2020 fuel challenge and beyond…

– Adaptive Fuel Line upgrade solution

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2020 fuel challenges & considerations

- VLSFO fuels = Black!
- High variety of different fuel blends
- The size of the catalytic fines is decreasing
- Catalytic fine streams will be a main blending component also for the new VLSFO fuel blends

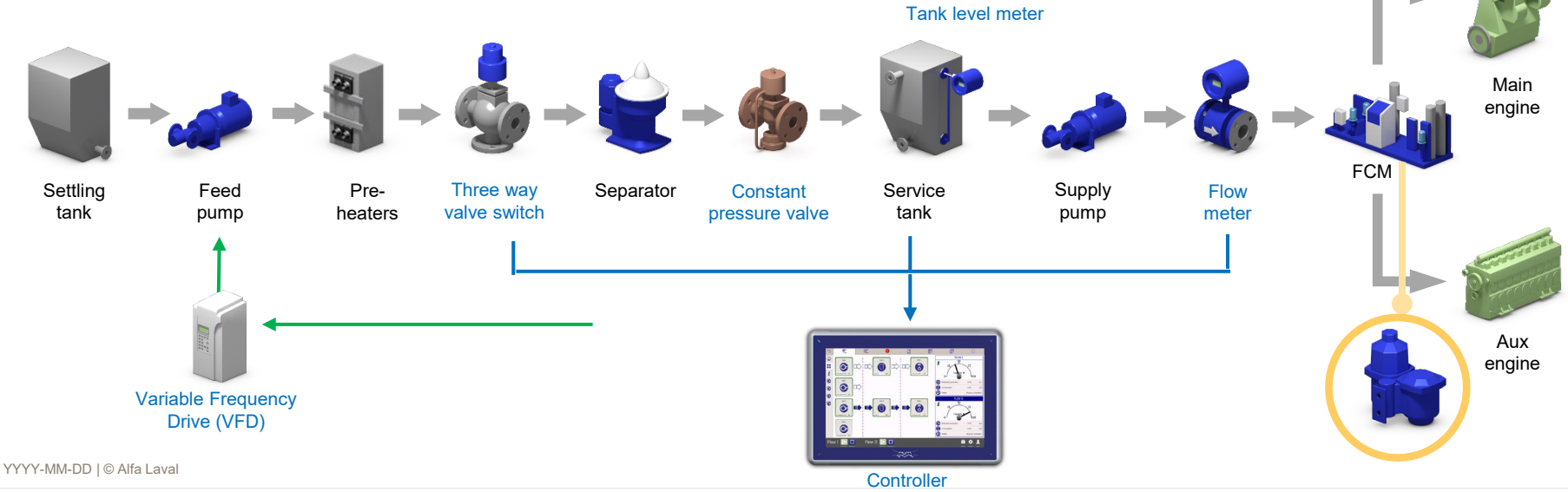
Fuel changeover – considerations

When changing over between different fuels you need to make sure your equipment is ready

			Fuel Condition Module / Booster			
Considerations	**Feed pump**	**Separator**	**Supply/circ. pumps**	**ACS / Cooler**	**Filter**	**Flow control**
Temperature gradient						
Change in viscocity	✓	✓	✓	✓		FlowSync™
Lubricity	✓		✓		✓	
Cat fines		✓				FlowSync™
Flow rate	✓	✓	✓		✓	FlowSync™

