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Document archive

Pushing Amps Data Acquisition System Spec
Dated: 2000

Recovered from site on March 20 2021

Specification for the Pushing Amps Data Acquisition System by Radio Modem

Prior to pushing an oven, the operator will enter the oven number using an alpha-numeric keypad. The operator starts the pushing cycle by operation of the master controller. The ram starts its cycle in slow speed. As the ram head extends outward and approaches the oven chamber a revolving cam limit switch closes a contact that allows the ram to make a transition from slow speed to full acceleration. (It is at this point that motor amp data collection needs to start). This transition takes place when the ram head is approximately 12 inches from striking the coke mass. The ram quickly accelerates and in about one-second strikes the coke mass. This is typically where peak motor current (amps) occurs as the ram encounters resistance to its forward motion (as it strikes the coke and draws increasing amounts of power), up to the point where the coke mass breaks free and begins to move. As the coke mass starts to move and accelerates, the amps begin to ramp down (breaking amps) and the coke mass begins to be pushed from the oven chamber. The motor amps continue to decline and level off to a value referred to as "the pushing amps", as the coke mass is discharged from the oven.

There are three categories of pusher ram motor amps monitoring that are significant in that they can be used to indicate the condition of the oven chamber (walls, floor and roof), charging practices, coal mix properties, heating irregularities and, at times, mechanical or electrical problems with a particular pusher.

The three categories are as follows:

Peak Amps – The highest amps occurring during the push. To accurately capture the peak value requires tracking in milliseconds. They typically occur within the first few seconds of the push, as the motor draws increasing levels of power upon first striking the coke mass.

Breaking Amps – Will typically fall below the peak amps and be characterized as amp levels that are higher than pushing amps and having a duration of several seconds as the coke mass begins to move and accelerate as it is being pushed out of the oven chamber.

Pushing Amps – As the coke mass is being pushed out of the oven an amp level is reached that indicates the free movement of the coke through the oven chamber.

The entire pushing cycle (starting when the ram accelerates until it again goes into slowdown at the far end of oven) is 40 seconds in duration. If we begin capturing data in one-second intervals, commencing with ram acceleration, and continuing until we go into slow down at the far end of the oven (40 readings), we can create a graphic representation from the stored data (pushing amp profile). The peak trap software will have to run concurrently to the one-second sampling interval as the peak duration can be less than one-second and fall between the one-second timed sampling intervals.

The software program must capture the data as described above. This will allow for the generation of a graphic amp profile and provide a separate peak amp reading. Along with

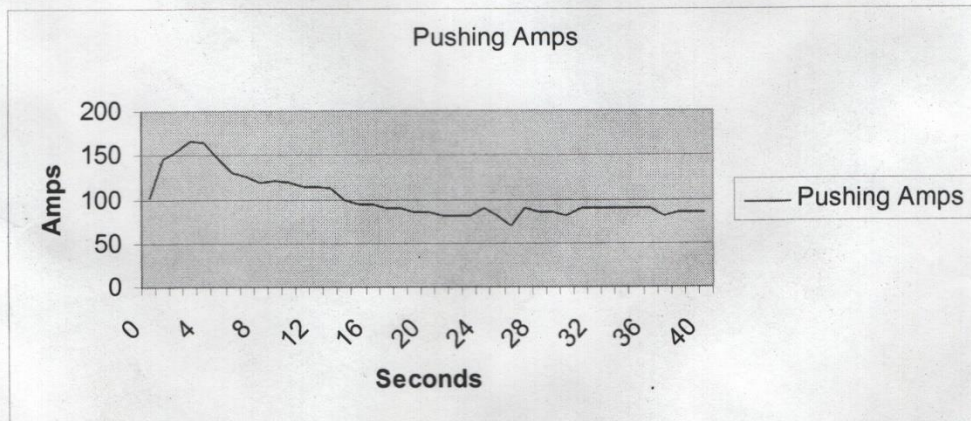
the amp data will be the oven number, date and time of push, and pusher in service. (#1 or #2).

Data will be sent at the end of the pushing cycle (end of cycle will be indicated by ram entering slow down at far end of oven) or upon entering a new oven number at the keypad. Resetting of the PLC registers (previous push data) will occur only after the data has been successfully transmitted to the receiving base station. System error to be displayed and numeric entry disabled when system fault is detected.

Stickers: There are times that, when attempting to push an oven, that it will not push (i.e., sticks). The motor current reaches a point where it trips the overload and the ram stops. At times the operator elects to retract the ram and try and push the oven again. It is important that the software will recognize that we are on the same oven and log each attempt as a separate event; logging peak amps for each attempt separately along with sampling data at the one-second intervals for the length of the shortened cycle.

Example Data and Chart:

Oven Number: C13
Date: 11/15/00
Time Pushed: 07:13:00 AM
Peak Amps: 167
Average Amps: 101
Pusher in Service: #2



Steve Buckner
11/12/00

11/13/00

Specification for Pushing Amps Data

40 second Pushing Amps.

