

# DPF Maintenance: Avoid the 5 Most Common Mistakes



# *What keeps you up at night?*

*We asked this question at a recent trucking summit and the majority answered one of the following:*

## *Aftertreatment System Issues:*

- *Unscheduled downtime*
- *Breakdowns*
- *DPF maintenance*

# How Much Will Aftertreatment Costs Be?

Industry research has estimated that aftertreatment maintenance costs will be second only to tires by 2020.

Lee Long, Director of Fleet Services at Southeastern Freight Lines:

“In 2005, we spent 55 hours a week on emissions exhaust in our shops, and in 2015, it was 662 hours a week.”

In January he lamented his fleet spent \$1 Million just on diesel particulate filters alone.

# Aftertreatment Costs

*“Aftertreatment system maintenance is proving to be more costly than tire maintenance, making it possibly the single most expensive maintenance item on today’s trucks. Parts costs are prohibitive, the associated downtime can be crippling, and much confusion still exists about the care of these systems even after eight years in the field.”*

*- Figuring Out DPF Maintenance, Jim Park, Heavy Duty Trucking magazine*

## 5 Most Common Mistakes...

1. Upstream Leaks
2. Prolonged Service Intervals
3. Lack of driver training/communication
4. Ignoring the DOC/SCR
5. Incomplete DPF Cleaning



# #1 Upstream Leaks

“In the past we would let small things on the engine slide, like minor oil or coolant consumption, charge-air cooler or exhaust manifold leaks. You can’t do that today. Practically everything that can fail out in front of the aftertreatment system will harm the DPF, and those minor problems become a major expense.”

-Randy Obermeyer quoted in Heavy Duty Trucking article May 2016

# Most Common Upstream Leaks

- Leaking injectors
- Leaking exhaust pipes
- Manifold gaskets
- Coolant leaks
- EGR cooler leaks
- Leaks around the turbo