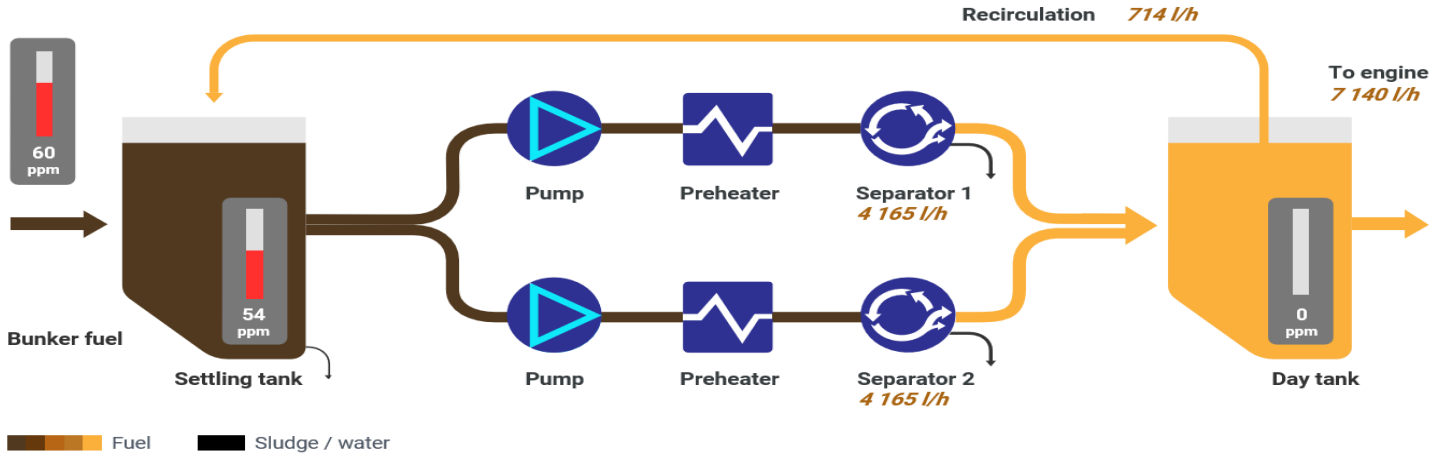
Flow control – FlowSync™

Feed pump	Separator	Sup/circ. pumps (FCM)	ACS (FCM)	Filter (FCM)
ALP with mech. seals	CFR rated ALCAP	ALP with mech. seals	Cooler	Moatti 10 µm
ALP with mag. couplings	ALCAP	ALP with mag. couplings		Moatti
IMO		IMO		



Flow control – FlowSync™

Two separators – slow steaming with FlowSync™



OPERATING PRINCIPLE

Single | Parallel

FLOW CONTROL

FlowSync installed ☑

ENGINE DATA

Average power 60 %

Installed engine power 50.0 MW

MEDIA DATA

Separator feed temperature 98 °C

Bunker feed temperature 50 °C

Upgrade considerations

- Lower OPEX and Improved engine protection

			Fuel Condition Module / Booster			
Fuel type	**Feed pump**	**Separator**	**Supply/circ. pumps**	**ACS cooler**	**Filter**	**Flow control**
HSFO	Magnetic couplings to reduce OPEX	Separation efficiency upgrade	Magnetic couplings to reduce OPEX		10 µm cat fines defence	Improved separation efficiency and particle removal
VLSFO	Magnetic couplings to reduce OPEX	Separation efficiency upgrade	Magnetic couplings to reduce OPEX	Better lubricatio n	10 µm cat fines defence	Improved separation efficiency and particle removal
ULSFO	Adjust to comply with separator and engine			Better lubricatio n		

CFR - rated ALCAP

The CFR-rated ALCAP separator can manage all 2020 fuels

- All densities up to 1.010 g/cm³
- All viscosities within ISO 8217
- Prepared for future VLSFO
- Lowest OPEX with minimal oil losses

Service Letter SL2017-638/DOJA MAN Diesel & Turbo

Separator flow

The lower the flow is through the separator, the longer the fuel stays in the separator, and the better the fuel is cleaned. Normally, a fuel separator has a layout for 100% load fuel consumption of the engine plus constant values for different margins. To be able to clean the fuel to a suitable level, the separator should be able to treat approximately the following quantity of oi:0.23 litres/kWh in relation to CFR (Certified flow rate). CFR must be given as according to CEN CWA 15375 or similar.

Since the engine is rarely running at 100% load, there is a large potential for increasing the separation efficiency by applying automatic flow control in relation to the actual fuel consumption. Furthermore, when the cat fines content in the fuel as bunkered is higher than 25ppm Al + Si, we recommend operating two separators in parallel to reduce the flow and increase the fuel cleaning efficiency. If flow reduction is not possible, we recommend to operate the separators in series.

Moatti 10 µm filter

Moatti 10 µm filter is ready for 2020

- Fulfils all engine manufacturers' recommendations and standards
- Hot side (FCM) installation possibilities, last line of defence before engine
- Continuous back-flushing, no adhesion of solids on the filter mesh and no variation in pressure drop
- Separate diversion chamber, minimal oil loss
- No consumables, low lifecycle cost
- No compressed air required
- Most efficient sludge removal on the market

Engine manufacturers and CIMAC Recommendation !!!

- All engine manufacturers recommend 10 µm filter with automatic or continuous back-flushing to be installed
- CIMAC recommend hot side installation

ACS – cooler

Automated Fuel Changeover System (ACS)

- Manage running on ULSFO/VLSFO fuels for longer period of time
- Keep the correct viscosity and lubricity at all time and in all conditions
- Automated Supply Pressure control Valve (SPV)

How to upgrade

- Review existing FCM data and requirements
- Prepare to upgrade at next dry dock