RESPA Case Study

Title: RESPA-CF/CFX on Bulldozer in Coal Mine, load out area

Summary: *Prior to installation, operators had to wear respirators and shower at the end of every shift. They often worked with doors open due to diesel fumes in the cab. Filters only lasted 250 hours and the evaporator cores were cleaned every 500 hours, however the AC stopped cooling after 100 hours. Since installing the RESPA system, the cab stays clean, cool and comfortable and no filter change is required for the full 1000 hour maintenance interval; the evaporator coils stay clean too and there have been no HVAC repairs needed. Operators no longer need to wear respirators and they are still clean at the end of shift. We hope to install this system on all the machines in the mine.*

Company Information	
Company Type:	Coal mining
Location:	Colombia, SA

Test Criteria				
Brief Statement of Problem:	Excessive dust in the cab, the operators showered after every shift, 500 hours cleaning interval of the evaporator core, 250 hours fresh air and recirculation filter change. When the bulldozer was refueled, the vapors of the diesel stayed inside the cab causing dizziness, operators worked with doors open because of the fumes. After 100 hours, air conditioners stopped sending cool air to the cab.			
What would constitute a successful test completion?	1000 hours of filter change interval without dust getting inside the cab.			
Environment(s):	x	Humid	x	Dry Dust
		Muddy		Mixed Debris
		Heavy Debris		Snow
	x	Extreme Heat		Extreme Cold
Other Environment:				
Application:	x	Mining		Construction
		Agriculture		Forestry
		Waste Industry - Landfill		Waste Industry - Recycling
		Waste Industry - Transfer Station		
Other Application:				
Notes:				

Machine Stats: Before RESPA Installation

Manufacturer:	Caterpillar
Model:	D11R
Precleaning/Filtration Equipment Currently Installed:	original AC system
Fresh-air Filter Replacement Interval:	250
Recirculation Filter Replacement Interval:	250
HVAC Breakdown/Repair Frequency:	500
Cost of HVAC Repairs and Machine Downtime:	
Maintenance Includes Blowing Out Filter:	no
Operator's Comments on Cab Air Quality:	They had to take showers at the end of every shift, wear respirators
Notes:	

RESPA Installation

Total Hours Spent on Installation:	5			
Machine Hours:	34303			
A/C Serviced:	yes			
Initial Cabin Pressure:				
Cabin Sealing Required:	No			
Cabin Pressure After Sealing:	0.28 inch of water			
Installation Location:		Roof		Hood
	X	Side of Cab		
Notes:	REV3K4 Adaptation Kit, REV0003 Fresh Air System (includes Pressure Monitor) and REV0004 Recirculation System			

Performance Results

Test Period 1				
Machine Hours:	34511			
Cabin Pressure:	0.21			
A/C Service Required:		Yes	x	No
If Yes, describe service:				
Condition of RESPA unit(s):	functioning correctly			
Operator's Comments:				
Test Period 2				
Machine Hours:	34613			
Cabin Pressure:	0.27			
A/C Service Required:		Yes	x	No
If Yes, describe service:				
Condition of RESPA unit(s):	functioning correctly			
Operator's Comments:				
Test Period 3				
Machine Hours:	35005			
Cabin Pressure:	0.19			
A/C Service Required:		Yes	x	No
If Yes, describe service:				
Condition of RESPA unit(s):	functioning correctly			
Operator's Comments:				
Test Period 4				
Machine Hours:	35310			
Cabin Pressure:	0.17			
A/C Service Required:	x	Yes		No
If Yes, describe service:				
Condition of RESPA unit(s):	fresh air filter change			
Operator's Comments:				

Machine Stats: After RESPA Installation

Fresh-Air Filter Replacement Interval:	1000
Recirculation Filter Replacement Interval:	2000
Machine Maintenance Interval:	250
HVAC Breakdown/Repair Frequency:	None since RESPA Installation 5000 hours ago.
Cost of HVAC Repairs and Machine Downtime:	
Operator Comments on Air Quality:	It is the best, is cooler during the day, cab stays cleaner. No need for a shower or respirator is needed.

