Steel Camel Presentation
Diesel Equipment Rental

How To Tackle Water In Diesel Rental Operations To:

- Prevent Premature Wear of Fuel Injectors and Pumps
- Reduce Unhappy Customers
- Reduce Equipment Downtime
- Lower Overall Operating Costs

About Steel Camel..
We Solve Problems..

We Lower Maintenance Costs

We Increase Up Time

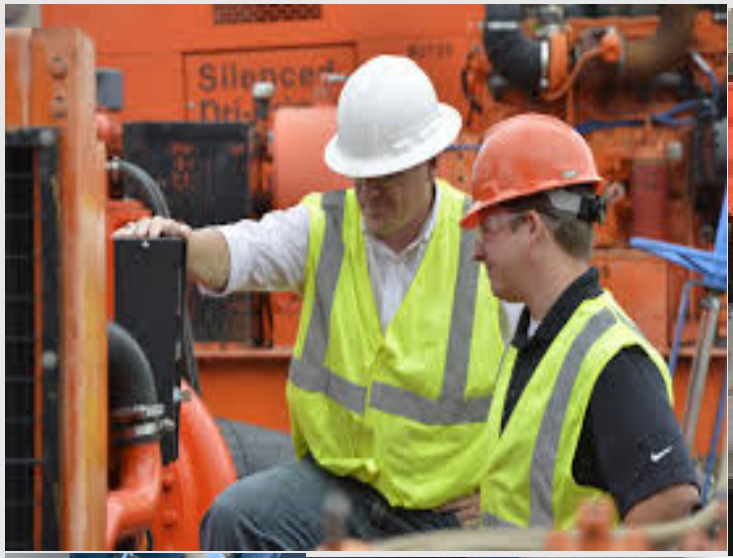
We Prevent Accidents

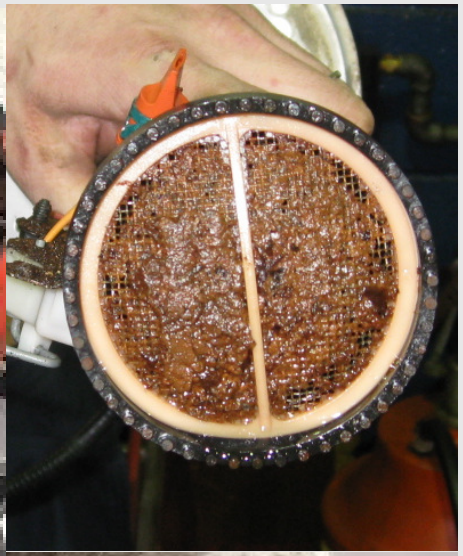
Specialists in Water & Corrosion

Experience in Heavy Equipment & Fuel Storage

Shell

Symbolic of What is Observed At Rental Yards



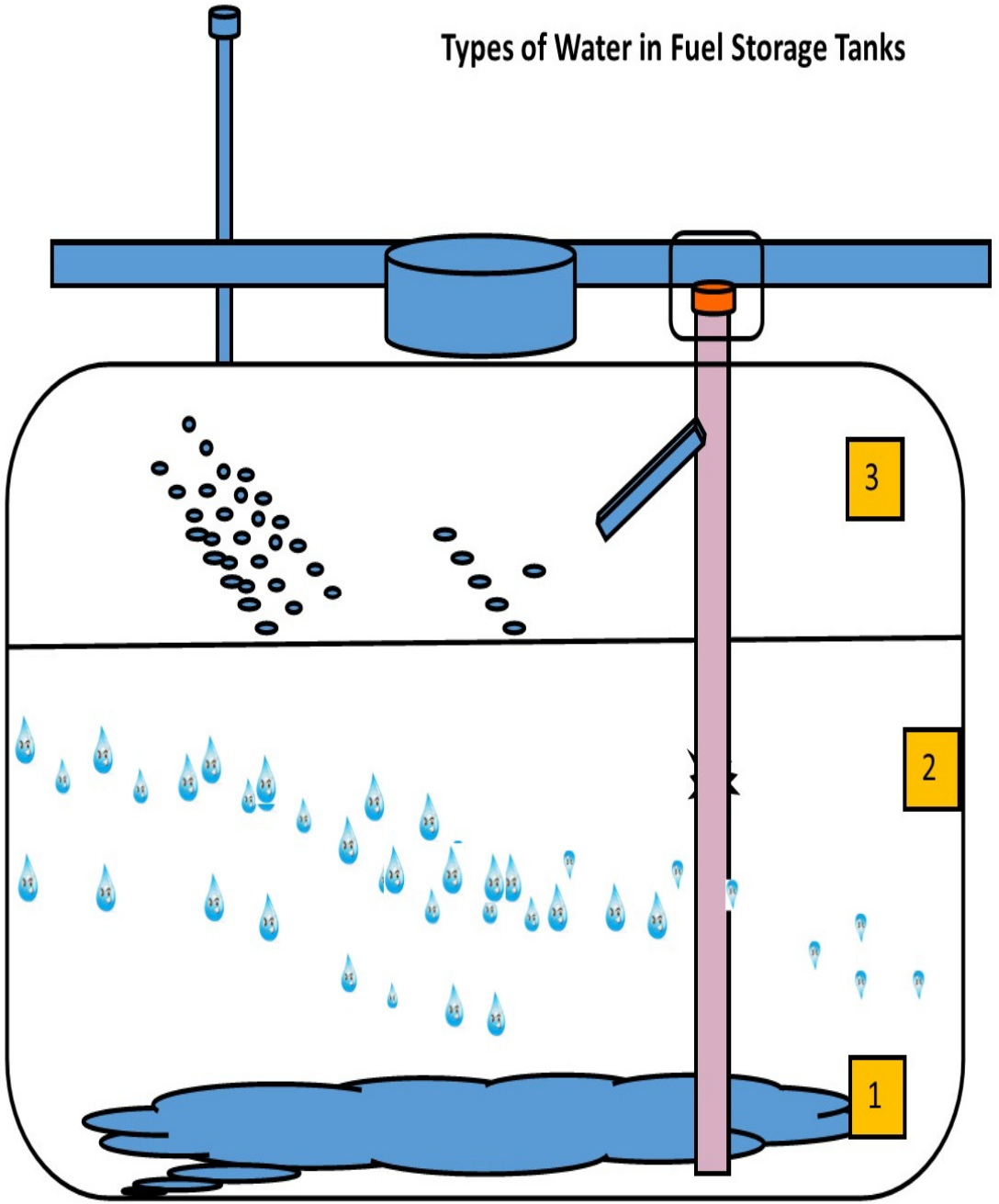


Review of Water Collection Points In Fuel Storage Tanks

1. **Free**
2. **Suspended**
3. **Atmospheric**

Xylem has all three…

All must be addressed



Water and Its Relationship to Diesel Fuel Engine Parts & Storage Tank Wear & Failure

The particles of debris and unburnt fuel due to increased water levels is damaging components. This is particularly true in fuel injectors

Why Is Water So Destructive?

- **Creates Pits & Holes**
- **Causes Expansion of Metal Parts**
- **Part of Sludge Formation**
- **Reduces Combustion Energy…. Poor Engine Performance**
- **Allows Unburnt Fuel – Carbon Deposits on Injectors… Not high enough temperatures….leads to damage**.

Particularly Bad for High Pressure Common Rail Tier 4 Engines.

