Wood Veneer Plant saves rebuilds and plant downtime
Case Study

Company:
Wood Veneer plant in Southwest Washington State.

According to the company, the return on investment (about $2,500 initial cost, including element and connections/fittings, and $150 for replacement elements) is excellent. The reduction of equipment rebuilds can pay for the installation within months.

It is estimated; for a period of 18 months (1.5 yrs.), Actuator rebuilds will be reduced from 6 planned, to 2, resulting in a cost savings of **$56,000 – $64,000.**

Additional savings are estimated by the reduction of unplanned downtime, gear oil replacement, and disposal costs.

Problem:
Lack of Gear oil filtration on high-speed Actuator Assemblies; utilized on the mill's log peeling machines -requiring frequent rebuilds and mill downtime.

The Actuator Assembly has a tube with screw and cycles approximately 8,000 times per day when the mill is running. The Actuator Assembly utilizes approximately 3 gals of gear oil (*Mobil SHC 629 Synthetic, ISO-150, with a Viscosity Index of 166*), with oil temperatures running approximately 110-120˚ F (43-40˚C). Enclosed pressure in the actuator is less than 10 psi. The assembly has no filtration.

Current rebuild cycle on the Actuator is about every 6 months. Cost of Actuator Assembly rebuild is approximately $14-16k (not including unplanned downtime costs). Production line downtime to change out an Actuator is about 1 hr.

Prior to filtering, oil analysis report showed abnormal contamination and fluid condition, with ISO Codes of **25-25-24**. See attached.

Solution:
Installed a **Fluidloop FL1000** Filtration system (on Actuator #1) with a 1µ Depth filter designed to remove both dirt particles and water from the gear oil; thereby reducing rebuilds on the actuator and unplanned mill downtime.

<u>Customer's goal:</u>
Reach an Oil Target Cleanliness of **18-16-14**, thereby:

- Increasing Actuator machinery lifespan due to cleaner gear oil.
- Reduce frequency of gear oil changes.

- Reduce mill downtime.

A second **Fluidloop FL1000** was installed on the second #2 Actuator, a couple months later.

Results:
Fluid sampling was done before/at installation, 1 week, and 5 weeks. Improvements in oil cleanliness were almost immediate. Prior to filtering, ISO Codes were **25-25-24**, at 1-week the ISO Codes improved to **23-20-15**, and at 5-weeks to **18-16-12.**

The customers Oil Cleanliness target of 18-16-14 was met (actual 18-16-12). If the current Target (18-16-14) can be maintained, using the Noria Machine life Extension Calculator, we can expect the system(s) to last **3 times longer** than currently being experienced at 25-25-14.

Above will result in reduction of rebuild cycles, unplanned downtime, oil replacement, and disposal costs for contaminated oil.

Cost Benefits:
According to the company, the return on investment (about $2,500 initial cost, including element and connections/fittings, and $150 for replacement elements) is excellent. The reduction of equipment rebuilds can pay for the installation within months. It is estimated; for a period of 18 months (1.5 yrs.), Actuator rebuilds will be reduced from 6 planned, to 2, resulting in a cost savings of **$56,000 – $64,000.**

Additional savings are estimated by the reduction of unplanned downtime, gear oil replacement, and disposal costs.

Oil Samples 0-1 weeks

Oil Sample 5-weeks

PLANT

PetroCard™ MORE THAN JUST FUEL.

OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Area
[Sample after filter]
Machine Id
EXLAR ACTUATOR PENDULUM
Component
Hydraulic System
Fluid
MOBIL SHC 629 (--- GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

WEAR

All component wear rates are normal.