# System Leaks





# Turbo Exhaust V-clamp Leak

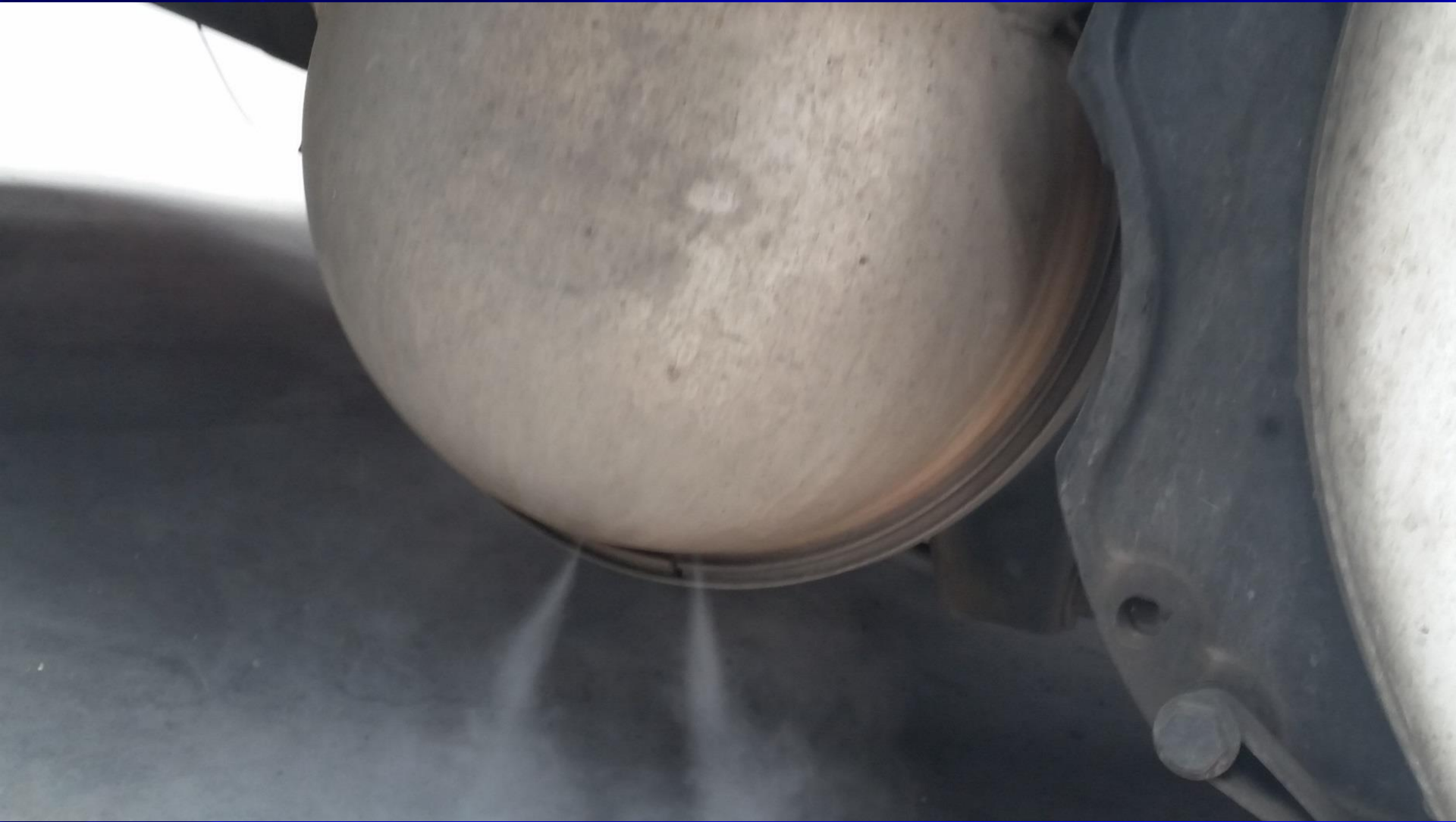


# Leaks and fuel consumption

“Leaks can also cause a diesel engine’s air management system to overcompensate with the fuel rate. The truck could be running 10 to 20% fat, not enough to smoke but enough to cause a DPF to clog. It might cause a .5 mpg drop in mileage, which won’t throw a fault code, it’s the worst case scenario for shops: there’s no code, but the truck is having a problem and they can’t find the cause.”

- Diesel Progress, July 2016

# Exhaust Gasket or Weld Leak



# Delta switch leak



# Exhaust Bellows Leak



# Upstream Leaks

“Maintenance executives ... have learned to hunt for upstream problems that throw contamination downstream to DPFs.”

- Transport Topics, Truck Techs Keeping Busy With Aftertreatment Issues, Jonathan Reiskin



System Pressure

Flow Control

ON

OFF

Test Pressure

Pressure  
Regulator

Flow Meter

To Set Pressure:  
Pull to unlock  
Turn to adjust  
Push to lock

MADE IN  
CALIFORNIA  
USA

DO NOT USE IN EVAP SYSTEM

FSX

DPF  
PROTECTION  
TECHNOLOGY

## #2 Prolonged Service Intervals

- OEMs recommend 250,000-400,000 miles
- FSX recommends the following:
  - Long Haul: 150,000 – 200,000 miles
  - Local, stop & go: 100,000 – 150,000 miles
  - Severe duty: 75,000 – 100,000 miles
  - Transit, garbage, idling: 50,000-75,000 miles or 2500 - 3500 hours



# TMC Deep Dive into Aftertreatment

Why do we have the problems we have with aftertreatment system failures? We have tunnel vision if we say that everything is the DPFs fault. We need a change of attitude. A whole bunch of upstream problems, usually caused by our own neglect, cause the DPF problems and then the DPF tries to fix itself. The self-fixing turns into self-destroying. Upstream problems cause most aftertreatment issues & failures.

- Bryan Lewis, ASE Master Med/Heavy Truck Technician, MD/HD Truck Instructor

## #3 Lack of Driver Training

- Drivers are the first line of defense when something is wrong
- Drivers need to be trained about the codes
- Drivers should have an easy way to report any issues

# Train Drivers to Communicate

*“Drivers have to communicate with their maintenance colleagues about check-engine lights and other warnings. Furthermore, if drivers are carrying 5 gallon jugs of coolant or diesel exhaust fluid and topping off the tanks that empty quickly, that is a classic warning of leaks upstream that probably are flowing toward aftertreatment systems.”*

- Transport Topics, Truck Techs Keeping Busy With Aftertreatment Issues, Jonathan Reiskin

# Train Drivers

There have been a lot of self-inflicted wounds on DPFs. Moore said he knows of drivers who have disabled the DPF regeneration function and failed to turn it back on, and that leads to filter clogging and then a derating of the truck.

