

Thiess Mt Owen

Thiess at Mt Owen have implemented a proactive approach to contamination control, this includes improved breathers on their bulk oil tanks and monitoring cleanliness of the oil being delivered to both the machine and the bulk storage facility on site. As part of this process FTA systems were fitted onboard the diggers rather than kidney looping the hydraulic circuits at service as they saw added benefit in continual onboard bypass filtration.



Thiess fitted all six of their digger hydraulic systems at Mt Owen with FTA's bypass filtration systems, JQ440's on the three 996 Liebherrs and JQ240's on two 994 Liebherrs and Hitachi 2500 also they have just placed an order for another JQ 440 for the 996 Liebherr to be commission April 05.

As a result of their contamination control all there digger hydraulics are running at ISO16/13 or better, Pump Life has improved from 12,000 to 18,000 hours and Cylinder Ram life from 5000 to 8000 hours which relates to lower operating costs and improved availability of their machines.

The reports attached is of one of the 994's which typically represents what as been achieved.

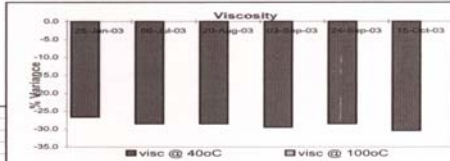




TECHNICAL ADVANCE FOR ECONOMIC GAIN

Wear Metal Report: **169,441**
 Client: **MT OWEN**
 Attention: **ROGER CLEMENT**
 Machine: **LIEBHERR 994 EXCAVATOR**
 ID. No.: **EX1080**
 Oil Name: **BP VANELLUS C6**
 Compartment: **HYDRAULICS**

Sample Date	25/06/03	6/07/03	20/08/03	3/09/03	24/09/03	15/10/03
Analysis Date	156840	187734	188109	168385	168881	169441
SMU	5235hrs	5889hrs	6082hrs	6295hrs	6658hrs	6988hrs
Oil Hrs	0	0	0	0	0	0
Oil Changed	No	No	No	No	No	No
Wear Metals	ppm	ppm	ppm	ppm	ppm	ppm
lead	2	2	1	1	2	2
iron	10	9	9	23	8	9
aluminium	5	5	4	4	5	5
copper	6	4	4	4	3	4
chromium	3	2	3	3	2	2
tin	0	0	0	0	0	0
nickel	0	0	1	1	1	0
Contaminants	silicon	10	9	9	9	9
sodium	10	9	10	9	9	9
Oil Additives	magnesium	13	12	12	12	11
zinc	1430	1343	1465	1499	1364	1410
molybdenum	0	0	0	10	1	2
calcium	6263	5491	6720	7327	6358	6004
phosphorous	1590	1356	1609	1431	1690	1605
boron	35	12	13	12	10	10
Infra Red	TBN	0	0	0	0	0
soot	0	0	0	0	0	0
glycol%	0	0	0	0	0	0
water (ppm)	0	0	0	0	0	0
fuel dilution%	0	0	0	0	0	0
oxidation	0	0	0	0	0	0
nitration	0	0	0	0	0	0
sulphation	0	0	0	0	0	0



Comments on elevated results
 Viscosity @ 40oC 30% below BP Vanellus C6.
 Viscosity and sodium trends are stable. Wear metals are within acceptable limits. Continue to Monitor.

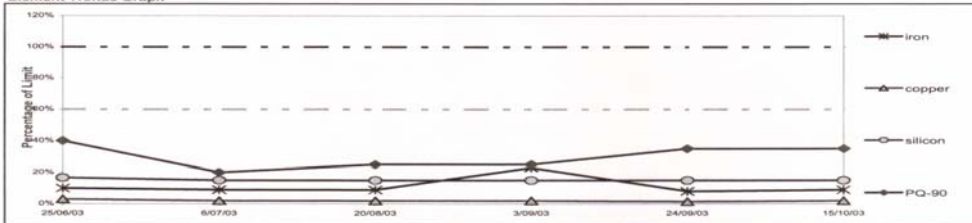
Results before filtration
 ISO 22/17/12
 Count 1ml 34,662ppm

Physical Tests	water %	0 <th>0 <th>0 <th>0 <th>0 <th>0 <th>0 <th>0 </th></th></th></th></th></th></th>	0 <th>0 <th>0 <th>0 <th>0 <th>0 <th>0 </th></th></th></th></th></th>	0 <th>0 <th>0 <th>0 <th>0 <th>0 </th></th></th></th></th>	0 <th>0 <th>0 <th>0 <th>0 </th></th></th></th>	0 <th>0 <th>0 <th>0 </th></th></th>	0 <th>0 <th>0 </th></th>	0 <th>0 </th>	0
PQ-90 mg / ltr	8	4	5	5	7	7	12	20	105
visc @ 100oC	0	0	0	0	0	0	+30%	0	0
visc @ 40oC	77	75	75	74	75	73	+30%	105	0

Particle Cleanliness Analysis

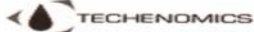
ISO 4406 - 02	22
ISO 4406 - 05	17
ISO 4406 - 15	12
Count 1ml	34662

Element Trends Graph



For enquiries, contact: SINGLETON LABORATORY phone: 02 65712699 fax: 02 65712044 mobile: 0419604431

This wear analysis and oil condition report should be used in conjunction with normal maintenance and evaluated from sample to sample. Every care will be taken in processing samples but no express or implied guarantee is furnished in regard to the continuing operation or condition of this machinery or any part thereof.