Areas To Tackle In Presentation…

all related to Water / Moisture

- ✓ Dispenser Fuel Filters
- ✓ Engine Fuel Filters
- ✓ Fuel Tanks
- ✓ Fuel Dispensing To and From Storage Tank
- ✓ Fuel Caps
- ✓ Venting Caps
- ✓ Filtering Fuel in Storage Tanks, both at shop & in field.
- ✓ Water Detection Devices
- ✓ Alert Mechanisms for Water

Some Issues

Rental Equipment Can Sit or It Can Utilized 100%.
Customer Fueling Habits and Deliveries Can Also Vary.

Common Poor Practices

1. Many Tech current use paste to detect water in fuel tank.

Major Problem: The paste is only picking up free water on the bottom of tank. The cloudy fuel in the column is not being detected, thus creating problems.

Common Poor Practices

2. The fuel returned to the main tank likely has water… based on customer fuel usage habits.

This leads to increased problems for fuel storage tanks. Confirmed by staff and noticeable water in filter bowls

Common Poor Practices

3. Many companies combine particulate filter and water separator on main tank.

Problem #1 OEM filters and separators are not working 100% to stop water.

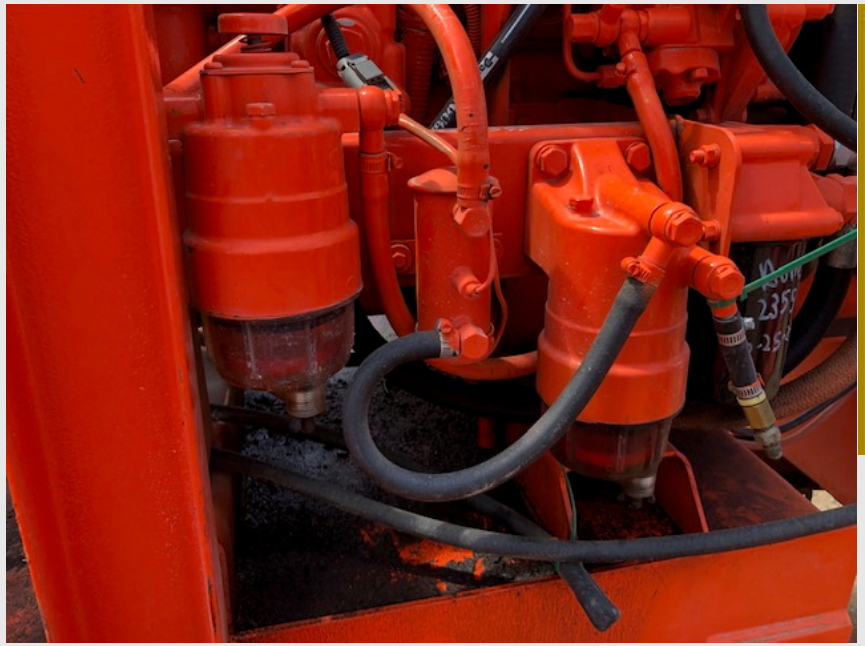
Problem #2 Water gets through to rental equipment fuel pump to the injectors if drain valve is not opened.

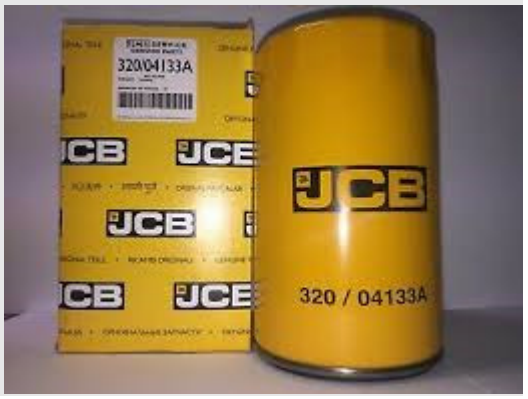
Typical Particulate Filter and Water Separator Set Up.

Common Poor Practices

Many OEMS are set up to employ a dual particulate filter system with a water on separator their rental equipment.

