley Outside Diameter	874 mm
Fluid Coupling			Pulley Shaft Diameter at Hub	280 mm
Fluid Coupling Size			Pulley Shaft Diameter at Bearing	240 mm
High Speed Coupling			Pulley and Belt Speed	
HS Coupling Make			Motor Full Load Speed	0 rpm
HS Coupling Model			Required Gearbox Ratio	1 :1
Low Speed Coupling			Selected Gearbox Ratio	1 :1
LS Coupling Make			Required Pulley Speed	0 rpm
LS Coupling Model			Calculated Pulley Speed for Reducer	0 rpm
Brake			Required Belt Speed	5.1 m/s
Brake Location	Low Speed		Calculated Belt Speed	5.1 m/s
Low Speed Brake Torque Input	30 kNm		Drive Inertia	
Equivalent HS Brake Torque	0 kN		Motor Inertia	0 kg-m2
HoldBack			High Speed Coupling Inertia	0 kg-m2
Static Analysis RunBack Force Fv	132,263 N		High Speed Brake Disc Inertia	0 kg-m2
Static Analysis Horizontal Force Fh	177,927 N		FlyWheel Inertia	0 kg-m2
Calculated HoldBack Torque	18,922 Nm		Gearbox Inertia HSS	0 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2	Yes		Total Drive Inertia	0 kg-m2
HoldBack Req Torque 3x Motor FLT	0 Nm		Total Drive Equivalent Mass	0 kg
HoldBack Make				
HoldBack Model				
HoldBack Rated Torque	0 Nm			

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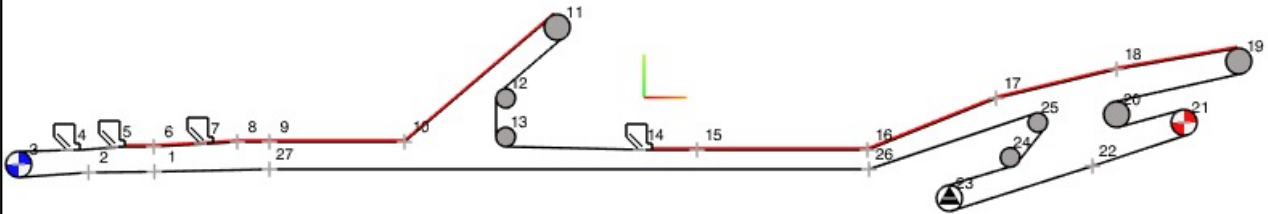
Drive Number	1	Drive	Pulley Number	21
Drive Description		Return	Pulley Condition	Moist
Load Share on Drive Pulley		100 %	Pulley Lagging Type	Ceramic
Starting Torque Factor Fully Loaded		140 %	Belt Wrap Angle	180 °
Starting Torque Factor Empty		140 %	Coefficient of Friction Running	0.35
Number of Motors on Drive Pulley		2	Drive Factor Cw Running	0.50
Motor Description		Toshiba Wound Rotor 560-1250	Coefficient of friction Starting	0.45
Motor Power Rating		800 kW	Drive Factor Cw Starting	0.32
Motor Voltage		6600 V	Pulley and Shaft Dimensions	
Gearbox Description		Falk M525AB2-RS	Pulley Shell Diameter	1200 mm
Drive Efficiency		95 %	Pulley Lagging Thickness	12 mm
Fluid Coupling			Pulley Outside Diameter	1224 mm
Fluid Coupling		No Selection - Direct Drive	Pulley Shaft Diameter at Hub	360 mm
Fluid Coupling Size			Pulley Shaft Diameter at Bearing	260 mm
High Speed Coupling			Pulley and Belt Speed	
HS Coupling Make		Falk	Motor Full Load Speed	985 rpm
HS Coupling Model		1130T35	Required Gearbox Ratio	12.378 :1
Low Speed Coupling			Selected Gearbox Ratio	12.37 :1
LS Coupling Make		Falk	Required Pulley Speed	79.58 rpm
LS Coupling Model		1080/525 MCFAS	Calculated Pulley Speed for Reducer	79.63 rpm
Brake			Required Belt Speed	5.1 m/s
Brake Location		None	Calculated Belt Speed	5.1 m/s
Low Speed Brake Torque Input		0 kNm	Drive Inertia	
Equivalent HS Brake Torque		0 kN	Motor Inertia	96.7 kg-m2
HoldBack			High Speed Coupling Inertia	0.98 kg-m2
Static Analysis RunBack Force Fv		132,263 N	High Speed Brake Disc Inertia	0 kg-m2
Static Analysis Horizontal Force Fh		177,927 N	FlyWheel Inertia	0 kg-m2
Calculated HoldBack Torque		26,499 Nm	Gearbox Inertia HSS	2.429 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2		Yes	Total Drive Inertia	200.218 kg-m2
HoldBack Req Torque 3x Motor FLT		576,042 Nm	Total Drive Equivalent Mass	81,902 kg
HoldBack Make		Ringspann®		
HoldBack Model		FXRT 290-70UX		
HoldBack Rated Torque		59500 Nm		

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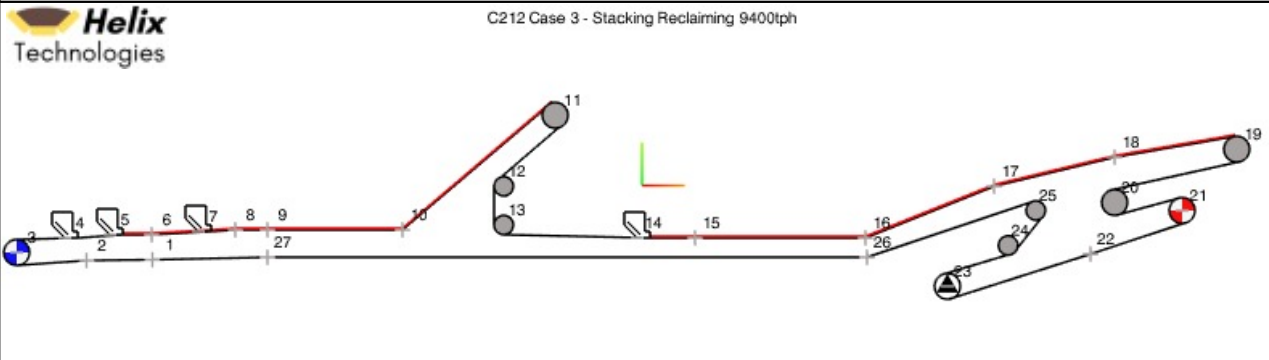
C212 Case 3 - Stacking Reclaiming 9400tph