- Tim Moore, VP Roadside Operations, FleetNet America in Transport Topics, August 8, 2016

# #4 Ignoring the DOC & SCR



# #5 Incomplete DPF Cleaning



# Don't run clogged DPFs!

Lee Long of Southeastern Freight Lines explains,

“Another contributing factor to premature engine overhaul is engine block heat retention. This is caused by constant chronic backflow from a clogged aftertreatment. The backpressure makes it difficult for the engine to vent its heat. Many fleets have noted this when they run clogged DPF's for example. Too much heat shortens the life of the engine.”

# Basic Elements of Successful DPF Cleaning

1. Focused Cleaning
2. Clean Both sides
3. Visible Process
4. Accurate Testing





**FSX** **TrapBlaster 7**

Clean Filters With  
**DIRTY SIDE DOWN**  
**CLEAN SIDE UP**  
(OUTLET SIDE OF FILTERS UP)

↑

**Do Not Clean:**

- Hot Filters (60° or higher)
- Hot Filters (over 40% - 100%)
- Smoking Filters

LOWER SPEAR

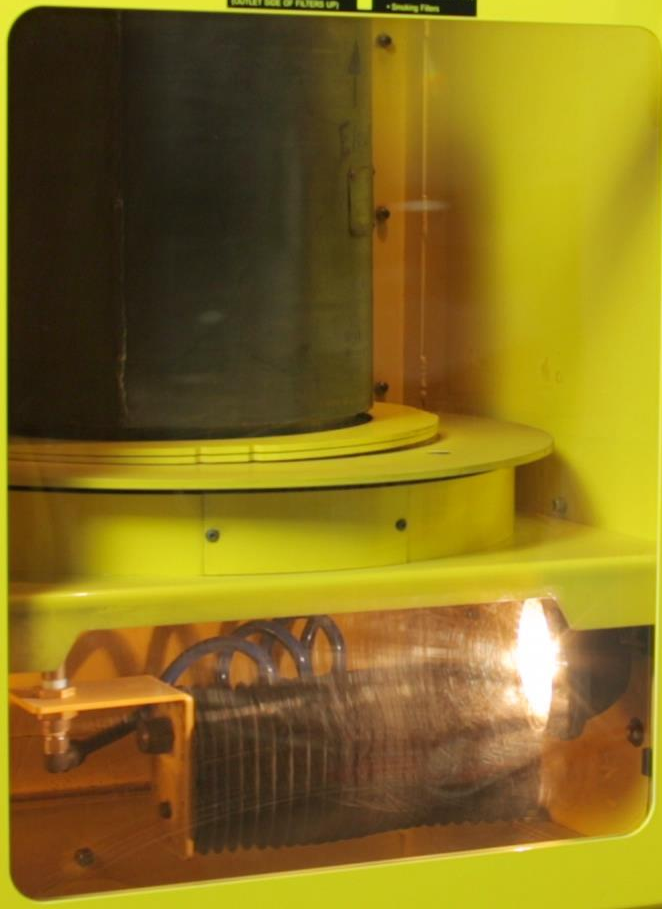
ENGAGE	MOVE	LEFT POSITION	RIGHT POSITION
BLAST OFF ONLY	ONLY	ADJUST ADJUST	ADJUST ADJUST
		LEFT HOLD RIGHT	LEFT HOLD RIGHT