Testimonials

Job Title:	**Maintenance Manager**

Comments on Product Performance:

"Before the Respa, we had a lot of complaints from the operators because the air conditioner stopped working after 250 hours, the machine was reported down. We use to change the two filters and then clean the air conditioner system. Every major overhaul we use to strip down the cab, change all the seals, reupholster the hole cab trying to keep all the dirt out and the cab clean as possible. With the Respa the cabs are cleaner, the pressure monitor tell us that our cab is performing correctly and the best part is that we change filters every 1000 hours and we are scheduling our first air conditioner maintenance with the Respa complaints from the operators because the air conditioner stopped working after 250 hours, the machine was reported down. We use to change the two filters and then clean the air conditioner system. Every major overhaul we use to strip down the cab, change all the seals, reupholster the whole cab trying to keep all the dirt out and the cab clean as possible. With the Respa the Cabs are cleaner, the pressure monitor tell us that our cab is performing correctly and the best part is that we change filters every 1000 hours and we are scheduling our first air conditioner maintenance with the Respa after 5000 hours"

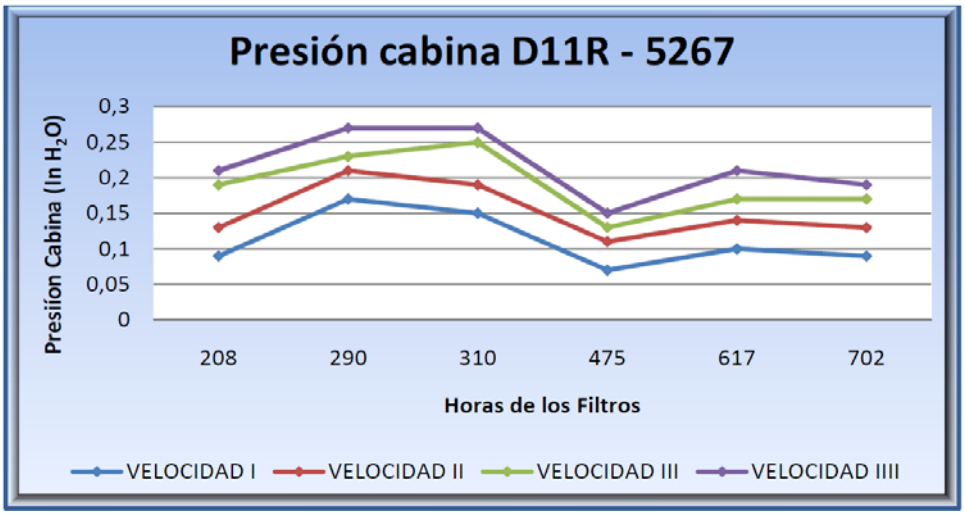
Job Title:	**Machine Operator**

Comments on Product Performance:

"The most important thing is that we don't have to take a shower after every shift, we no longer have to use the respirator in the cab because we don't see dust coming out of the vents anymore. Before, when they fueled the bulldozer, we used to work for several hours with the doors open because the filter was on top of the diesel tank and we got vapors and fumes inside the cab, making unbearable working in that environment. The systems works really well and we hope to see it really soon in all the machines in the mine".

D11R Equipped with RESPA-CF/CFX Cab Air Quality System

FECHA	HORAS EQUIPO	HORAS FILTROS	VELOCIDAD I	VELOCIDAD II	VELOCIDAD III	VELOCIDAD IIII
13/04/2012	34303	0				
25/04/2012	34511	208	0,09	0,13	0,19	0,21
01/05/2012	34593	290	0,17	0,21	0,23	0,27
09/05/2012	34613	310	0,15	0,19	0,25	0,27
17/05/2012	34778	475	0,07	0,11	0,13	0,15
24/05/2012	34920	617	0,1	0,14	0,17	0,21
28/05/2012	35005	702	0,09	0,13	0,17	0,19



Cabin pressure with just the RESPA-CF/CFS running blue line, Fan speeds 1-3 colors Red, Green and Purple.