Drive Number	2	Brake	Pulley Number	3
Drive Description	Brake		Total Motor Power on Drive	0 kW
Number of Motors on Drive Pulley	1		Absorbed Power at Pulley	0 kW
Motor Category	Metric Motor		Drive Efficiency	100 %
Motor Description	No motor - brake only		Absorbed Power at Motor	0 kW
Motor Power Rating	0 kW		Motor Full Load Speed	0 rpm
Motor Voltage	0 V		Motor Full Load Torque	0 Nm
Number of Poles	0		Motor Full Load Current	0 Amps
Motor Frame Size			Motor Efficiency at Duty Point	999 %
Motor Shaft Diameter	0 mm		Motor Power Factor at Duty Point	999
Motor Shaft Height	0 mm		Mass of Motor	0 kg
Motor Inertia	0.00 kgm2		Selection Mode	Manual

Drive Number	1	Drive	Pulley Number	21
Drive Description	Return		Total Motor Power on Drive	1600 kW
Number of Motors on Drive Pulley	2		Absorbed Power at Pulley	1581.97 kW
Motor Category	Toshiba		Drive Efficiency	95 %
Motor Description	Toshiba Wound Rotor 560-1250		Absorbed Power at Motor	832.62 kW
Motor Power Rating	800 kW		Motor Full Load Speed	985 rpm
Motor Voltage	6600 V		Motor Full Load Torque	7756 Nm
Number of Poles	6		Motor Full Load Current	83.7 Amps
Motor Frame Size	560-1250		Motor Efficiency at Duty Point	94.93 %
Motor Shaft Diameter	140 mm		Motor Power Factor at Duty Point	0.88
Motor Shaft Height	560 mm		Mass of Motor	6750 kg
Motor Inertia	96.70 kgm2		Selection Mode	Manual

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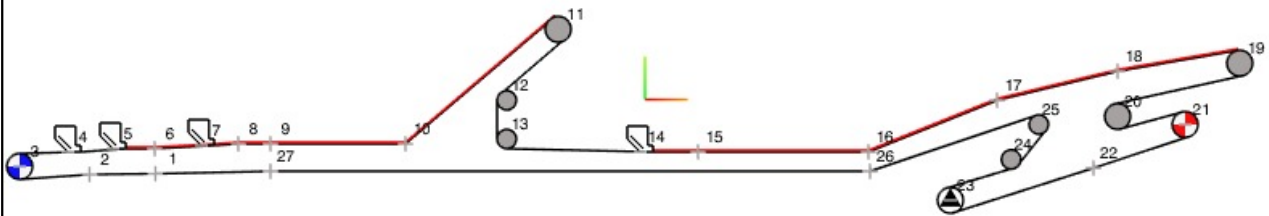
Drive Number	2	Brake	Pulley Number	3
Drive Description		Brake	Coupling Size	
Number of Motors on Drive Pulley		1	Motor Power Rating	0 kW
Selection Mode		Manual	Motor Full Load Speed	0 rpm
Coupling Category	Voith		Coupling Rated Slip	3 %
Coupling Description			Peak Torque	150 % FLT
Coupling Size			Run-up Torque % (2 sec)	0 % FLT
Coupling Power Rating		0 kW	Coupling Output Speed	0 rpm
Min Required Ramping Time		0.00 s	Mass of Coupling	0 kg
Max Starting Time		30 s		

Drive Number	1	Drive	Pulley Number	21
Drive Description		Return	Coupling Size	
Number of Motors on Drive Pulley		2	Motor Power Rating	800 kW
Selection Mode		Manual	Motor Full Load Speed	985 rpm
Coupling Category	Voith		Coupling Rated Slip	0 %
Coupling Description	No Selection - Direct Drive		Peak Torque	0 % FLT
Coupling Size			Run-up Torque % (2 sec)	0 % FLT
Coupling Power Rating		0 kW	Coupling Output Speed	985 rpm
Min Required Ramping Time		0.00 s	Mass of Coupling	0 kg
Max Starting Time		0 s		

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Drive Number	2	Brake	Pulley Number	3
Drive Description		Brake	Motor Power Rating	0 kW
Number of Motors on Drive Pulley		1	Motor Full Load Speed	0 rpm
Selection Mode		Manual	Motor Torque @ FL Speed	NaN Nm
Gearbox Category	Flender		Motor Torque at Pulley Speed	NaN Nm
Description			Gearbox Rated Torque	0 Nm
Type			Service Factor Required	1.5
Size			Service Factor Calculated	NaN
Code				
Ratio		1	Plus Speed Selection Tolerance	5 %
Number of Stages		1	Minus Speed Selection Tolerance	5 %
			Fluid Coupling Slip	3 %
Design Efficiency (input)		100 %	Required Gearbox Ratio	1 :1
Gearbox actual Efficiency		0 %	Selected Gearbox Ratio	1 :1
Maximum Input Shaft Speed		1800 rpm	Required Pulley Speed	0 rpm
Minimum Input Shaft Speed		500 rpm	Calculated Pulley Speed for Reducer	0 rpm
Input Shaft Diameter		0 mm	Required Belt Speed	5.1 m/s
Output Shaft Diameter		0 mm	Calculated Belt Speed	5.1 m/s
Gearbox Inertia		0 kg/m2	Mass of Gearbox	0 kg

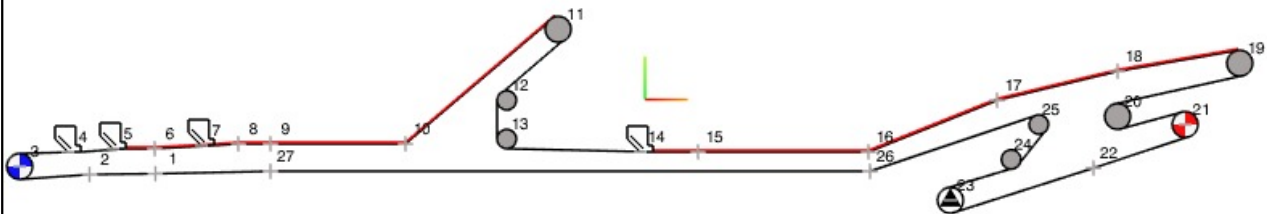
Project	Demo 08 C212 Design Review	Client	ABC Iron
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Drive Number	1	Drive	Pulley Number	21
Drive Description		Return	Motor Power Rating	800 kW
Number of Motors on Drive Pulley		2	Motor Full Load Speed	985 rpm
Selection Mode		Manual	Motor Torque @ FL Speed	7756 Nm
Gearbox Category		Falk A-Plus	Motor Torque at Pulley Speed	96004 Nm
Description		Falk M525AB2-RS	Gearbox Rated Torque	146317 Nm
Type		Right Angle Shaft	Service Factor Required	1.5
Size		525	Service Factor Calculated	1.52
Code		M525AB2-RS	Plus Speed Selection Tolerance	5 %
Ratio		12.37	Minus Speed Selection Tolerance	5 %
Number of Stages		2	Fluid Coupling Slip	0 %
Design Efficiency (input)		95 %	Required Gearbox Ratio	12.378 :1
Gearbox actual Efficiency		94 %	Selected Gearbox Ratio	12.37 :1
Maximum Input Shaft Speed		1800 rpm	Required Pulley Speed	79.58 rpm
Minimum Input Shaft Speed		580 rpm	Calculated Pulley Speed for Reducer	79.63 rpm
Input Shaft Diameter		140 mm	Required Belt Speed	5.1 m/s
Output Shaft Diameter		265 mm	Calculated Belt Speed	5.1 m/s
Gearbox Inertia		2.49 kg/m2	Mass of Gearbox	5810 kg

