A photograph of an industrial power plant at sunset. The sky is a mix of blue and orange. In the foreground, there are large metal structures, including a tall cylindrical tower on the left and a large, complex structure on the right. A network of pipes and walkways is visible in the middle ground. A green rectangular box is overlaid on the right side of the image, containing white text.

Case Study
Centrifuges for
Power Generation
and Genset
Applications

FM200 Centrifuge for Power Generation and Genset Applications

Enhanced engine lube oil cleanliness, reduced service down time and increased cost saving benefits with the use of MANN+HUMMEL centrifuges.



Problem

Maintenance and servicing causing high operational costs due to high wear rates



Application

Power generation and genset



Outcome

Successfully met and exceeded costs savings in lube oil maintenance using MANN+HUMMEL centrifuge



Background

High wear and tear of engine components was a recurring problem for one of the world's largest suppliers of mobile gensets in addition to the rising maintenance and operating costs. The customer has several mobile gensets that work around the clock and were in need of a quick, easy and robust solution to their problem.

Situation

Considering the application in detail and based on the vast experience in lube oil filtration, the MANN+HUMMEL FM200 centrifuge was recommended for this application due to its ability to separate out soot while offering the customer a payback of less than twelve months on their investment.

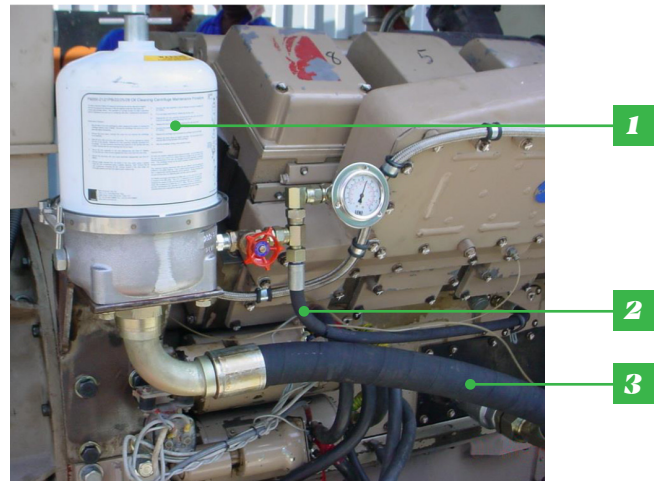
Application details

Performance	Values
Application	Mobile Genset
Engine	Diesel Engine
Capacity	50.3 liter
Cylinders	16 Cylinder direct injection
Power output	900 kW - 1500 kW
Lube oil capacity	177 liter
Max oil temp	120 °C
Pressure	5 - 7 bar at rated speed



Solution

For this application, the oil pump flow rate was not known due to lack of technical data. The following three centrifuges were recommended based on the oil sump capacity of the engine. In order to achieve good level of cleanliness, four minimum sump turns per hour through a centrifuge is recommended. As can be seen from the table below, the FM400 and FM200 both met these criteria. However, the FM200 was selected due to cost reasons.



- 1** MANN+HUMMEL FM200 Centrifuge
- 2** Oil feed to centrifuge (pressurized supply preferably before cooler and filters)
- 3** Oil drain line (return through modified crankcase door)

Centrifuge FM400, FM200 and FM090

Centrifuge	Flow intake at 5 bar [l/min]	Flow intake at 5 bar [l/h]	Sump capacity [l]	Sump turns per hour
FM400	45	2,708	177	15.3
FM200	17	1,020	177	5.7
FM090	8	478	177	2.7

Results

Wear rates in critical wear metals, such as chrome, iron, copper and others, were maintained far below the engine manufacturer's allowable limits.

Test shown on the site proves that the centrifuge can reduce wear rates and improve the total base number (TBN) on project sites where the wear rate is high in value.

Oil additives that are acid neutralizer, anti-wear additives, dispersant, antioxidants and others are still high in value, which indicates that not only oil oxidations, nitration and acid formation during the test were limited but also that the oil is still fit for further use.

Contrary to a standard bypass filter, the centrifuge does not require any filter element replacement during servicing and only requires cleaning. This in turn eliminates spare elements stocking, shipping and filter waste disposal.

Test results show that without a centrifuge fitted the main oil filter sees an 18 psi drop during 400 hours of testing which is lower than the recommended minimum engine oil pressure thus requiring a filter change. With centrifuge fitted the average pressure drop on the main oil filter for the same duration is only around 0.5 psi, thus substantially extending the service life of the main oil filter.

Finally, the test results and site reports confirm that the centrifuge does not affect the performance and operation of the engine.

Conclusion

By switching to the MANN+HUMMEL FM200 centrifuge the client was able to eliminate the need for the existing two bypass filters enjoying substantial benefits in cost savings and engine down time.

The centrifuge also assisted in ensuring minimum oil additive depletion rate before service of the generators. By maintaining or reducing abrasive wear metals PPM's within engines, the client was able to minimize or eliminate damage to expensive and critical engine components. Furthermore, the installation of the FM200 has brought further benefits to the customer, such as reduced service intervals, extended oil life, reduced engine wear and reduction in waste disposal costs.

The outcome of all these benefits was ultimately realized in the return on investment for the customer, which helped generate a payback period of less than twelve months.

Return on investment

Parameter	Value
Total no. of engines	100
Annual service cost per year without centrifuge	190,000.00 €
Annual service cost savings per year with MANN+HUMMEL centrifuge	63,000.00 €
Payback period (months)	10



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