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Using Hazard Monitoring Data to Develop a Culture of Safety

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Presenter

What is a Culture of Safety?

A commitment by everyone, from the CEO to the cleanup man that safety is an important value for the organization

Safety – An Overused Word

Of course we are concerned with safety, who wouldn't be

What Do I mean By Safety?

Safety must permeate every aspect of operations from driving vehicles, to maintenance, to work in the office

It must become part of the culture?

Something that does not have to be thought about, or for that matter enforced, its just who we are

The Era of “Big Data”

Everyone by now has heard of the “Internet of Things” (IOT) and “Big Data”

What does this mean to me?

All around you data is being collected, stored and in most case simply ignored

There’s gold in them piles of data?

If one takes the time and sets up the procedures a lot of useful information about plant operations can be mined from this stored data

But I don’t have the time

It won’t take much if you set up some simple templates and have a set time and person to do the review

Automation System Event Logs

Most factory automation systems maintain an event log that records and significant alarms generated by the automation system

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Typical Automation Event Log

Date	Time	Event
2/18/2015	10:15:18 AM	BELT CONVEYOR 3 HEAD WEST BEARING SENSOR FAULT
2/18/2015	10:15:18 AM	BELT CONVEYOR 3 HEAD TOP WEST RUB SENSOR FAULT
2/18/2015	10:15:18 AM	BELT CONVEYOR 3 HEAD BOTTOM WEST RUB SENSOR FAULT
2/18/2015	8:22:27 AM	LEG 1 SLOWDOWN TRIPPED
2/18/2015	8:22:23 AM	LEG 1 SLOWDOWN WARNING
2/18/2015	8:22:11 AM	LEG 1 SLOWDOWN TEST PUSHBUTTON PRESSED
2/18/2015	7:47:07 AM	DRAG CONVEYOR 1 POPCOVER ALARM
2/18/2015	7:46:11 AM	LEG 1 HIGH AMPS ALARM
2/18/2015	7:44:35 AM	PIT 1 PERCENT GATE DOES NOT APPEAR TO BE MOVING
2/18/2015	7:44:35 AM	BIN 5 HIGH LEVEL
2/17/2015	2:34:02 PM	DRAG CONVEYOR 4 PLUGGED
2/17/2015	2:27:56 PM	LEG 1 SLOWDOWN WARNING
2/17/2015	2:27:16 PM	LEG 2 HIGH AMP ALARM
2/17/2015	2:26:40 PM	DRAG CONVEYOR 7 SLACK CHAIN
2/17/2015	2:25:10 PM	LEG 1 HIGH AMPS SHUT DOWN CONVEYOR
2/17/2015	2:20:49 PM	SLIDE GATE 2 DOES NOT APPEAR TO BE MOVING
2/17/2015	2:20:49 PM	SLIDE GATE 1 DOES NOT APPEAR TO BE MOVING
2/17/2015	2:20:43 PM	SLIDE GATE 1 DOES NOT APPEAR TO BE MOVING
2/17/2015	2:20:13 PM	LEG 1 DRIVE FAULTED
2/17/2015	2:20:13 PM	DRAG CONVEYOR 3 SLACK CHAIN
2/17/2015	2:20:04 PM	LEG 1 SLOWDOWN WARNING
2/17/2015	2:20:04 PM	LEG 1 SLOWDOWN TRIPPED
2/17/2015	2:19:58 PM	BIN 100 GATE 3 NOT MOVING ALARM
2/17/2015	2:19:58 PM	COMMUNICATION LOST TO RACK 40 IN MCC 4

