

SBI-EM (Engineering & Manpower Services) Ltd
 Site: 803

[24_3011samples.doc](#)

3 **60% = Working Condition**

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains MTC	Was Oil Changed?	Total Work Hrs.	Oil Work Hrs.
1008	23/5/06	15-76-863	Caterpillar 330B Excavator	Engine	Total TIR 7400 15W40	No	Yes	8,727	265

Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
4	ND	ND	--	--	<u>121.61</u>

Sample Elemental Content (ppm)																	
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe
5	17	33	1	1074	1082	0	2382	0	0	3	241	7	64	31	14	306	136

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Comments
The sample's Viscosity is HIGH . Its soot content is HIGH . Its dust/sand content is VERY HIGH . No water was found in the sample, however its Sodium and Potassium contents are HIGH indicating a possible slow leak of coolant into engine oil. The sample's Iron, Copper and Chromium contents are VERY HIGH indicating engine abrasion. Recommendations: Check and service air intake system. Check and service cooling system – it may be leaking.

19.06.06 (803) Dear Zvi / Michael Fadida

1. We didn't receive any reports about any maintenance that has been done on this engine since 05.07.05, but it is clear that the recommendations were performed only partially.
2. The condition of the engine deteriorated since the last "oil analysis". This engine has to be stopped and all the recommendations performed.
3. Recommendations.
 - a. Replace air filter (if not yet replaced).
 - b. Make sure that the cooling system is sealed and clean, including after cooler and oil cooler.
 - c. If the subsystems in (b) are found to be in order, make sure that the engine head gasket seals well.
 - d. If the above is found to be in order, make sure that the lobes work properly, injector timing, valves and turbo clearances are in order.
 - e. Do not operate the engine unless all the recommendations are performed thoroughly.
 - f. After performing the above referenced recommendations, before the unit is put to work, change the oil. There is no need to analyze the used oil.
 - g. Make sure you use oil recommended by the manufacturer.
 - h. As soon as the unit becomes operational, you have to perform 2 consecutive FC* treatments (1:1000 by volume)
 - i. After the new oil accumulates 200 work-hours it has to be changed + oil sample taken and then to perform 1 x FC* (1:1000 by volume).
 - j. Until further notice, not to exceed 200 work-hours between oil changes.

* **Very important** to report back whether the recommendations were performed.

* MTC - Polytron MTC (complementary oil additive package).
 * FC - Polytron FC (complementary fuel additive package).

Sincerely,
 Alex / Maintenance Consultant

Comments:

At this stage, based on used oil analysis the consultant gives some maintenance recommendations that will bring the engine to reasonably good working condition without using Polytron. To clean the fuel system and keep it in good working condition he recommends to apply Polytron FCC as soon as the unit becomes operational.

SBI-EM (Engineering & Manpower Services) Ltd

Site: 803

[24- 3946samples.doc](#)

4 **85% = Working Condition**

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains MTC?	Was Oil Changed?	Total Work Hrs.	Oil Work Hrs.
1553	5/7/06	15-76-863	Caterpillar 330B Excavator	Engine	Total TIR 7400 15W40	No	Yes	9,017	269

Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
3	ND	ND	--	--	94.39

Sample Elemental Content (ppm)																		
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe	
1	2	9	2	1240	1320	0	2896	0	0	1	321	2	11	4	2	13	23	

Comments
The sample's Viscosity is typical. No results suggest abnormal engine wear. (Viscosity and wear metal content, which were high in the previous sample from this engine, are now typical).

25.07.06 (803) Dear Zvi / Michael Fadida

1. The working condition of the engine improved a lot. Looks like you followed the recommendation and it paid off.
2. If MTC* is not used, at this stage do not extend oil change intervals beyond 250 work-hours.
3. Make sure to use anti-freeze fluid in the cooling system.
4. Treat the fuel for this engine in 2 consecutive fuelings with FC* (1:1000 by volume), without waiting for the next maintenance break.
5. Until further notice, not to exceed 250 work-hours between oil changes.
6. May take oil samples every other oil change (every ~ 500 work hours).
7. From the next oil change start adding MTC* (10% by volume).
8. If MTC* is added to new oil, you can change the oil every 1000 work-hours and take oil samples every 2000 work-hours.