CONTAMINATION

There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

FLUID CONDITION

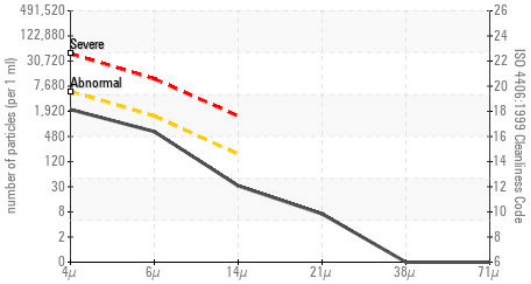
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Test	UOM	Method	Limit/Abn	Current	5 weeks	1 week	Before
Sample Number		Client Info		PE0000670		PE0000791	PE0000788
Sample Date		Client Info		28 Mar 2023		01 Mar 2023	22 Feb 2023
Machine Age	mths	Client Info		0		0	0
Oil Age	mths	Client Info		0		1	0
Filter Age	mths	Client Info		0		0	0
Oil Changed		Client Info		N/A		Not Changd	Not Changd
Filter Changed		Client Info		N/A		N/A	N/A
Sample Status				NORMAL		ABNORMAL	ABNORMAL
PQ		ASTM D8184		7		12	13
Iron	ppm	ASTM D5185m	>20	19		5	15
Chromium	ppm	ASTM D5185m	>10	0		<1	1
Nickel	ppm	ASTM D5185m	>10	0		0	0
Titanium	ppm	ASTM D5185m		0		0	0
Silver	ppm	ASTM D5185m		0		<1	<1
Aluminum	ppm	ASTM D5185m	>10	0		2	▲ 31
Lead	ppm	ASTM D5185m	>10	0		<1	<1
Copper	ppm	ASTM D5185m	>75	19		17	26
Tin	ppm	ASTM D5185m	>10	0		0	<1
Vanadium	ppm	ASTM D5185m		0		<1	<1
White Metal	scalar	*Visual	NONE	NONE		NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	NONE		NONE	NONE
Silicon	ppm	ASTM D5185m	>20	<1		2	2
Potassium	ppm	ASTM D5185m	>20	2		0	<1
Particles >4µm		ASTM D7647	>5000	1858		▲ 60448	▲ 239854
Particles >6µm		ASTM D7647	>1300	551		▲ 8207	▲ 224653
Particles >14µm		ASTM D7647	>160	28		▲ 173	▲ 146876
Particles >21µm		ASTM D7647	>40	6		29	▲ 90260
Particles >38µm		ASTM D7647	>10	0		1	▲ 3325
Particles >71µm		ASTM D7647	>3	0		0	1
Oil Cleanliness		ISO 4406 (c)	>19/17/14	18/16/12		▲ 23/20/15	▲ 25/25/24
Silt	scalar	*Visual	NONE	NONE		NONE	NONE
Debris	scalar	*Visual	NONE	NONE		NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE		NONE	NONE
Appearance	scalar	*Visual	NORML	NORML		NORML	NORML
Odor	scalar	*Visual	NORML	NORML		NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG		NEG	NEG
Sodium	ppm	ASTM D5185m		0		<1	1
Boron	ppm	ASTM D5185m		0		0	0
Barium	ppm	ASTM D5185m		0		0	0
Molybdenum	ppm	ASTM D5185m		0		0	0
Manganese	ppm	ASTM D5185m		<1		0	<1
Magnesium	ppm	ASTM D5185m		0		<1	<1
Calcium	ppm	ASTM D5185m		2		<1	<1
Phosphorus	ppm	ASTM D5185m		275		247	260
Zinc	ppm	ASTM D5185m		0		6	1
Sulfur	ppm	ASTM D5185m		518		629	583
Acid Number (AN)	mg KOH/g	ASTM D8045		0.58		0.63	0.72
Visc @ 40°C	cSt	ASTM D445	142.8	67.7		69.3	70.1