B-2 = 113 →

140 6.35 second

90 11.04 second

88

96 16.30 second

115 21.90 second

179 slow down 37 second

Roof carbon Heavy/Medium

Center & East

Both walls.

Medium carbon

B-4 = 135 ^{JAMB.}

~~78~~

113 6.20 second

119 11.32 second

96

87

90 16.34 second

179 = slow down 38 second

Roof carbon Heavy

Center / East.

Heavy carbon

South wall,

Amp.		Roof Carbon
B-6 = 195		Center to East
145	6.20 second	Heavy Carbon
136		South wall 2/3
145	10.20 second	
129		
131	16.32 second	
114		
183	slow down 36 second	

B-8. 186		Roof Carbon Heavy
200	6.28	C + E.
140	11.32	Heavy ^{at} South wall
134		From East to Center
127		
118	16.02	
110		
117	21.04	
90		
185	slow down 38 second	

C-1-145

200 6.34

232 10:34

136

138 16.11

127 21.41

107

108

104

112

165 slow down 38 second.

Lite Carbon.

The High Amps

Occurring The Peak

Peak Amps.

C-3 178

203 6.42

116 11.43

110 16.03

104 21.41

96

101

171 slow down

Lite Carbon.

The High Amps

Occurring The Peak

Peak Amps.

C-5 = 222

251 6.40

153 11.38

136 16.35

135 21.30

126

113

102

101

96

184 slow down 38 second

Medium Carbon
Roof center to East.

The Highs Amps.

Occurring The Push

Peak Amps.

C-7 123

207 6.40

158 11.38

122 16.35

101 21.28

96

180 slow down 39 second

Heavy Roof carbon
center. East.

The Highs

And Both wall

Amp occurring

The Push

Peak Amps

C-9 = 211 6.38

209 11.05

112 16.30

123 21.20

117

180 slow down 36 second.

Heavy Roof carb.
East & center.

The Highs

Amps. occurring
The Push

Peak Amps.

11/21/00

	A10-155	A12-165	D6- ¹⁶⁵ 231	D-8-164
1st CONTACT FRAME	+96 218	184	108	325
5sec	160	156	97	150
10sec	135	110	92	116
15sec	127	92	88	109
20sec	101	89	73	100
25sec	85	87	73	90
30sec				
35sec				
40sec				
slow DOWN	178	178	176	176

ent By: SYSTEMS ALTERNATIVES, INC.;

419 891 1045;

22 Nov 00 10:02AM; Job 454; Page 2/2



Systems Alternatives International, LLC

1705 Indian Wood Circle

Maumee, OH 43537

(419) 891-1100 Fax (419) 891-1045

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9057

QUOTE

QUOTE NO. 11092000BMEW

Page 1 of 1

To: Acme Steel
Steve Buckner

Ship To:
To be advised

Ph 773-933-5144
Fax 773-933 5003

SALESPERSON	DATE November 22, 2000	SHIPPED VIA Best Way
F.O.B. POINT Shipping Point	TERMS N/30	REFERENCE Your Inquiry

QTY	DESCRIPTION	UNIT PRICE	AMOUNT
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Coke Pusher Current Monitor

(2)	Pusher Instrumentation Package in Nema 4 enclosure with Micro PLC (1 analog, 1 digital input), Alpha-Numeric keypad and display, Spread Spectrum Radio modem, External Antenna, and Peak Current Monitoring Software. After receiving a contact closure the PLC software will monitor the analog input and trap the peak value received, as well as record the analog input in 1 second intervals for up to 50 seconds. A new cycle can only start after the data is transferred to the base station. Cycle end and stick detection logic to be worked out with Acme. An operator entered oven ID will be stored with the peak value. Requires 120vac power	\$5,300.00	\$ 10,600.00
(1)	Base station CD8300/SS radio modem in Nema 4 enclosure with high gain antenna (25' of coax). Connects via RS232 to serial port on customer provided data collection computer. Requires 120vac	1,495.00	1,495.00
(1)	Visual Basic/Access program that will run on customer supplied Windows NT computer (attached to radio modem). This program will poll each pusher instrumentation packages over the radio link, and will obtain a new push peak value, upto 50 amp readings, and an oven ID, and store them in an Access Data base with a time stamp. One simple access report will be provided that will print push reports for a time range, with the push report showing the peak, each of the 50 individual readings, an average, and a simple graph of time vs amps. Additional reports can be added by the customer, or at additional cost by SAI.	5,100.00	5,100.00
Total			\$ 17,195.00

Notes:

Customer is responsible for supplying and configuring reporting PC computer with Windows NT, Microsoft Access 2000, Printer, and serial port. Customer is responsible for installation of all SAI supplied Equipment. If customer requires on site startup assistance, SAI can provide it at \$125/hr plus expenses