**FSX** **TrapBlaster 7**  
DPF Pneumatic Cleaner

[www.FSXC.com](http://www.FSXC.com)  
Patent Pending



INCHES PRESSURE



# COMPLETE CLEANING SYSTEM



# 3 Key Diagnostics

- Flow measurement



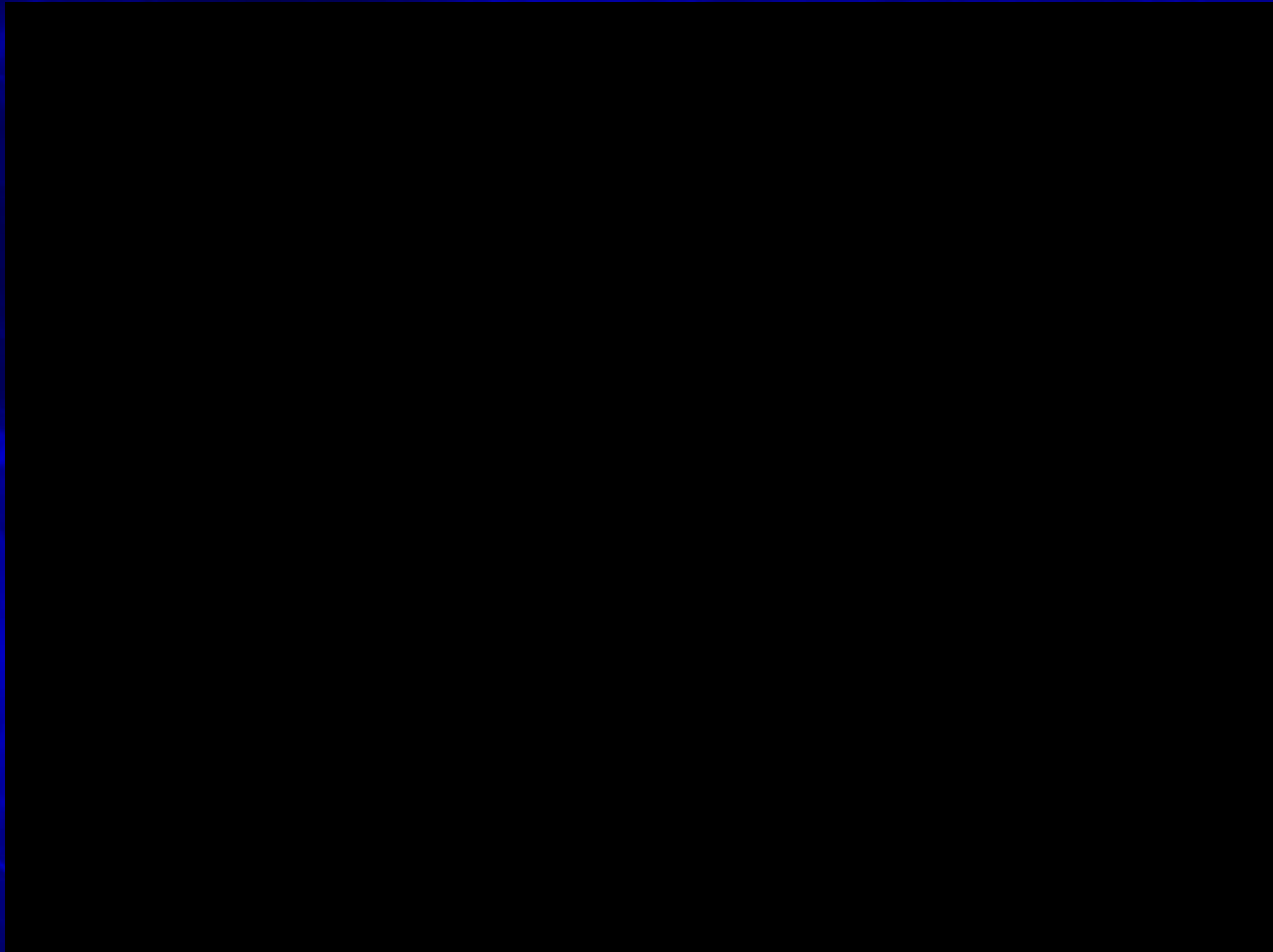
- Bypass detection



- Pin gauge test




**TEST → CLEAN EVERY CELL → TEST AGAIN**



# VISIBLE FAILURE MODE DETECTION

VISIBLE CLEANING PROCESS



# Why is it important for fleets to properly care for their DPFs?

*“DPF maintenance is still a new topic to many fleets ... If they are not paying attention to how often their regenerations are occurring and doing PM on the DPF, they end up with unplanned breakdowns, often with a load, and costs multiply quickly. Emission system PM can be done in a shift while a downtime repair can be a week or more depending on what is wrong and where parts are ... plus PM is significantly cheaper than a repair.”*