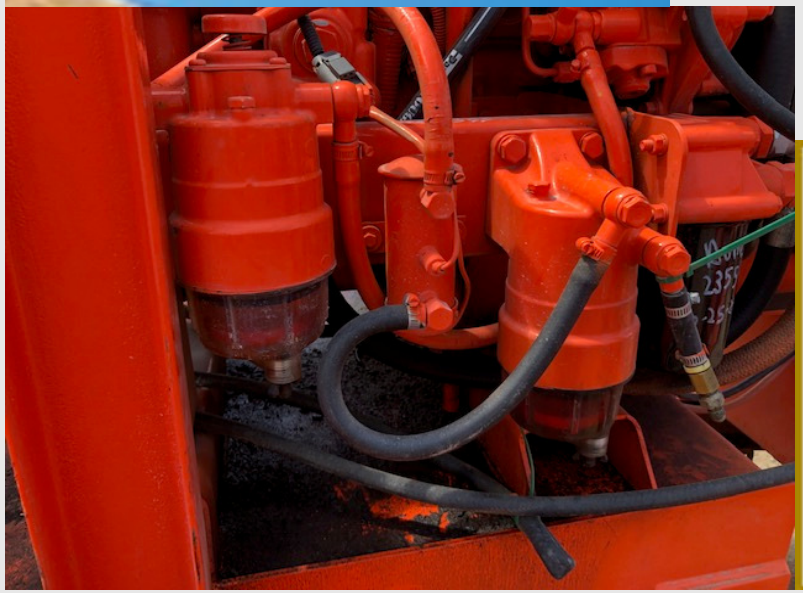
Problem #3 This situation relies on rental customer to use discharge valve on water separator. The customers often will not follow directions / drain the valve. This leads to water getting into injector rack and further related issues.





Common Poor Practices

4. Black Smoke....results of too much water interfering with combustion.



4. While customer might not pay attention. Rental Companies Should. Many Techs use “leaning” techniques.

More attention should be payed to excess water.

The Best Defense Against Corrosion, Premature Wear and Part Failures Is An Aggressive Offensive Strategy Towards Water.

Tackle The Water Early and Often !!

Products

Dieselcraft
Diesel Performance Products

SC
Steel Camel

Distributor & Manufacturer

Key Strategies and Techniques To Be Addressed In This Presentation and Proposal

1. **Blocking Water**
2. **Removing Water**
3. **Testing For Water**
4. **Inspections**

Steel Camel

Let's Take Closer Look At Technology & Water Issues

How Does Water Get Into Rental Equipment Storage & Mobile Equipment Tanks?

1. General Condensation……From both temperature changes and with deliveries. Particularly with tanks maintained with low levels.

2. Rain / Humidity

Rental Equipment Typically Sits & Works Outside.... plus

Over time, operator sloppiness , lack of attention leads to water intrusion

3. Current Caps on High Usage Machines are not suited to handle high levels humidity

Therefore, water creeps into tanks.

4. Fuel Transfer Coming Back From The Customers

Detecting Water

“Prevention is Better than Cure”