* **Very important** to report back whether the recommendations were performed.

* MTC - Polytron MTC (complementary oil additive package).

*FC - Polytron FC (complementary fuel additive package).

Sincerely,
 Alex / Maintenance Consultant

Comments:

At this stage, based on used oil analysis the consultant gives some maintenance recommendations and conditional recommendation to start using Polytron MTC and FC, and if used, to change the oil every 1,000 work hours (versus every 250 work hours before using Polytron MTC.)

SBI-EM (Engineering & Manpower Services) Ltd
Re.: Analysis of Oil Samples - Results

 Site: **803** 4449-25 samples.doc

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90% = Working Condition

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains MTC?	Was Oil Changed?	Total Work Hr.	Oil Work Hr.
3918	3/11/06	15-76-863	Caterpillar 330B Excavator	Engine	Total TIR 7400 15W40	Yes	Yes	10,135	1,118

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Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
3	ND	ND	1.68	10.45	99.99

Sample Elemental Content (ppm)																	
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe
0	3	10	1	1135	1206	1	4108	0	0	0	76	3	14	2	5	9	19

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Comments

The sample's Viscosity is typical. No results suggest abnormal engine wear.

12.12.06 (803) Dear Zvi / Michael Fadida

1. The working condition of the engine improved since the last oil analysis dated 05.07.06.
2. If the oil contained MTC*, then there would be a need to have oil analysis after 450 work-hours. See recommendations from the last report.
3. Replace the air filter with the next maintenance job.
4. If the oil was changed but no MTC* added to the new oil, then keep changing the oil every 300-350 work-hours.
5. If MTC* is used, you can change the oil every ~1,000 work-hours and take oil sample every 2,000 work-hours.

* **Very important** to report back whether the recommendations were performed.

Sincerely,
 Alex / Maintenance Consultant

Comments:

At this stage, as a result of using Polytron concentration of Fe (Iron) went down from 23 ppm within 269 work-hours to 4.57 ppm within 269 work-hours which is 5 times lower than without Polytron. The consultant recommends to keep on changing oil every 1,000 work hours, versus every 250 work-hours without Polytron, since the oil is still in good condition after 1,118 work-hours (4.5 times longer service life)

SBI-EM (Engineering & Manpower Services) Ltd

 Re.: Analysis of Oil Samples - Results

 Site: **803**
[4869 - 28 samples.doc](#)

6 Working Condition = 100%

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains MTC?	Was Oil Changed?	Total Work Hrs.	Oil Work Hrs.
5305	11/3/07	15-76-863	Caterpillar 330B	Engine	Total TIR 7400 15W40	Yes	Yes	12,218	1,073

Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
3	ND	ND	--	--	105.35

Sample Elemental Content (ppm)																	
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe
1	2	11	1	1031	1216	1	3686	0	0	1	147	0	9	2	3	2	17

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Comments

The sample's Viscosity is typical. No results suggest abnormal engine wear.

26.03.07 (336) Dear Zvi

1. The working condition of the engine is very good. This is the third time that the oil with MTC* is changed every 1,000 work-hours.
2. Please report when was the last time that the air filter was replaced.
3. Make sure that you use anti-freeze in the cooling fluid.
4. You can keep on using MTC* (10% by volume).

*MTC - Polytron MTC (complementary oil additive package)

 Sincerely,
 Alex / Maintenance Consultant

Comments:

At this stage, as a result of using Polytron concentration of Fe (Iron) went down from 23 ppm within 269 work-hours to 4.26 ppm within 269 work-hours which is 5.4 times lower than without Polytron. The consultant recommends to keep on changing oil every 1,000 work hours, versus every 250 work-hours without Polytron, since the oil is still in good condition after 1,073 work-hours (4.3 times longer service life).

Note: the comments in blue color were added by us for clarification purposes for those who are not familiar with used oil analysis. All the rest is a copy of the original document.