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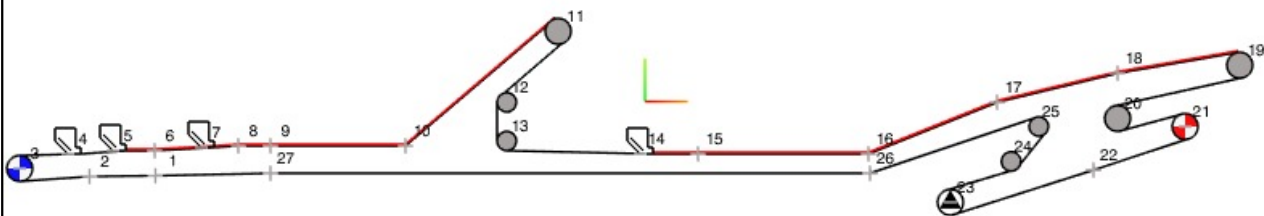


Drive Number	2	Brake	Pulley Number	3
Drive Description		Brake	Brake Location	Low Speed
Load Share on Drive Pulley		0 %	Disc Material	Mild Steel
Brake Category		Svendborg BSFI 300	Disc Diameter	1200 mm
Brake Description		Svendborg	Disc Thickness	30 mm
Caliper		BSFI 3120	Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley		1		
Selection Mode		Manual		
Brake Selection Input Data			Caliper Clamping Force Minimum	80000 N
Low Speed Brake Torque Input		30 kNm	Caliper Clamping Force Maximum	85000 N
Equivalent HS Brake Torque		0 Nm	Pad Offset Width W	130 mm
Design Braking Torque Input		30000 Nm	Air Gap	3 mm
Selected Brake's Torque Rating		30816 Nm		<i>Recomended working airgap is 1mm</i>
Design Stopping Time		10.93 sec	Disc Initial Speed	111 rpm
Consecutive number of Stops		3	Disc Moment of Inertia	47.94 kgm²
Average number of Stops per hour		6	Required Gearbox Ratio	1 :1
Ambient Temperature		45 deg C	Drive Efficiency	100 %
Disc Temp after stops		85 deg C	Mass of Caliper	76 kg
Drive Number	1	Drive	Pulley Number	21
Drive Description		Return	Brake Location	None
Load Share on Drive Pulley		100 %	Disc Material	Mild Steel
Brake Category		Svendborg BSFI 200	Disc Diameter	0 mm
Brake Description		No Brake on Drive	Disc Thickness	0 mm
Caliper		N/A	Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley		2		
Selection Mode		No Brake on Drive		
Brake Selection Input Data			Caliper Clamping Force Minimum	0 N
Low Speed Brake Torque Input		0 kNm	Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque		0 Nm	Pad Offset Width W	0 mm
Design Braking Torque Input		0 Nm	Air Gap	0 mm
Selected Brake's Torque Rating		0 Nm		<i>Recomended working airgap is 1mm</i>
Design Stopping Time		10 sec	Disc Initial Speed	0 rpm
Consecutive number of Stops		3	Disc Moment of Inertia	0 kgm²
Average number of Stops per hour		6	Required Gearbox Ratio	12.378 :1
Ambient Temperature		40 deg C	Drive Efficiency	95 %
Disc Temp after stops		20 deg C	Mass of Caliper	0 kg

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Drive Number	2	Brake	Pulley Number	3
Drive Description		Brake	Motor Power Rating	0 kW
Load Share on Drive Pulley		0 %	Motor Full Load Speed	0 rpm
Starting Torque Factor Fully Loaded		150 %	Motor Torque at Full Load Speed	Nm
Starting Torque Factor Empty		150 %	Motor Torque at Pulley Speed	Nm
Number of Motors on Drive Pulley		1	Pulley Shaft Diameter at Brg	240 mm
Drive Efficiency		100 %		
High Speed Coupling			Low Speed Coupling	
HS Coupling Category			LS Coupling Category	
HS Coupling Make			LS Coupling Make	
HS Coupling Model			LS Coupling Model	
Coupling Type			Coupling Type	
Coupling Torque Rating		0 Nm	Coupling Torque Rating	0 Nm
Service Factor Required		3.5	Service Factor Required	3.5
Service Factor Calculated			Service Factor Calculated	
Maximum Shaft Bore		0 mm	Maximum Shaft Bore	0 mm
Minimum Shaft Bore		0 mm	Minimum Shaft Bore	0 mm
Maximum Rotation Speed		99 rpm	Maximum Rotation Speed	99 rpm
High Speed Coupling Inertia		0 kg-m2	Low Speed Coupling Inertia	0 kg-m2
Drawing Number			Drawing Number	
High Speed Coupling Mass		0 kg	Low Speed Coupling Mass	0 kg
High Speed Coupling Price		0	Low Speed Coupling Price	0
Fluid Coupling				
Direct Drive		Yes		
Fluid Coupling				
Fluid Coupling Size				

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Drive Number	1	Drive	Pulley Number	21
Drive Description		Return	Motor Power Rating	800 kW
Load Share on Drive Pulley		100 %	Motor Full Load Speed	985 rpm
Starting Torque Factor Fully Loaded		140 %	Motor Torque at Full Load Speed	7756 Nm
Starting Torque Factor Empty		140 %	Motor Torque at Pulley Speed	96004 Nm
Number of Motors on Drive Pulley		2	Pulley Shaft Diameter at Brg	260 mm
Drive Efficiency		95 %		
High Speed Coupling			Low Speed Coupling	
HS Coupling Category		Falk Flexible	LS Coupling Category	Falk Rigid
HS Coupling Make		Falk	LS Coupling Make	Falk
HS Coupling Model		1130T35	LS Coupling Model	1080/525 MCFAS
Coupling Type		Flexible	Coupling Type	Rigid Flanged
Coupling Torque Rating		19900 Nm	Coupling Torque Rating	455000 Nm
Service Factor Required		1.5	Service Factor Required	1.5
Service Factor Calculated		2.57	Service Factor Calculated	4.74
Maximum Shaft Bore		140 mm	Maximum Shaft Bore	300 mm
Minimum Shaft Bore		50 mm	Minimum Shaft Bore	0 mm
Maximum Rotation Speed		1100 rpm	Maximum Rotation Speed	120 rpm
High Speed Coupling Inertia		0.98 kg-m2	Low Speed Coupling Inertia	59.4 kg-m2
Drawing Number			Drawing Number	
High Speed Coupling Mass		190.9 kg	Low Speed Coupling Mass	1066 kg
High Speed Coupling Price		0	Low Speed Coupling Price	0
Fluid Coupling				
Direct Drive		Yes		
Fluid Coupling		No Selection - Direct Drive		
Fluid Coupling Size				