Detecting Water- Techniques
- Internal Fuel Testing
- Keep Customers in Check

1. Visual 2. Chemical 3. Filter Alert 4. Lab Karl Fischer

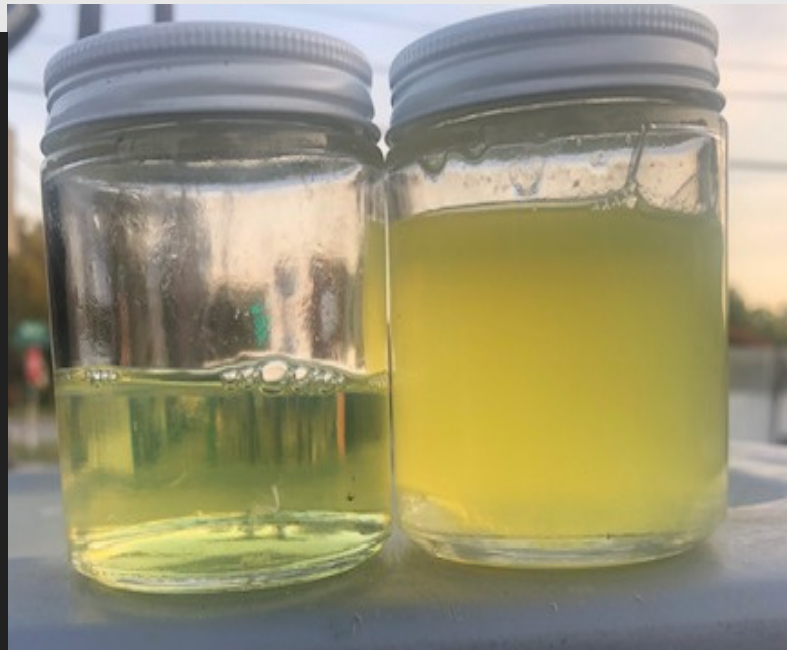
Detecting Water - Technique – Visual Alerts

1. Recommend Field and Yard Techs Check For Water with the Bailer.. Early and Often. Record which machines have cloudy fuel.

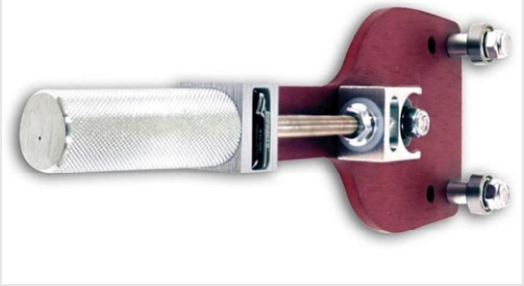
Address Immediately.

The bailer can detect emulsified water

Use in conjunction with paste.