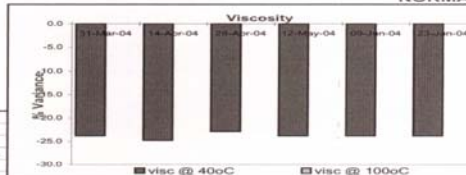


CONDITION MONITORING

TECHNICAL ADVANCE FOR ECONOMIC GAIN

Wear Metal Report: **176,028**
 Client: **MT OWEN**
 Attention: **ROGER CLEMENT**
 Machine: **LIEBHERR 994 EXCAVATOR**
 ID. No.: **EX1080**
 Oil Name: **CALTEX DELO 400 15W/40**
 Compartment: **HYDRAULICS**

Sample Date	31/03/04	14/04/04	28/04/04	12/05/04	30/06/04	23/08/04
Analysis Date	224404	150404	280404	130504	110604	230804
SMU	173978	174278	174618	174917	175615	176028
Oil Hrs	9548hrs	9715hrs	997hrs	10211hrs	10648hrs	10586hrs
Oil Changed	No	No	No	No	No	No
Wear Metals	ppm	ppm	ppm	ppm	ppm	ppm
lead	1	1	1	2	1	1
iron	8	8	8	8	9	10
aluminium	4	5	4	5	3	3
copper	4	5	5	5	5	6
chromium	2	2	2	2	2	2
tin	0	0	0	0	0	0
nickel	0	1	1	1	1	1
Contaminants	silicon	6	7	8	7	7
sodium	9	9	7	8	8	9
Oil Additives	magnesium	10	10	10	11	11
zinc	1455	1600	1645	223	1828	1938
molybdenum	0	1	0	0	1	0
calcium	4308	5163	6050	5051	7052	8124
phosphorous	1368	1623	1787	1404	1735	1865
boron	5	5	5	4	5	5
Infra Red	TBN	0	0	0	0	0
soot	0	0	0	0	0	0
glycol%	0	0	0	0	0	0
water (ppm)	0.00	0.00	0.00	0.00	0.00	0
fuel dilution%	0	0	0	0	0	0
oxidation	0	0	0	0	0	0
nitration	0	0	0	0	0	0
sulphation	0	0	0	0	0	0



Comments on elevated results
 Oil properties normal. Wear and contamination within acceptable levels. Continue with regular maintenance.

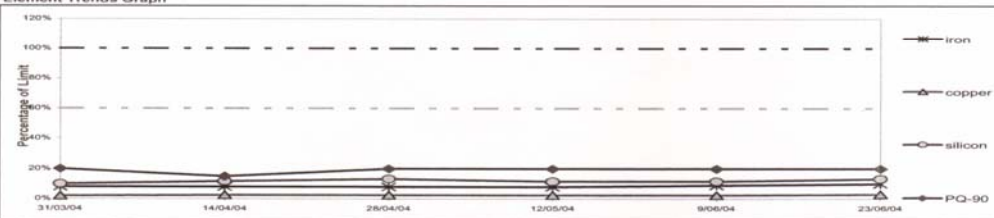
Results after filtration
 ISO 19/16/13
 Count 1ml 9,538ppm
 Reduction 72%

Physical Tests	water %	0.00 <th>0.00 <th>0.00 <th>0.00 <th>0.00 <th>0.00 <th>0 </th></th></th></th></th></th>	0.00 <th>0.00 <th>0.00 <th>0.00 <th>0.00 <th>0 </th></th></th></th></th>	0.00 <th>0.00 <th>0.00 <th>0.00 <th>0 </th></th></th></th>	0.00 <th>0.00 <th>0.00 <th>0 </th></th></th>	0.00 <th>0.00 <th>0 </th></th>	0.00 <th>0 </th>	0
PQ-90 mg / ltr	4	3	4	4	4	4	12	20
visc @ 100oC	0	0	0	0	0	0	+30%	0
visc @ 40oC	80	79	81	80	80	80	+30%	105

Particle Cleanliness Analysis

ISO 4406 - 02	19
ISO 4406 - 05	16
ISO 4406 - 15	13
Count 1ml	9538

Element Trends Graph



For enquiries, contact: SINGLETON LABORATORY phone: 02 65712699 fax: 02 65712044 mobile: 0419604431

This wear analysis and oil condition report should be used in conjunction with normal maintenance and evaluated from sample to sample. Every care will be taken in processing samples but no express or implied guarantee is furnished in regard to the continuing operation or condition of this machinery or any part thereof.