Jamin Woody

Service Manager

Motor Trucks

Everett, WA

# Dump the garbage!

*“The DPF is the trash can for the emissions system. Occasionally it needs to be emptied. As with the trash can at your house, when you jam trash in and then stomp on it so that you can fit more in, it becomes a challenge to get it out.”*

Kirk Altricher  
Past TMC Chairman  
VP of Maintenance  
Crete Carriers



# What happens when fleets improperly maintain their DPFs?

*“Plugged DPFs, low power complaints, engine derates, cracked DPFs and damage to DOC.”*

Kirk Altricher  
Past TMC Chairman  
VP of Maintenance  
Crete Carriers





# MYTH #1

## Regeneration Cleans The Filter *False!* No Need For Other Maintenance

- DPF Regeneration Oxidizes Soot Only
- DPF Regeneration Does NOT Remove Ash!
- Ash Build-Up Must Be Cleaned or it can cause the DPF to fail.
- **REGEN DOES NOT REMOVE ASH!**
- **DPF MUST BE REMOVED TO CLEAN ASH**

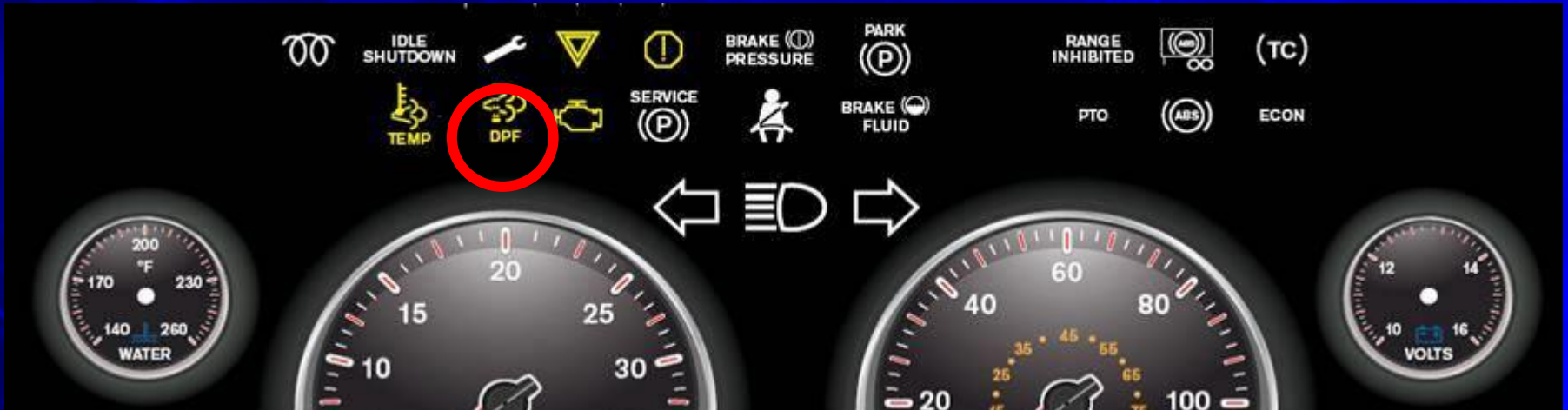


# MYTH #2

The DPF Status Warning Light tells you when to clean ash from the DPF. **False!**

**Truth:** The light monitors the operating status of the Active Regeneration System, as it relates to restriction from soot.