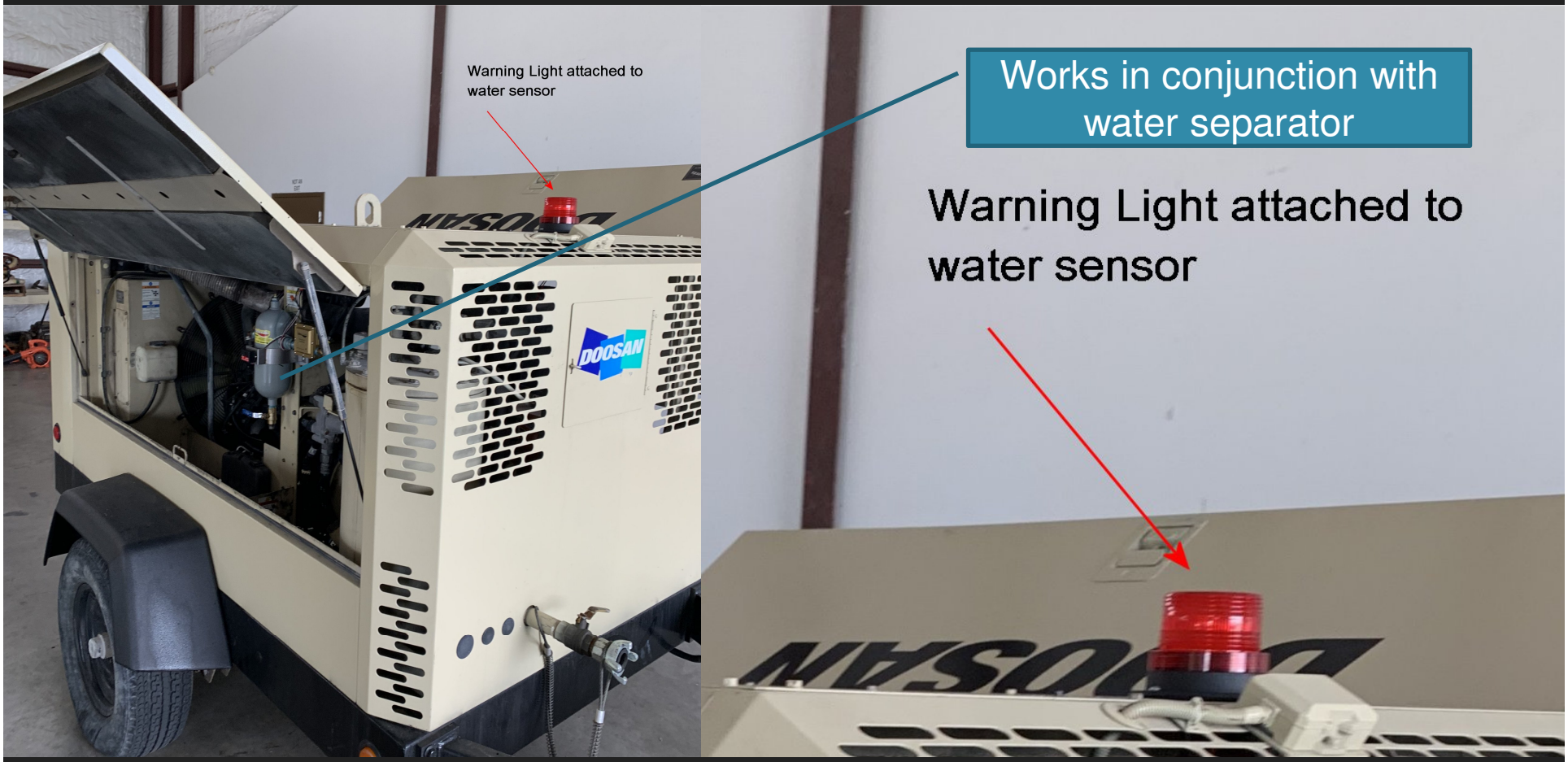


Inspecting For Water – Inspect The Fuel Filters



2. Recommend companies purchase filter cutter for both shop and field techs.
Find Sludge and You Find Water……..Address Immediately.
Find Rust and You Find Water……..Address Immediately.

Detecting Water - Water Sensor and Flashing Red Light



Alerts Rental Customer to Empty Bowl in Filter… Hooked up to Diesel Craft Water Separator… 3. Recommend for high volume machines…

Inspecting for Water- Technique – Slow Flow

Find Slow Fuel Flow and Typically You Find Water. WaterGuard Filters have swell mechanism that slows flow and alerts the operator…Common Filters Employed Do not.. Big Difference when it comes to preventing fuel injector problems. Filter sizes would need to be researched.

Yes, there are other water absorbing filters on the market……..let's compare
1) Volume of Water Held 2) Durability Under Pressure 3) Ability to Deter Sludge

Karl Fischer Lab Test.. If cloudy fuel is found on regular basis.

OASIS REPORT

Severity: (N) - Normal

Oil Analysis Data Sheet Report

Sample ID: SEPD WINTER HAVEN **Description:** PROTEC FUEL MANAGEMENT

Manufacturer: **Oil Type:** **Grade:**

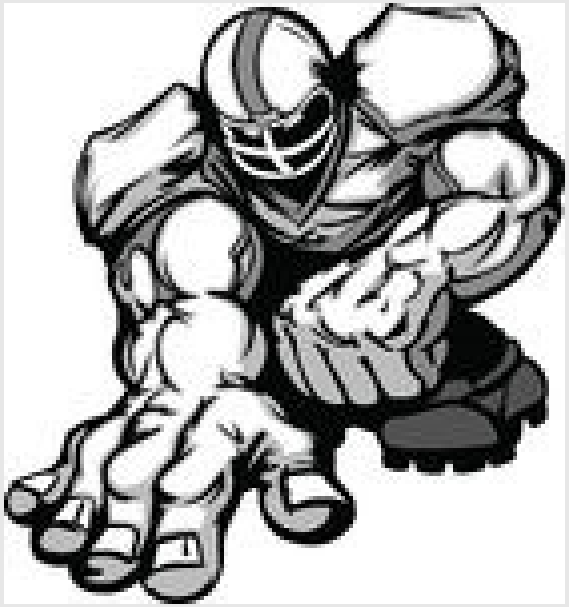
Lab Number / Sample Date	Units	729006 06/06/19	728580 05/31/19
ADDITIONAL TESTS			
Karl Fischer H2O	ppm	8947	12198