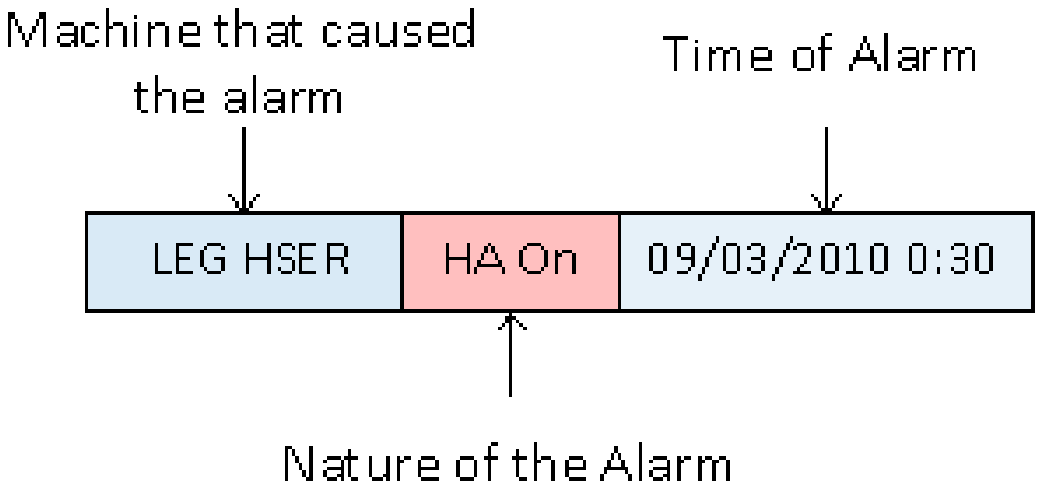
Hazmon System Event Logs

Most hazards monitoring record any alarm events that occur. These can be printed or saved on a memory card or disk drive

Typical Hazmon Alarm Log

LEG HSER	HA On	09/03/2010 0:30
LEG HSER	HW On	09/03/2010 0:30
LEG HSER	HA Off	09/03/2010 0:30
LEG HSER	HW Off	09/03/2010 0:30
LEG HNWR	HA On	09/03/2010 0:31
LEG HNWR	HW On	09/03/2010 0:31
LEG TNER	HA On	09/03/2010 0:31
LEG TNER	HW On	09/03/2010 0:31
LEG HNWR	HA Off	09/03/2010 0:31
LEG HNWR	HW Off	09/03/2010 0:31
LEG TNER	HA Off	09/03/2010 0:31
LEG TNER	HW Off	09/03/2010 0:31
LEG HSER	HA On	09/03/2010 0:54
LEG HSER	HW On	09/03/2010 0:54
LEG HSER	HA Off	09/03/2010 0:54
LEG HSER	HW Off	09/03/2010 0:54
LEG TNER	HA On	09/03/2010 0:54
LEG TNER	HW On	09/03/2010 0:54
LEG HNWR	HA On	09/03/2010 0:54
LEG HNWR	HW On	09/03/2010 0:54
LEG TNER	HA Off	09/03/2010 0:54
LEG TNER	HW Off	09/03/2010 0:54
LEG HNWR	HA Off	09/03/2010 0:54
LEG HNWR	HW Off	09/03/2010 0:54
LEG TNER	HA On	09/03/2010 0:58
LEG TNER	HW On	09/03/2010 0:58
LEG HNWR	HA On	09/03/2010 0:58
LEG HNWR	HW On	09/03/2010 0:58
LEG HNWR	HA Off	09/03/2010 0:58
LEG HNWR	HW Off	09/03/2010 0:58
LEG TNER	HA Off	09/03/2010 0:58
LEG TNER	HW Off	09/03/2010 0:58
LEG HSER	HA On	09/03/2010 1:10
LEG HSER	HW On	09/03/2010 1:10
LEG HSER	HA Off	09/03/2010 1:10
LEG HSER	HW Off	09/03/2010 1:10
LEG HSER	HA On	09/03/2010 1:25
LEG HSER	HW On	09/03/2010 1:25
LEG HSER	HA Off	09/03/2010 1:25
LEG HSER	HW Off	09/03/2010 1:25

What Does it Mean?