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<u>Station / Section</u>		Shaft Length mm	Wrap Angle deg	T1 Run kN	T2 Run kN	Resultant Force kN	T1 Start kN	Calculated		Selected			Shaft Mass kg
Station	Description							Defl. Dia mm	Dt. Dia mm	Shaft Dia mm	Brg Dia mm	Brg Ctrs mm	
3 Brake	Tail Brake	* 2994	180.0	129.5	130.6	258.9	141.0	225.9	208.3	280	240	2354	1447
11 Head	Tripper Head	* 3060	180.0	341.6	344.3	683.3	419.3	282.6	280.8	360	280	2300	2445
12 Bend	Tripper Bend 1	* 2960	75.0	343.5	346.2	418.2	421.6	250.0	238.4	300	220	2300	1642
13 Bend	Tripper Bend 2	* 3020	90.0	341.7	344.4	483.2	420.1	259.2	250.2	300	220	2300	1676
19 Head	Head	* 3174	180.0	424.8	428.1	849.7	518.3	304.0	309.6	360	280	2354	2536
20 Bend	HT Bend	* 3174	180.0	428.3	431.6	856.6	522.2	304.7	310.4	360	280	2354	2536
21 Drive	Drive	* 3074	180.0	431.9	123.9	553.6	526.2	273.2	283.5	360	260	2354	2456
23 Takeup	Takeup	* 2994	180.0	122.6	123.6	245.2	122.6	222.8	204.6	280	180	2354	1447
24 Bend	LT Bend 1	* 2934	36.5	123.9	125.0	77.6	124.1	167.1	139.4	240	150	2354	1042
25 Bend	LT Bend2	* 2954	156.5	125.8	126.9	246.3	126.2	223.1	204.9	240	150	2354	1049

* Indicates Manual pulley shaft dimensions entered

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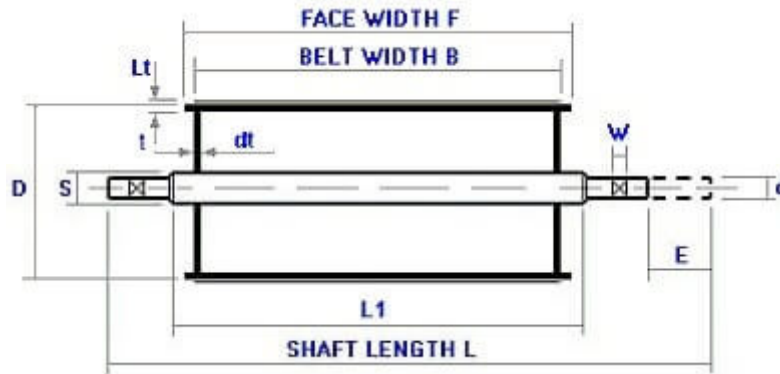
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Station / Section

Station	Description	Shell Dia mm	Lagging mm	Face Width mm	Shaft Length mm	Brg Ctrs mm	Shaft Dia mm	Brg Dia mm	Wrap Angle deg	Pulley Speed RPM	Pulley & Shaft Mass kg	Mom of Inertia kgm2
3	Brake	* 850	12	1750	2994	2354	280	240	180.0	111.4	2627	180.0
11	Head	* 1000	12	1750	3060	2300	360	280	180.0	95.1	4533	430.4
12	Bend	* 800	12	1750	2960	2300	300	220	75.0	118.2	3153	208.8
13	Bend	* 800	12	1750	3020	2300	300	220	90.0	118.2	3186	209.2
19	Head	* 1000	12	1750	3174	2354	360	280	180.0	95.1	4710	448.2
20	Bend	* 1000	12	1750	3174	2354	360	280	180.0	95.1	4710	448.2
21	Drive	* 1200	12	1750	3074	2354	360	260	180.0	79.6	5361	797.2
23	Takeup	* 900	12	1750	2994	2354	280	180	180.0	105.4	2933	247.0
24	Bend	* 800	12	1750	2934	2354	240	150	36.5	118.2	2362	168.6
25	Bend	* 800	12	1750	2954	2354	240	150	156.5	118.2	2369	168.7

* Indicates Manual pulley dimensions entered

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Belt Width **1600 mm** Belt Class **ST2240**

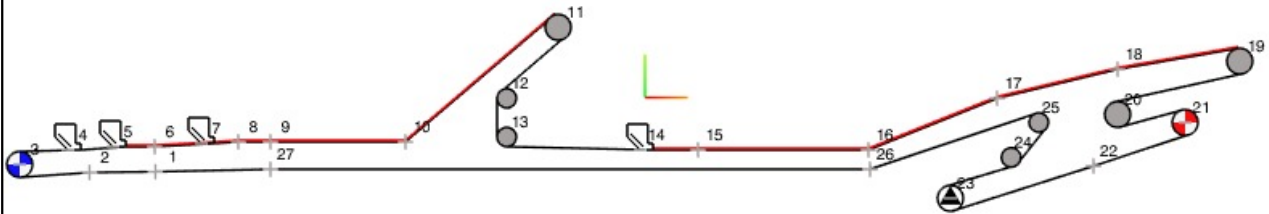
<u>Station / Section</u>		Shell Dia mm	Shell t mm	Calc Shell t mm	Lagging mm	OD mm	Face Width mm	Shaft Length mm	Shaft Dia mm	Brg Dia mm	Pulley & Shaft Mass kg	Mom of Inertia kgm2
Station	Description											
3	Brake	* 850	17	19	12	874	1750	2994	280	240	2627	180.0
11	Head	* 1000	26	30.9	12	1024	1750	3060	360	280	4533	430.4
12	Bend	* 800	30	31	12	824	1750	2960	300	220	3153	208.8
13	Bend	* 800	30	30.9	12	824	1750	3020	300	220	3186	209.2
19	Head	* 1000	28	34.5	12	1024	1750	3174	360	280	4710	448.2
20	Bend	* 1000	28	34.6	12	1024	1750	3174	360	280	4710	448.2
21	Drive	* 1200	28	27.8	12	1224	1750	3074	360	260	5361	797.2
23	Takeup	* 900	22	18.5	12	924	1750	2994	280	180	2933	247.0
24	Bend	* 800	22	18.6	12	824	1750	2934	240	150	2362	168.6
25	Bend	* 800	22	18.8	12	824	1750	2954	240	150	2369	168.7