Data Interpretation:

Karl Fischer H2O (Mass %): 0.89

…. Companies with consistent water are advised to have supplier and customer fuel checked for suspended water…… do it discretely on deliveries. Use a visual fuel clarity test to start. If cloudy , send to lab. If over 350 ppm …make changes. Cost is roughly $40.00 per test

Blocking Water



- ✓ **Diesel**

Blocking Water - Technique – Vent Stack Filter

Yard Fuel Storage Tanks.. small investment…big pay off.
Very Effective for High Through-put Tanks

Blocking Water - Technique – Breather Cap on Equipment

Only if the port is available on Tank Top of Rental Unit… Needs to be explored. Particularly for with Machines High Volume Fuel Use.

Blocking Water - Technique – Employ Water Blocking Gel for Fuel Caps.. Easy to apply with a Caulking Gun.

Use On all equipment until yard and customer until water problems are under control…then as preventative maintenance. Less than a dollar per application. Good idea for preventative maintenance plans.

Removing Water - Yard and in Field

Portable Water Separator & Filters... Electric.

Dieselcraft
Diesel Performance Products

Removing Free Water off Bottom - Technique

Diesel

Dieselcraft
Diesel Performance Products

These Units have By-Pass Valve to Pump Free Water and Debris off Bottom.

Uses Pump Only.

Easy to Drain Into 5 Gallon Bucket

Get Water Early & Often

Removing Suspended Water -

Diesel

Dieselcraft
Diesel Performance Products

Same Portable Unit:

Suspended Water Remover

25-30 gallons Per Minute
@ 1600-1800 gallons per hour

Same Machine / Switch Valve to Operate Water Separator

Plug In and Go

Removing Emulsified Water -

Diesel

Suspended Water Remover
Emulsified Water Remover

30 gallons Per Minute
@ 1800 gallons per Hour

Plug In and Go
Can Be Truck Mounted, or
On Wheels For Portable.

This unit is also used to pump fuel and capture water and debris from units coming back from rental to facility storage tank.

Both Free and Suspended Water.

Dieselcraft
Diesel Performance Products

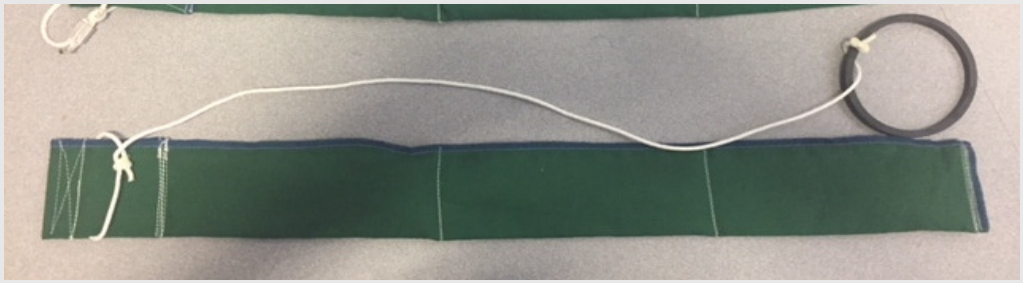
Critical to Control Incomimg Water Fuel Mixture Into Bulk Tank

This unit is also used to filter out fine droplet of water….down to 10 micron….Important for High Common Pressure Rail Engines, Which Xylem deploys….this needs to be addressed.