Logs Are Easily Sorted

LEG TNWR	HA On	09/03/2010 4:08
LEG HEB	HA On	09/03/2010 4:08
LEG HEB	HA On	09/03/2010 4:08
LEG TNWR	HA On	09/03/2010 4:08
LEG TNWR	HA On	09/03/2010 4:08
LEG HSER	HA On	09/03/2010 4:29
LEG HSER	HA On	09/03/2010 4:29
LEG HSER	HA On	09/03/2010 4:29
LEG HSER	HA On	09/03/2010 4:29
LEG HSER	HA On	09/03/2010 4:46
LEG HSER	HA On	09/03/2010 4:46
LEG HSER	HA On	09/03/2010 4:46
LEG HSER	HA On	09/03/2010 4:46
LEG HSER	HA On	09/03/2010 4:55
LEG HSER	HA On	09/03/2010 4:55
LEG HSER	HA On	09/03/2010 4:55
LEG HSER	HA On	09/03/2010 4:55
LEG TEB	HA On	09/03/2010 5:58
LEG TEB	HA On	09/03/2010 5:58
LEG HWB	HA On	09/03/2010 5:58
LEG HWB	HA On	09/03/2010 5:58
LEG TEB	HA On	09/03/2010 5:58
LEG TEB	HA On	09/03/2010 5:58
LEG HWB	HA On	09/03/2010 5:58
LEG HWB	HA On	09/03/2010 5:58
LEG HSER	HA On	09/03/2010 6:06
LEG HSER	HA On	09/03/2010 6:06

Typical Hazmon Data Log

Date	LEG 1 HSER	LEG 1 HSWR	LEG 1 TSER	LEG 1 TSWR	LEG 1 HEB	LEG 1 HWB	LEG 1 TEB	LEG 1 TWB	LEG 1 SPD
03/09/2010 0:00	77	74	78	78	81	75	79	77	390
03/09/2010 0:00	78	75	76	77	82	75	79	78	390
03/09/2010 0:00	77	74	75	77	82	77	79	77	400
03/09/2010 0:00	77	74	77	77	82	77	79	77	392
03/09/2010 0:00	77	74	77	77	81	76	79	78	398
03/09/2010 0:00	78	75	77	76	81	74	79	78	390
03/09/2010 0:01	77	73	76	77	82	76	79	78	392
03/09/2010 0:01	78	76	77	78	82	76	79	77	391
03/09/2010 0:01	77	74	76	77	82	75	79	77	390
03/09/2010 0:01	77	74	75	78	80	76	79	77	394
03/09/2010 0:01	77	74	77	77	81	76	79	77	395
03/09/2010 0:01	78	74	77	79	81	76	79	77	395
03/09/2010 0:02	77	75	77	77	81	76	79	77	394
03/09/2010 0:02	78	74	76	78	82	75	79	77	378
03/09/2010 0:02	77	74	77	77	81	75	79	78	391
03/09/2010 0:02	77	75	77	77	81	76	79	77	394
03/09/2010 0:02	77	74	77	78	81	75	79	78	388
03/09/2010 0:02	78	75	77	77	80	76	79	77	392
03/09/2010 0:03	78	76	76	78	81	74	79	78	382
03/09/2010 0:03	78	75	75	77	81	77	79	78	394
03/09/2010 0:03	77	76	77	77	80	75	79	77	386
03/09/2010 0:03	76	74	75	77	81	76	79	76	402
03/09/2010 0:03	78	74	76	78	82	76	79	78	398
03/09/2010 0:03	78	74	77	78	81	75	79	78	389

Be Careful How Much You Collect

Collecting data from 100 sensors every minute will accumulate over 3GB of data a year typically

Using the Data to Improve Culture

- Review data to monitor plant and employee performance
- Compare data from different plants and teams to establish clear operational guidelines
- Don’t use the data to punish, use it to educate!

Share the Results

- Share operational data with your operations teams
- Make them aware of the reviews and stress this is part of your companies safety culture
- No one likes to be watched, so stress the importance of using this information to continually improve plant safety and performance

There Must be Consequences

- Teams that “just don’t get it” must be fixed or replaced
- There will be cases and infractions that simply lead to dismissal without exception
- As hard as this seems it must be enforced so everyone knows if your violate a basic safety rule and place your co-workers in jeopardy you just don’t work for us

But .....

- He’s my friend
- He’s been here ten years
- He’s a great leader
- He’s posted the highest profit of any manager
- Etc., etc……

Was it Worth It?

January 20, 2014

International Nutrition
Omaha, Nebraska
2 Dead

“killed a maintenance mechanic and a custodian and sent 10 other people to hospitals with broken bones, burns and damaged organs”

©Story and picture – Omaha Daily Mail

No It Was Not!

The stark reality is it is much more important for everyone to go home safe than for the deadline to load the train be met

We Had an Incident

A well planned data collection strategy will be an important tool in determining the cause of an incident

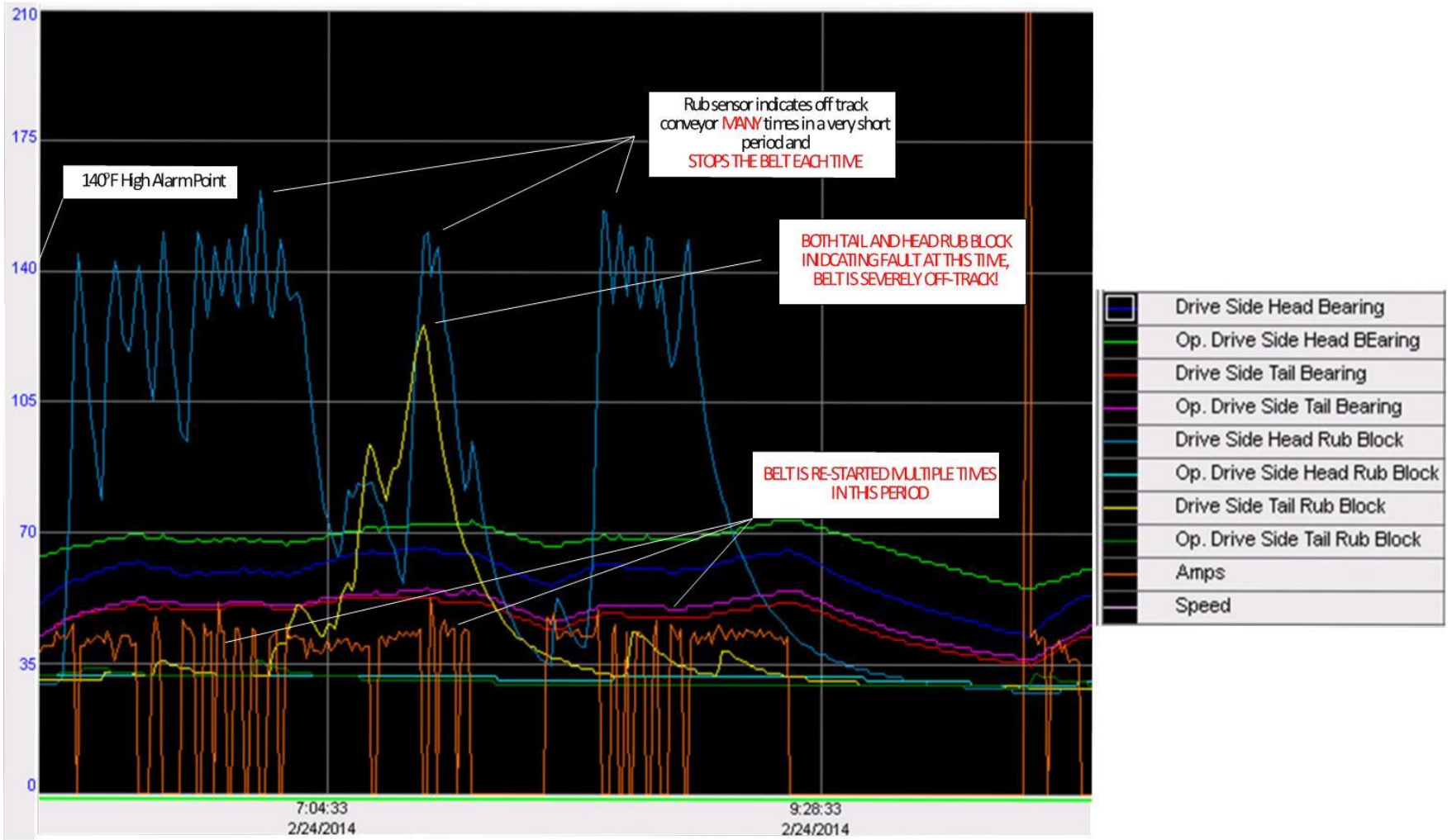
A Typical Strategy

1. Data from all systems is collected and archived
2. Data is backed up off site in case the local storage equipment is destroyed in the incident
3. A plan is in place to utilize the data in a forensic audit