* Indicates Manual pulley dimensions entered

Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



C212 Case 3 - Stacking Reclaiming 9400tph

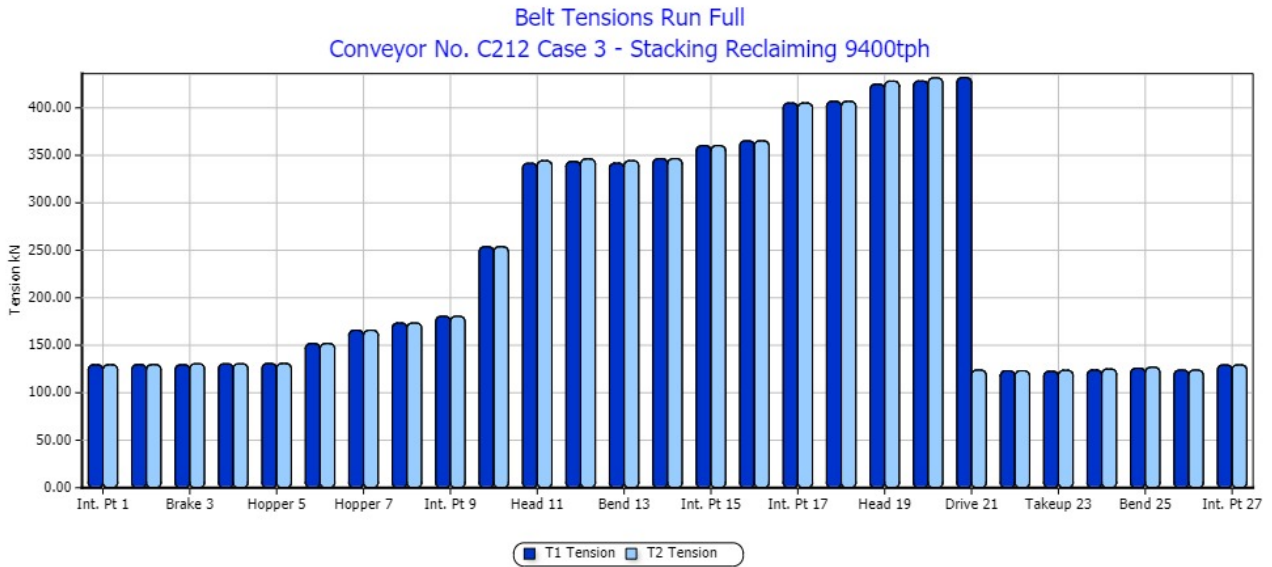


<u>Station / Section</u>		Shell Dia mm	Lagging mm	Face Width mm	Brg Ctrs mm	Drive Power kW	Wrap Angle deg	Pulley Speed rpm	T1 Run kN	T2 Run kN	T1 Start kN	T2 Start kN
3 Brake	Tail Brake	850	12	1750	2354	0	180.0	111.4	129.46	130.56	240.34	242.8
									Running Full		Starting Empty	
11 Head	Tripper Head	1000	12	1750	2300		180.0	95.1	341.63	344.31	419.33	422.25
									Running Full		Starting Full	
12 Bend	Tripper Bend 1	800	12	1750	2300		75.0	118.2	343.52	346.21	421.61	424.49
									Running Full		Starting Full	
13 Bend	Tripper Bend 2	800	12	1750	2300		90.0	118.2	341.69	344.36	420.05	422.91
									Running Full		Starting Full	
19 Head	Head	1000	12	1750	2354		180.0	95.1	424.84	428.14	518.29	521.84
									Running Full		Starting Full	
20 Bend	HT Bend	1000	12	1750	2354		180.0	95.1	428.28	431.60	522.2	525.78
									Running Full		Starting Full	
21 Drive	Drive	1200	12	1750	2354	1600	180.0	79.6	431.92	123.92	526.16	123.67
									Running Full		Starting Full	
23 Takeup	Takeup	900	12	1750	2354		180.0	105.4	122.58	123.63	122.58	125.28
									Running Full		Starting Empty	
24 Bend	LT Bend 1	800	12	1750	2354		36.5	118.2	123.91	124.96	126.02	128.5
									Running Full		Starting Empty	
25 Bend	LT Bend2	800	12	1750	2354		156.5	118.2	125.81	126.87	129.7	132.19
									Running Full		Starting Empty	

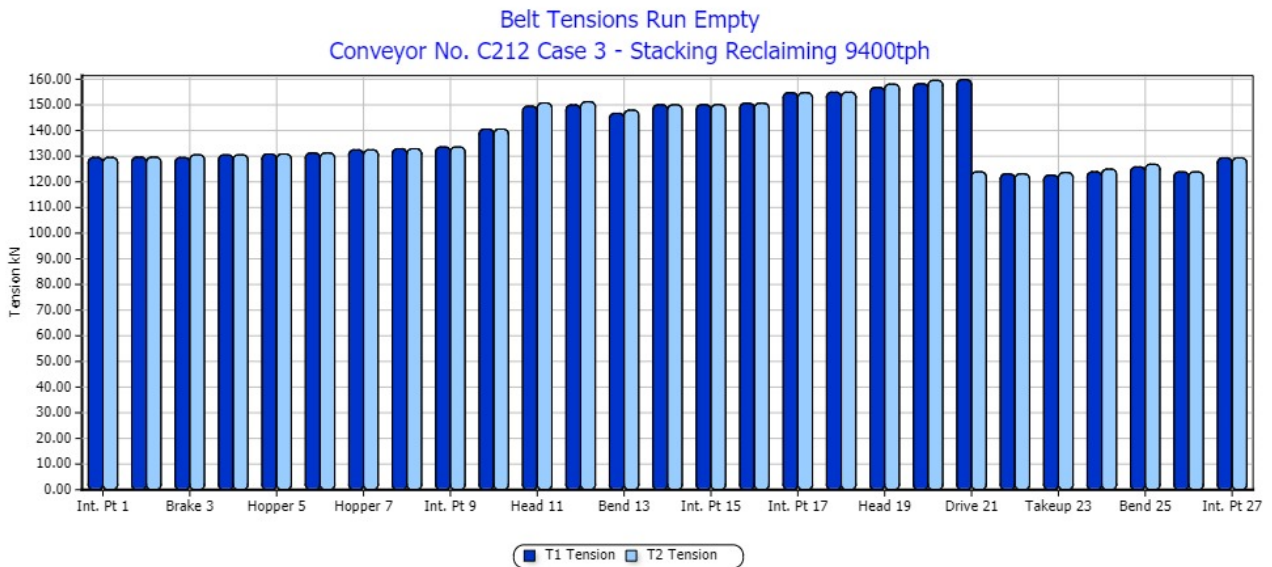
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Conveyor Tension Graphs

Calculation Method **Visco**



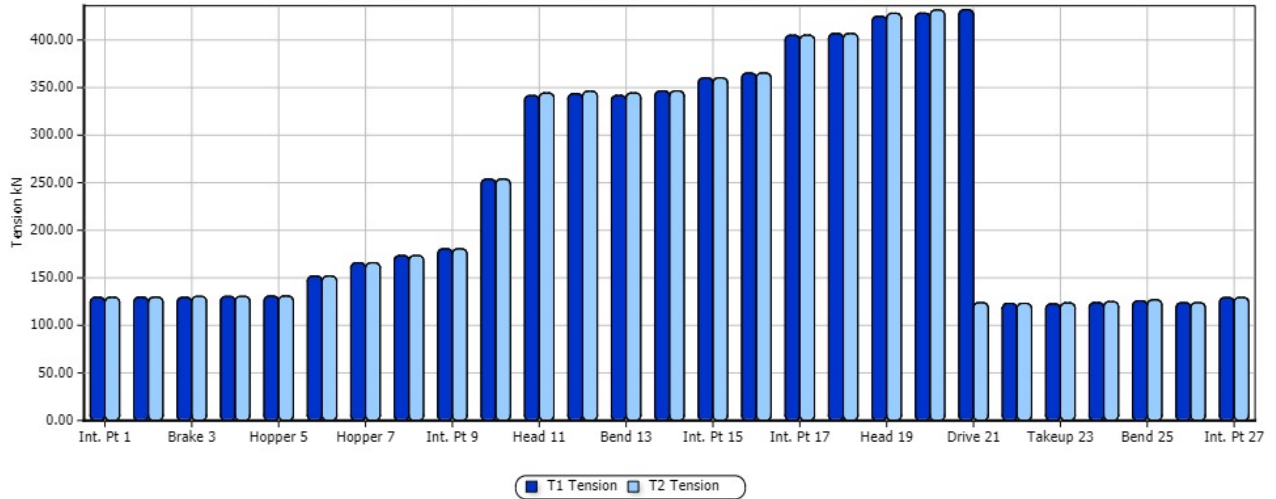
Helix Technologies Pty Ltd



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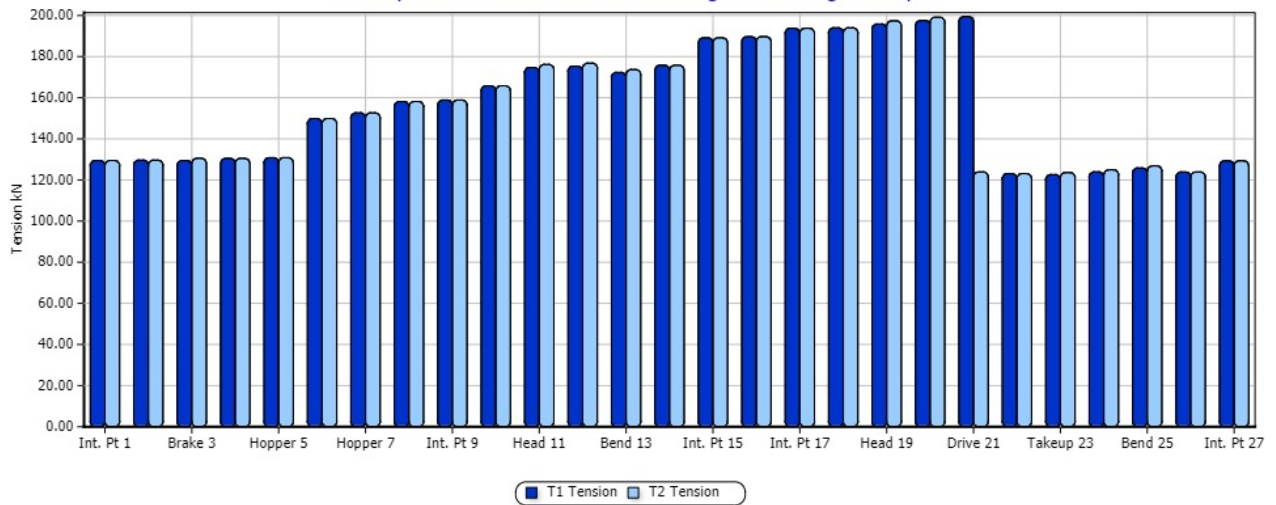
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Belt Tensions Run Inclines Loaded
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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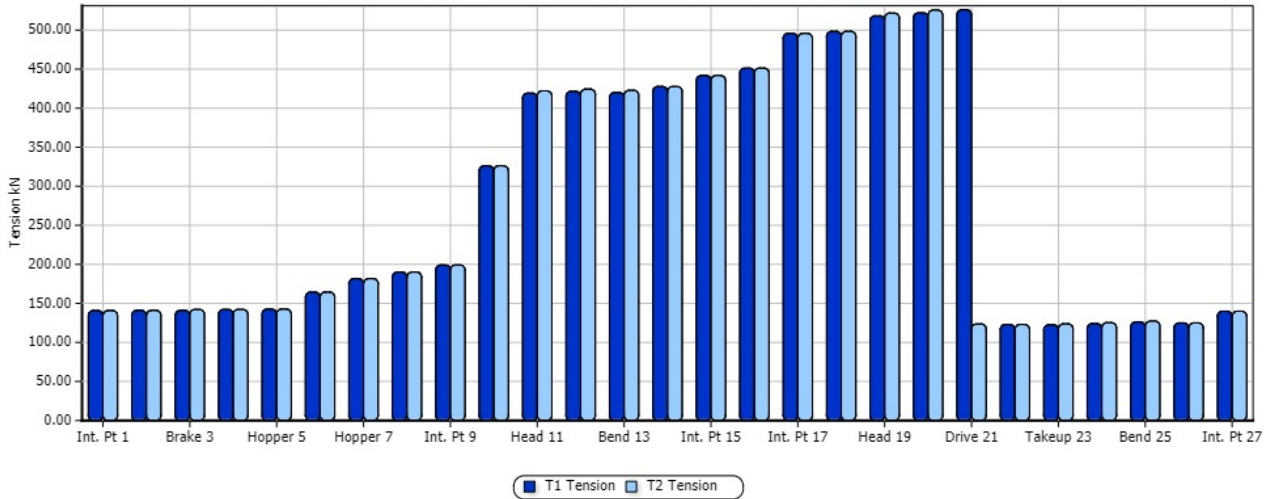
Belt Tensions Run Declines Loaded
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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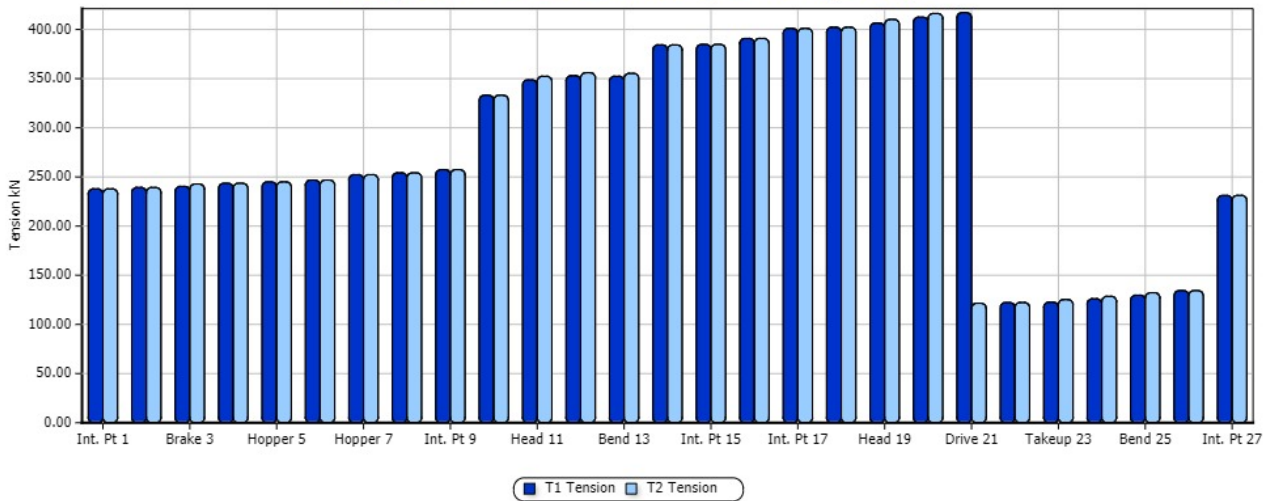
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Belt Tensions Starting Full
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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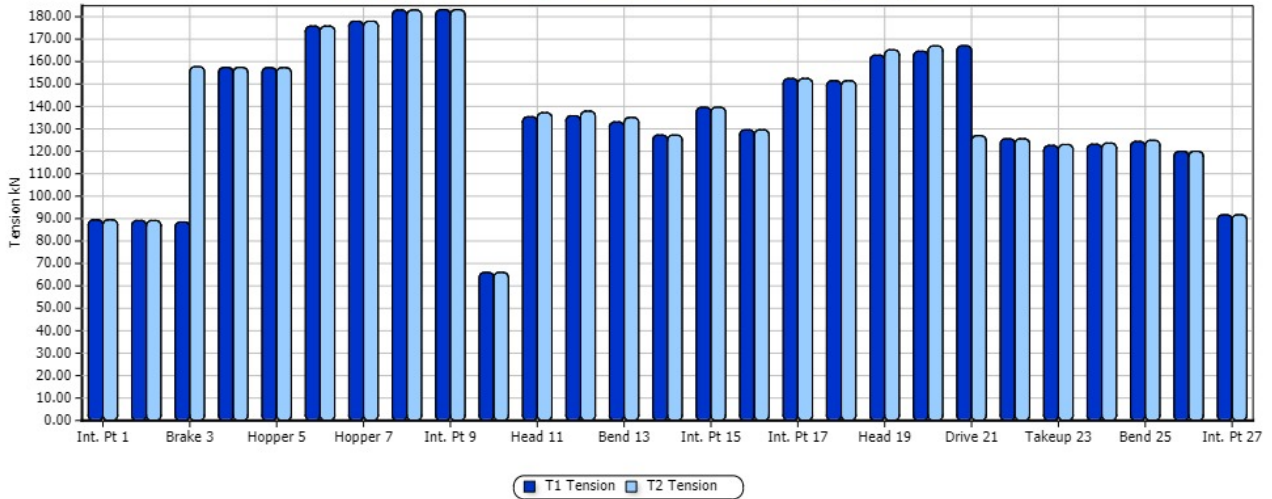
Belt Tensions Starting Empty
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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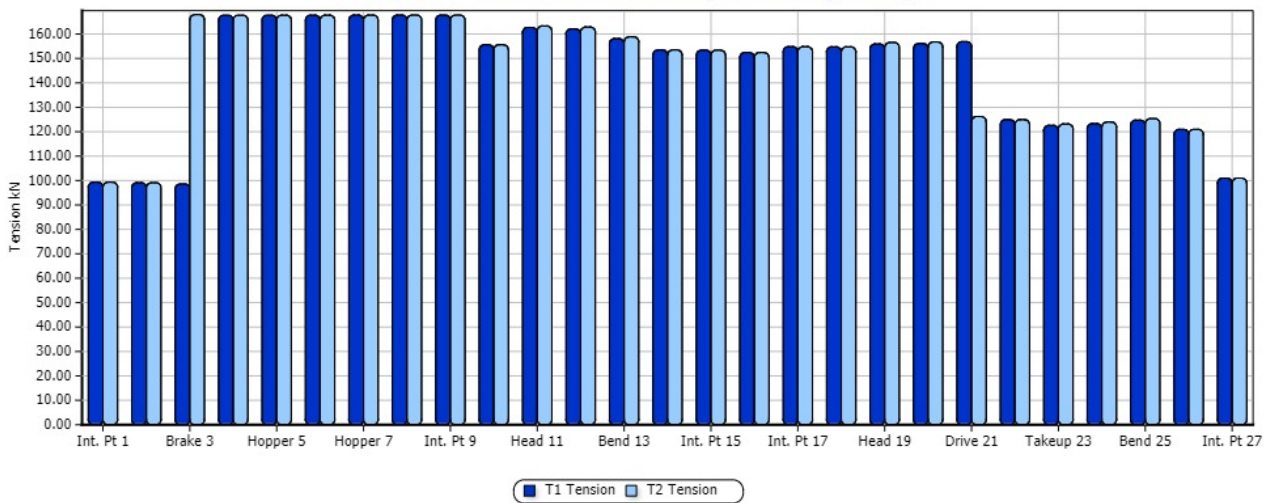
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Belt Tensions Stopping Braking Full
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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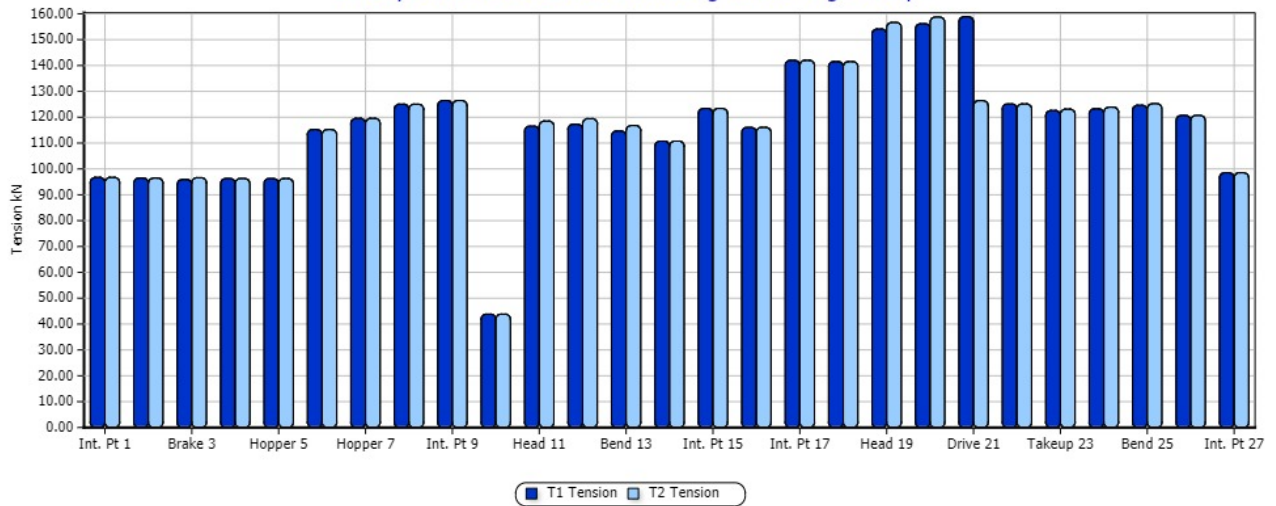
Belt Tensions Stopping Braking Empty
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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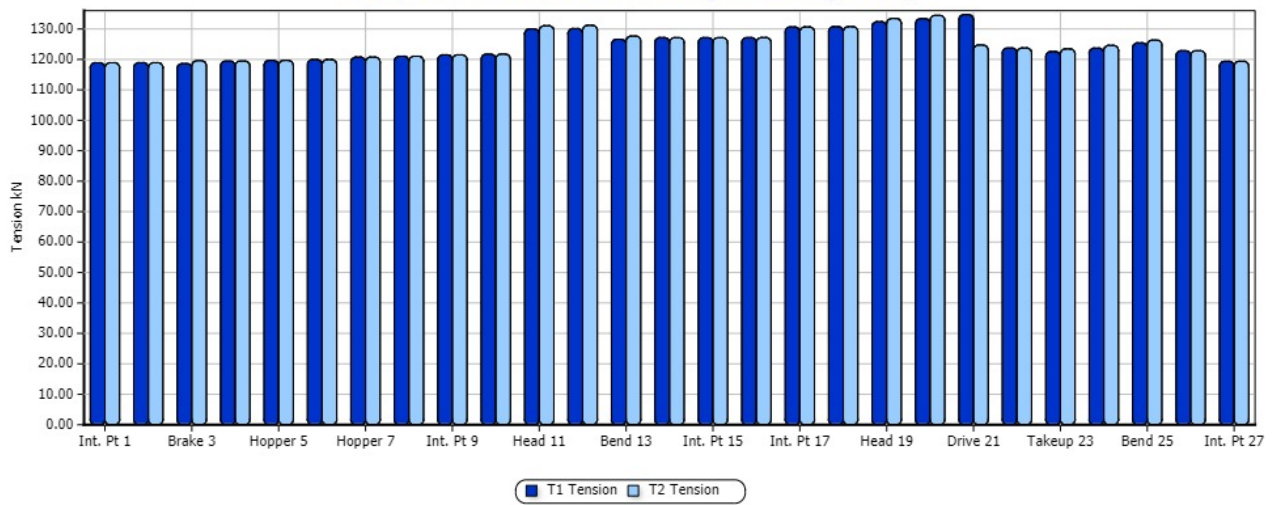
Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019

Belt Tensions Stopping Coasting Full
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



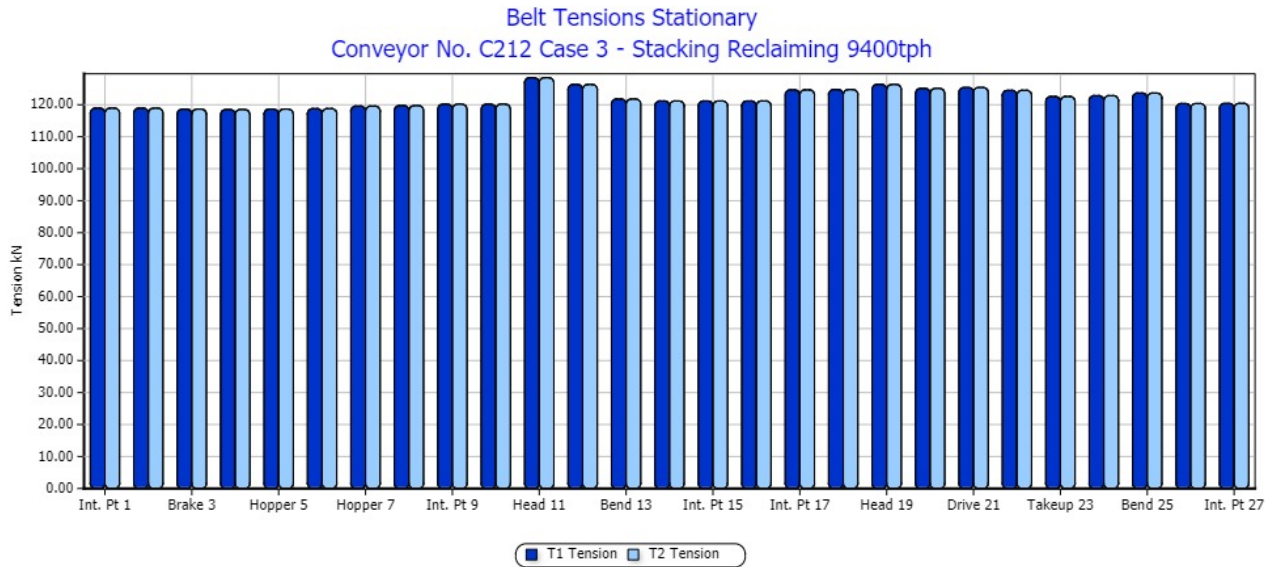
Helix Technologies Pty Ltd

Belt Tensions Stopping Coasting Empty
 Conveyor No. C212 Case 3 - Stacking Reclaiming 9400tph



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Project	Demo 08 C212 Design Review	Client	ABC Iron
Project No.	P0923	Prepared By	Peter Burrow
Conveyor No.	C212 Case 3 - Stacking Reclaiming 9400tph	Design Date	01 Oct 2019



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