**Truth:** Too frequent regeneration cycles indicate increasing ash build-up.  
(Diesel particulate filter damage likely)

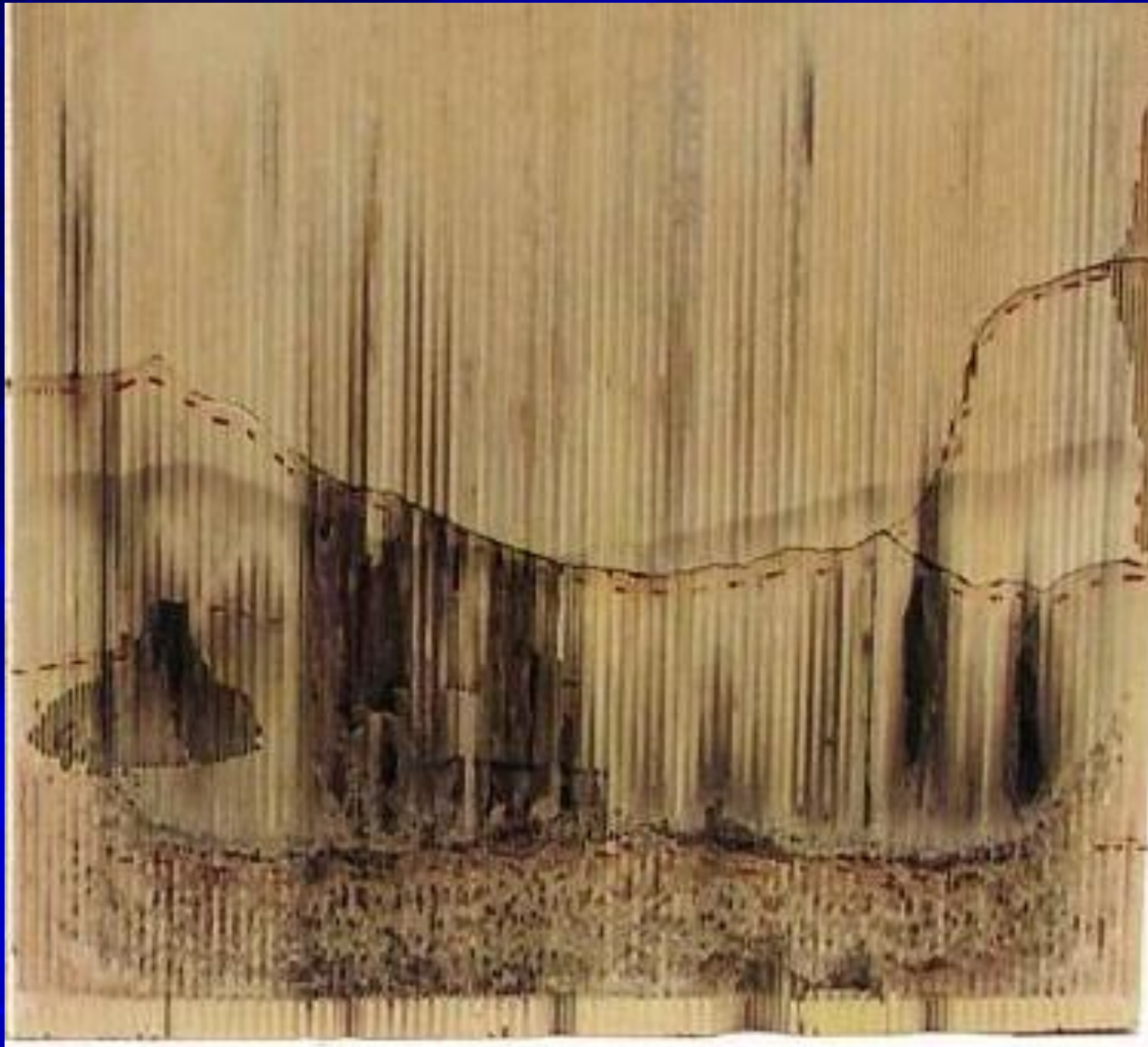


# Hardened Ash Plugs & Accretions



- Ash comes from engine oil burn
- Hardening comes from regenerations and coolant leaks
- Identified with pin gauging