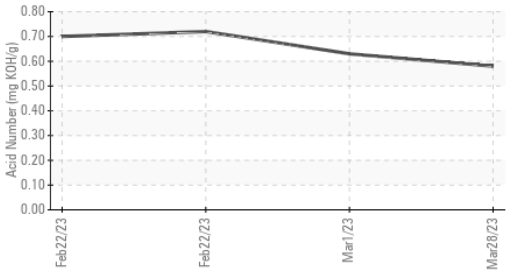
Report Id: [redacted] (Generated: 09/21/2023 12:14:20) Rev: 1

Submitted By: DUANE DENOTTA

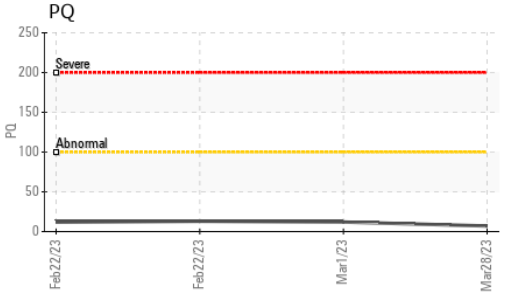
Particle Count



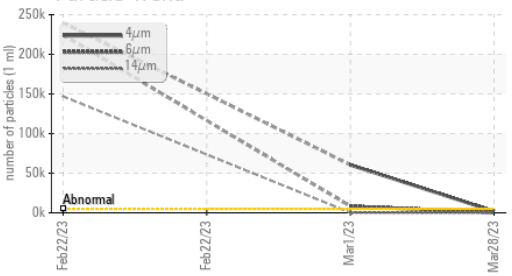
Acid Number



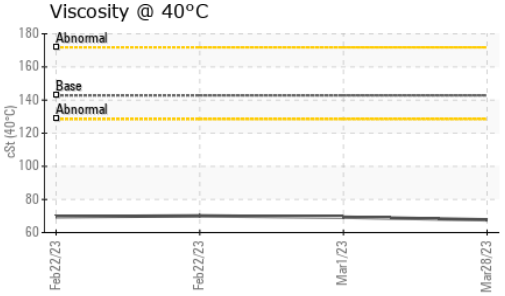
PQ



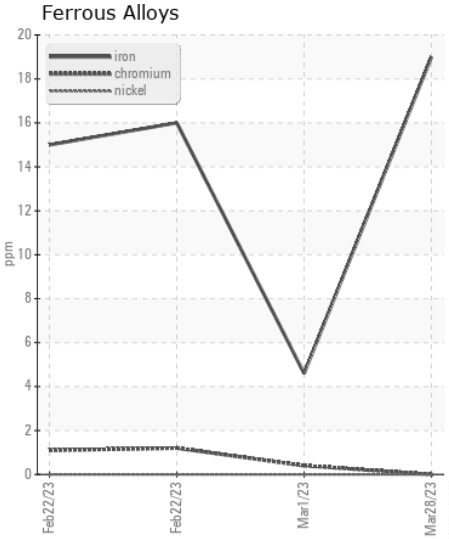
Particle Trend



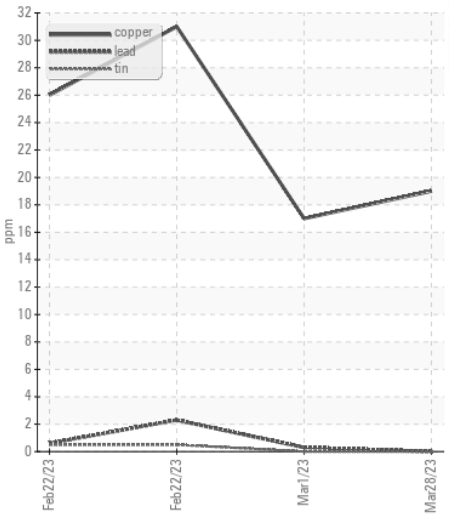
Viscosity @ 40°C



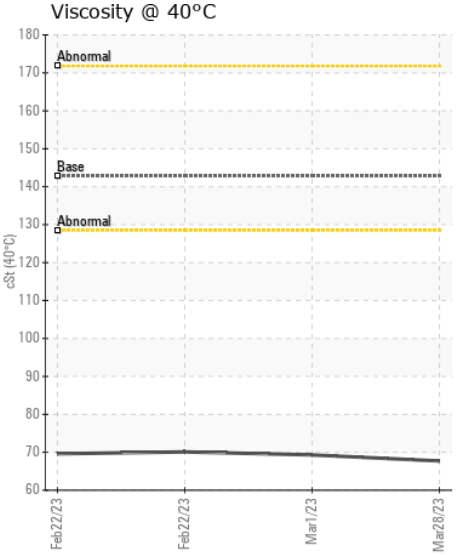
Ferrous Alloys



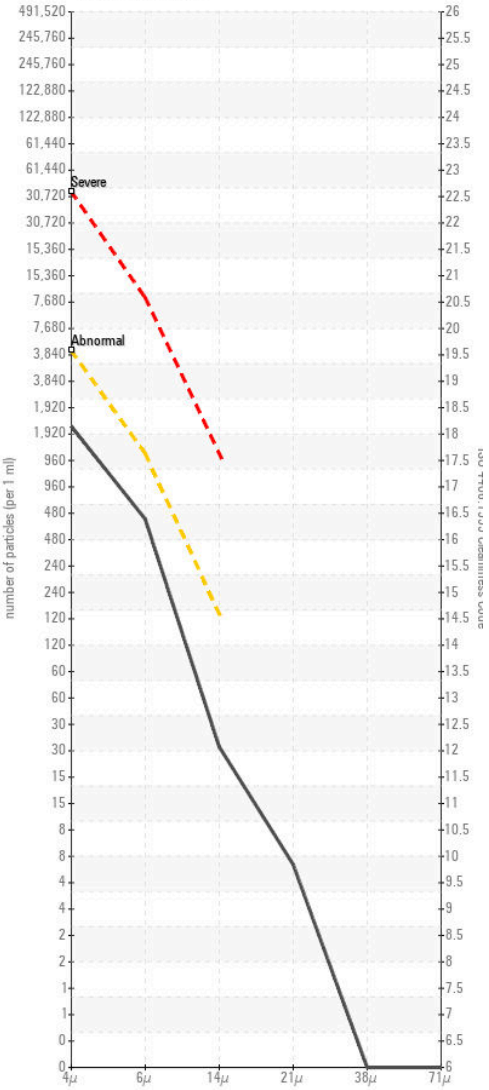
Non-ferrous Metals



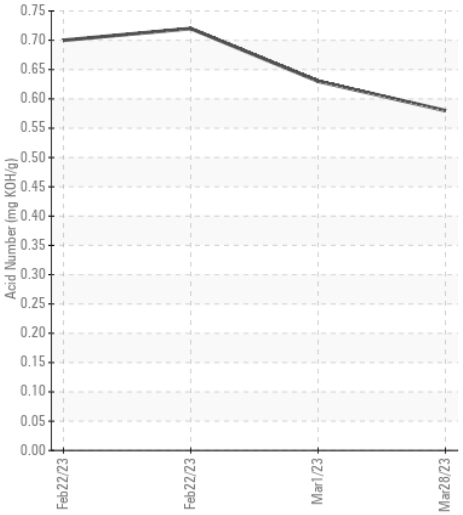
Viscosity @ 40°C



Particle Count



Acid Number



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : [redacted] **Received** : 03 Apr 2023
Lab Number : [redacted] **Diagnosed** : 05 Apr 2023
Unique Number : [redacted] **Diagnostician** : Doug Bogart
Test Package : PLANT (Additional Tests: ICP, KV40, PQ, PrtCount, SCREEN)

Certificate L2367

[redacted]
Contact: Service Manager

To discuss this sample report, contact Customer Service at 1-800-237-1369.
** - Denotes test methods that are outside of the ISO 17025 scope of accreditation.*
Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

T:
F: