



RESPA Case Study

Title: Hitachi Mining Shovels EX3600 in Open Pit Coal Mine

Summary: The Hitachi Mining shovel experienced regular extended downtime due to HVAC failure. This case study reveals a key to machine productivity, HVAC uptime. The dramatic turnaround in HVAC repairs took place after the RESPA Cab Air Quality system was installed. The machine went from 50 hours to 1000 hours and has not suffered HVAC downtime since the system was installed.

Company Information	
Company Type:	Open pit coal mine
Location:	Colombia, South America

Test Criteria				
Brief Statement of Problem:	70 hours between failures of the HVAC system due to coal dust saturating the evaporator core.			
What would constitute a successful test completion?	Reach 250 hours between equipment failures.			
Environment(s):	<input checked="" type="checkbox"/>	Humid	<input checked="" type="checkbox"/>	Dry Dust
		Muddy		Mixed Debris
	<input checked="" type="checkbox"/>	Heavy Debris		Snow
	<input checked="" type="checkbox"/>	Extreme Heat		Extreme Cold
Other Environment:				
Application:	<input checked="" type="checkbox"/>	Mining		Construction
		Agriculture		Forestry
		Waste Industry - Landfill		Waste Industry - Recycling
		Waste Industry - Transfer Station		

Machine Stats: Before RESPA Installation	
Manufacturer:	Hitachi
Model:	EX3600 (Same HVAC configuration on EX8000, EX2500, EX5500 and EX1900)
Precleaning/Filtration Equipment Currently Installed:	Factory installed HVAC system
Fresh-air Filter Replacement Interval:	50 hours
Recirculation Filter Replacement Interval:	50 hours
HVAC Breakdown/Repair Frequency:	70 hours
Cost of HVAC Repairs and Machine Downtime:	
Maintenance Includes Blowing Out Filter:	yes
Operator's Comments on Cab Air Quality:	Cab is dusty all the time and we had to report the shovel down very often because the HVAC starts blowing hot dusty air.
Notes:	Fresh air filters often fall because of the way they are secured to the housing

RESPA Installation

Total Hours Spent on Installation:	7		
Machine Hours:	28851		
A/C Serviced:	yes		
Initial Cabin Pressure:	1.15" W.G. (285 Pascal)		
Cabin Sealing Required:	no		
Cabin Pressure After Sealing:			
Installation Location:	<input type="checkbox"/>	Roof	<input type="checkbox"/>
	<input type="checkbox"/>	Side of Cab	
Notes:	Installation made with kit REV3k9 under the cab		

Performance Results

Test Period 1

Machine Hours:	28851		
Cabin Pressure:	1.15" Water Column (285 Pascal)		
A/C Service Required:	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
<i>If Yes, describe service:</i>			
Condition of RESPA unit(s):	Working correctly		
Operator's Comments:	A/C working correctly		

Test Period 2

Machine Hours:	28963 (112 hours of run time)		
Cabin Pressure:	1.13" Water Column (280 Pascal)		
A/C Service Required:	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
<i>If Yes, describe service:</i>			
Condition of RESPA unit(s):			
Operator's Comments:			

Test Period 3

Machine Hours:	29144 (293 hours of run time)		
Cabin Pressure:	0.35" Water Column (87 Pascal)		
A/C Service Required:	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
<i>If Yes, describe service:</i>			
Condition of RESPA unit(s):			
Operator's Comments:	The door seal was ripped off of the bottom of the door creating a serious leak and loss of pressure. It was immediately repaired		

Test Period 4

Machine Hours:	29634 (783 hours of run time)		
Cabin Pressure:	0.69" Water Column (172 Pascal)		
A/C Service Required:	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
<i>If Yes, describe service:</i>			
Condition of RESPA unit(s):	No issues to report everything looks and runs fine		
Operator's Comments:			

Machine Stats: After RESPA Installation

Fresh-Air Filter Replacement Interval:	1000 hours
Recirculation Filter Replacement Interval:	1000 hours
Machine Maintenance Interval:	1000 hours
HVAC Breakdown/Repair Frequency:	HVAC has not broken down since beginning of test
Cost of HVAC Repairs and Machine Downtime:	20.000 usd per hour
Operator Comments on Air Quality:	Cab is exceptionally clean air quality is very good.

Testimonials

Job Title:	Manager of availability
Comments on Product Performance:	We had HVAC breakdowns every 70 hours; the machine performance is really good but its availability was really low because of the issues with the air conditioner system. We have had almost 800 hours without a breakdown... the system works! The productivity gains have really helped our coal production and uptime percentage.

Images



Test machine is one of five EX3600's equipped with the RESPA-CF Vortex HyperFLOW Cab Air Quality System operating in the coal mine. As of the date of this report all five machines have exceeded 1000 hours of run time with similar results!



Fresh Air Intake Three RESPA-CF Units



Recirculation Air Three RESPA-FFX Units



Recirculation RESPA-FFX after 293 hours of run time.



Torn door seal which caused pressure drop at 293 hours of run time. At no time during the test did the pressure ever drop below 0.35" W.G. (87 Pascal). Superior pressurization contributes to protecting the cab and operator from dust infiltration.