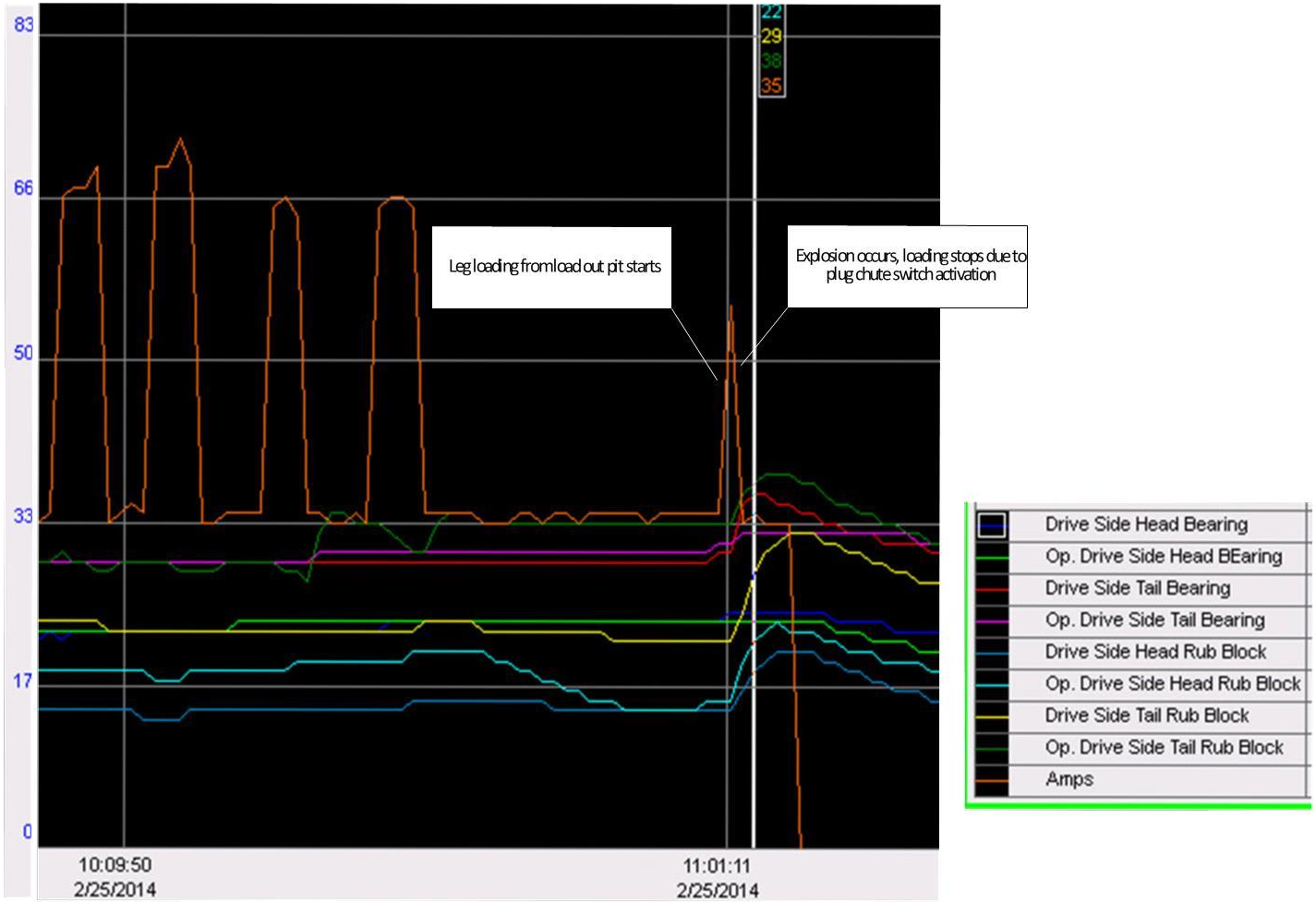
The Data Tells a Story

The data will provide clues and possibly even a complete chronology of what went wrong with what

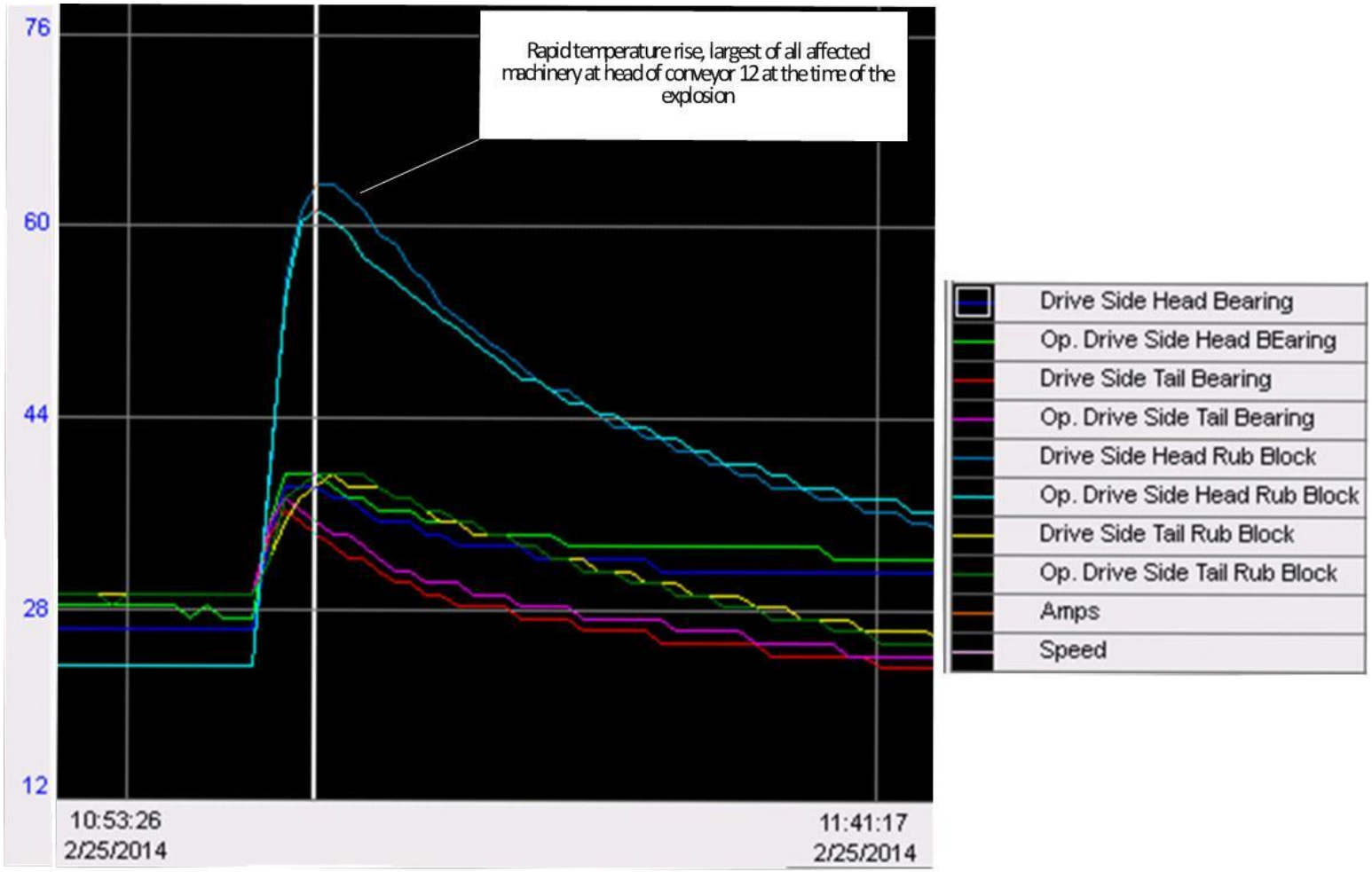
The Night Before



The Next Morning



The Smoking Gun



The Story Unfolds

- The night before in a hurry to get the train loaded and avoid the penalties the conveyor is pushed past its limits
- The next morning a truck is dumping its load into the leg and the dust cloud makes it way up the spout to the conveyor
- A burning ember ignites the dust cloud forcing hot gas down through the spouting damaging the conveyor and three legs

How Could A “Culture of Safety” Helped?

- There would have been specific procedures for restarting an off track conveyor
- Those procedures would have included physical inspection with cover off to ensure no hot materials were present
- Strict limits would be in place as to the number of re-starts of the conveyor before a complete inspection was required

The Bad News

- This incident was 100% preventable
- The operational logs for this facility was full of clues that the plant was being pushed and production being put before safety
- No one was looking at the data

The Good News

- There was only one minor injury caused by a falling blast cover
- The company used the system data to re-evaluate its operational and safety program
- Provisions are now in place to monitor plant operations and make use of operational data

Are There Any Legal Issues

I am not a lawyer so I cannot offer legal advice

But Here are Some Possible Issues

If your system can collect data and you have an incident you may be required to produce that data

Ooops! We Lost It

It may be worse not to have the data if it is demanded, the onus to collect and protect relevant data is on you

Who Has Access to the Data

- Do you know where the data is stored?
- Is it secured?
- Is it backed up or archived?
- Is someone responsible for the control and management of plant data?

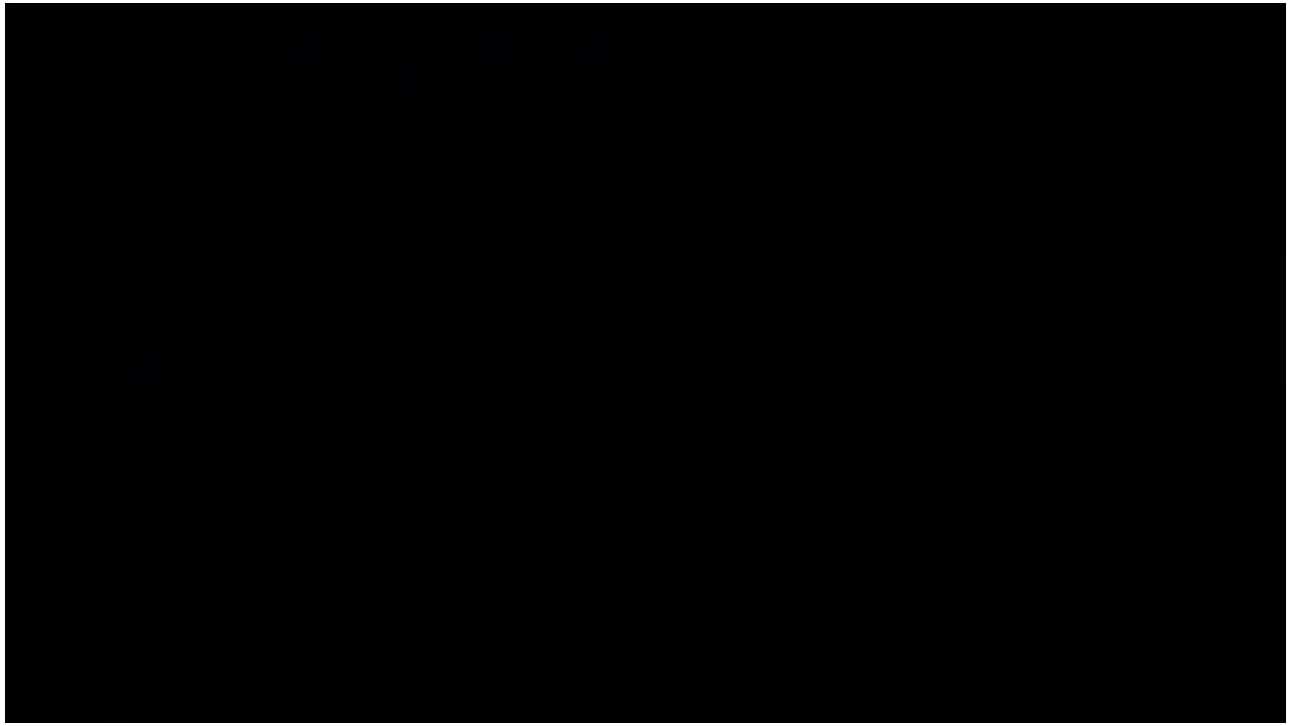
Who Controls the Data?

- Are there security protocols in place?
- Is the data stored on a safe network?
- Who manages access to the network and the data?
- Do you have a data loss protocol in place?

Have a Plan

- Don’t wait for an event to happen
- Have a fully developed plan in place
- Verify the plan and data collection system on a predefined schedule

Preventable.ca



Questions?

Thank You

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