Dieselcraft
Diesel Performance Products

Removing Water - Yard and in Field

Ongoing Water Absorption in Equipment Tanks



Camel Tails Water Absorbing Socks. Placed and secured in tanks. Checked Every 30 Days. Provides ongoing protection and alert mechanism

Sizes for 2 inch and 3 inch fill port openings.
Large one hold 19 ounces...Small Ones Hold 6 ounces of water.

If units swell often, further investigation needs to occur.

Removing Water - Yard Tank

Recommend Water Guard Filter as Secondary Filter

Unit Will Choke off when excess water is present and produce Slow Flow to alert operator of change.

Review….Water Effects Fuel Quality Which Effects Operating Costs for Rental Operations

Review…Water Has Relationship To High Pressure Common Rail Injectors

The Tolerances of HPCR Engines are much tighter

Specifications are base on clean, dry, debris free fuel.

Rental Customers may not be maintaining fuel properly.

Engine Manufacturers will not warranty water fuel problems.

So Rental Companies Must Take Matters Into Their Own Hands.

Breakdown of Costs To Rental Companies

1. **Costs of Labor for Parts, Maintenance, Repair and Overhaul Associated with Water in Fuel.**

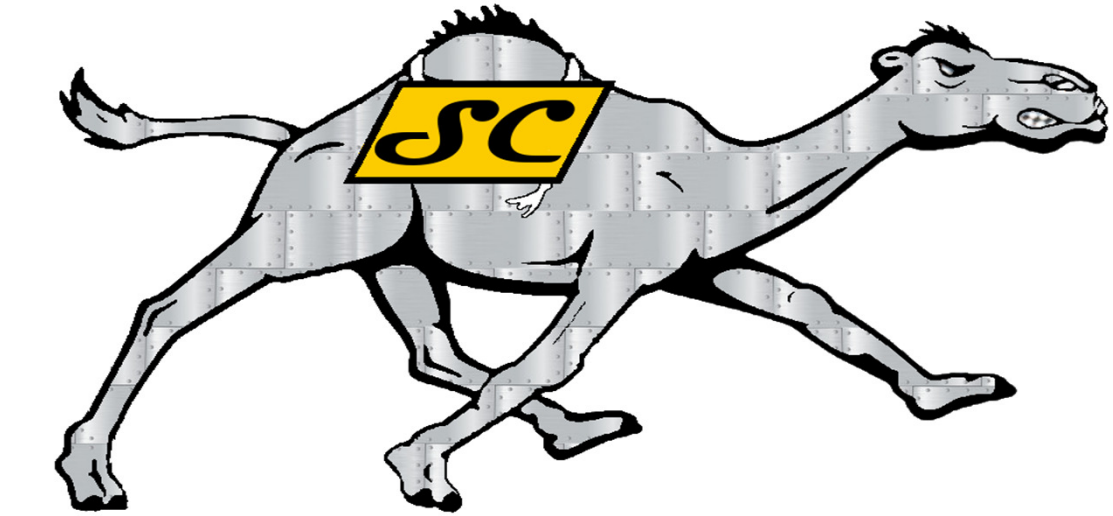
2. **Opportunity Cost of Machines Being Down / Not Able To Be Rented.**

3. **Costs of Unhappy and Lost Customers**

4. **Cost of techs being tied up when they can be making profitable service calls.**

Product Costs From Steel Camel

	units	case	
Bailers	12	1	$125
Dispenser Filters 5 x11	6 x $78	1	$468.00
Camel Tails – Small 1"	12	1	$215.00
Camel Tail – Large 2"	12	1	$421.00
Dieselcraft	1		$9500.00 delivered X 2 = $19,000.00
Vent Filters / with hardware	2 x $95.00		$190.00
Bushings (available upon request)			
Equipment Filters - Secondary	6 x $78	1	$468.00
Filter Cutter	6 x $75.00		$450.00



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