# Ash & Cracking

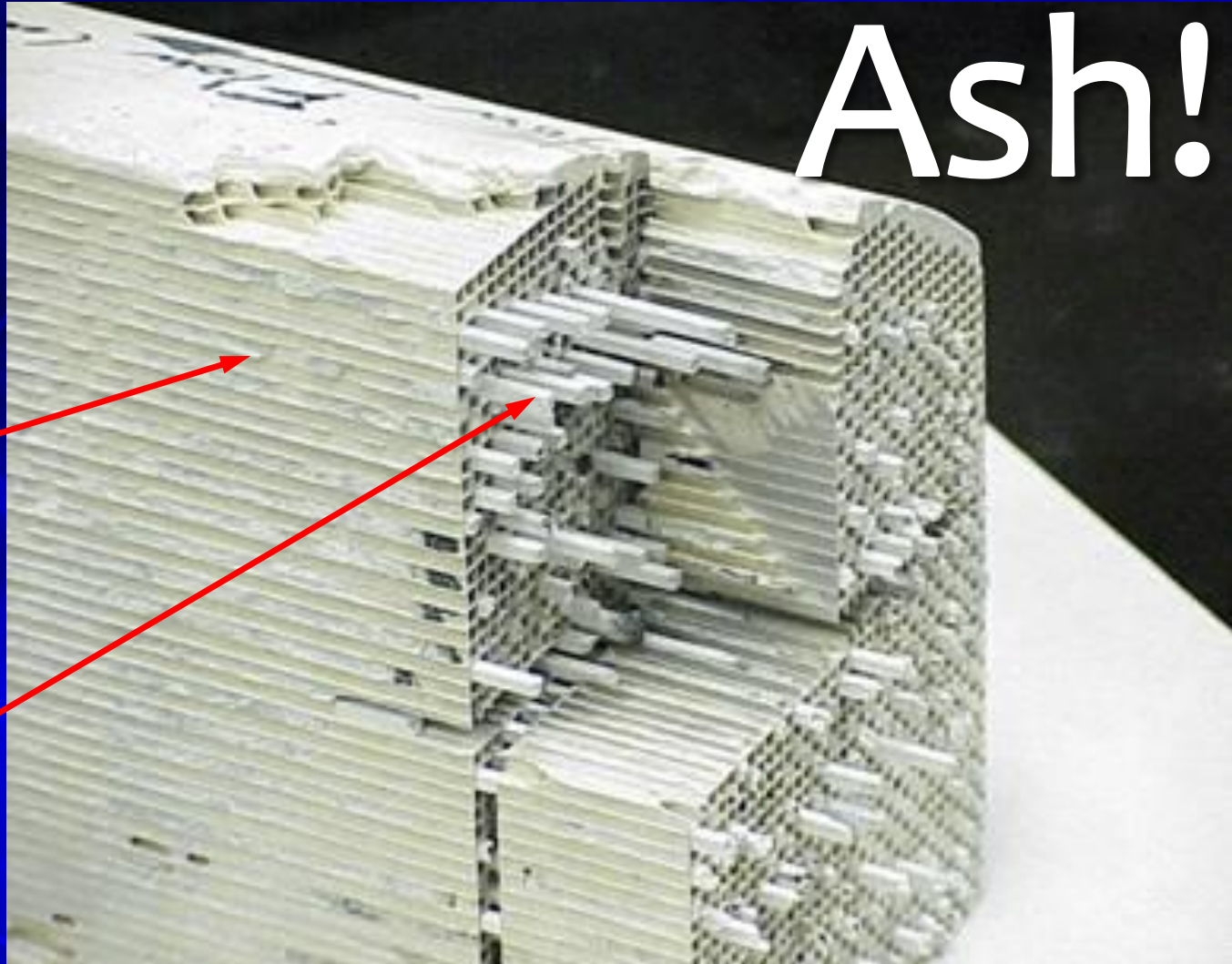


# What Do Most Failures Have In Common?

# Ash!

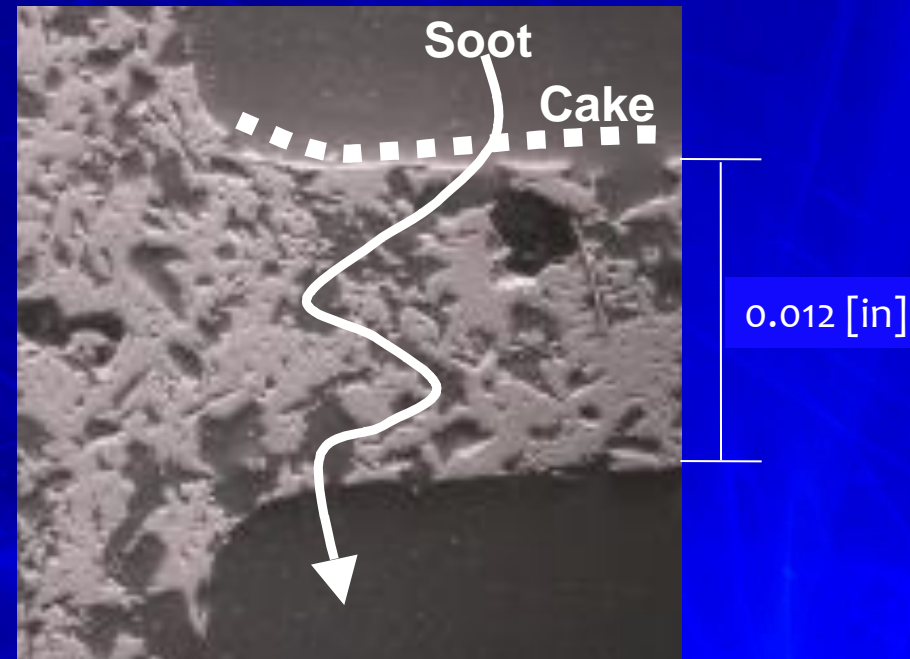
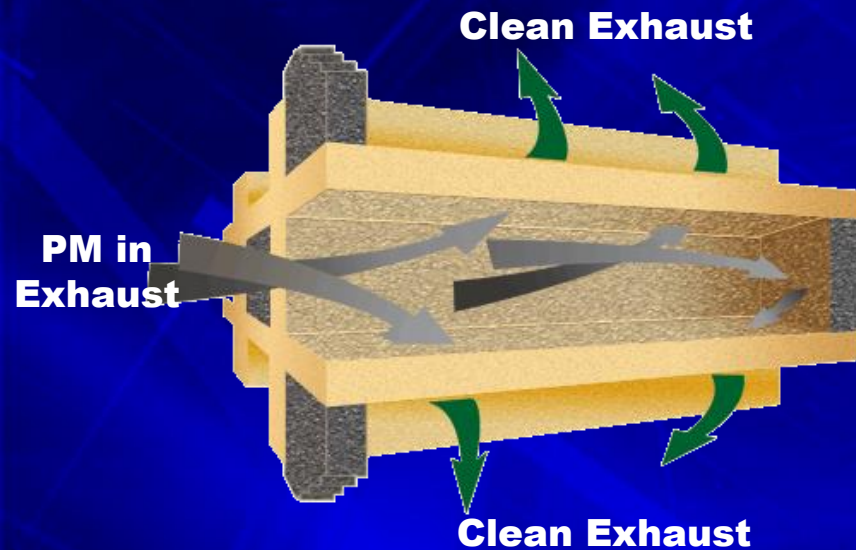
DPF

Ash  
Plugs



# A Closer Look

- Soot particles (particulate matter – PM) are trapped on or in the ceramic filter wall



# FLEET COST OF DPF FAILURE

- Average Cost \$2,500 Per DPF
- 400 Units X \$2,500 = **\$1 Million at Risk!**
- In Service DPF Failures are Expensive.
- Direct Costs
  - Towing
  - Downtime
  - DPF Replacement
  - Penalties
- Lost Engine Performance
  - Up to 4% MPG Loss.
  - Reduced Horsepower.



# What about wet washing the DPF?

- Stage 1 – FSX pneumatic cleaning – get it out dry
- Stage 2 – FSX thermal cleaning (optional)
- Stage 3 – FSX wet cleaning if necessary





# FSX CAPABILITIES



Stage 3 - Wet Wash Chemical Solutions



# CATALYTIC TESTING



**FSX CatTester**



**Questions?**

**FSX Equipment Inc.**

**360-691-2999**

**[fsxinc.com](http://fsxinc.com)**