#52292

ERL MAINTENANCE SUPPORT SDN BHD

(Company No. 498574-T)

E-MAS

Your Railway Operations & Maintenance Specialist

ROLLING STOCK DEPARTMENT

IN-HOUSE TECHNICAL INSTRUCTION

GEARBOX OIL SAMPLES COLLECTION

R00.OMR.M92083.BN.0001.B

Release

	Name	Dept./Position	Date	Signature
Released:	Norazman	RST HOD	26.05.16	
Checked:	Mohamad	RST QEMR	26.05.16	
Author:	Sahar	RST Tech. Exec.	26/5/16	

Amendments or additions to this procedure must be indicated with a vertical black line in the adjacent left margin.

Change Record and Configuration Control

Revision	Date	Modification	Name
B	26-May-16	Updated to new RST Technical Instruction template and updated all the superseded reference documents. The main contents are remain unchanged	Sahar
A	29-Jan-08	New - to supersede the existing procedure (DOCS ref. no. R00.OMR.M12990.BT.0014.A) in order to comply with the current company requirement.	Roslan

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1 Purpose

This technical instruction is to supersede the existing procedure, Gearbox Oil Samples Collection, R00.OMR.M91121.BT.0001.A, in order to comply with the current company requirement. Overall contains of previous procedure also has been revised.

This technical instruction is to ensure that the gearbox oil samples collection is carry out accordingly in order to get a valid interpretation of oil analysis results as part of the gearbox condition monitoring for extending the gearbox overhaul interval.

2 Scope, Distribution & Access

This document is applicable to all RST personnel who are involve in gearbox oil collection.

The distribution and access shall be available for all RST and could be viewed and retrieved via EDMS and RST Portal [http://express50/ E-MAS_Portal/RST.html]. The hardcopy of this procedure is available in RST foreman room for reference. The full access for editing this document is only granted to RST MGT.

3 Procedure

This procedure is established to ensure that the gearbox oil samples collection requirements are adhered at all time so that the certified laboratory will produce a valid interpretation of oil analysis results.

3.1 Condition to be adhered during sample collections

- ✓ Immediately after train shutdown
- ✓ Gearbox at normal operating temperature = 60 ± 10 °C
- ✓ Always at the same point (magnetic dipstick filler opening) when collecting samples
- ✓ If possible never from but before the filter (if applicable)
- ✓ Not after considerable quantities (100ml) of oil have been added

3.2 Prepare the sampling kits

- ✓ Oil Sampling pump in clean condition
- ✓ Sampling tubes and rod - The rod is used to obtain oil sample at specific point.
- ✓ New sampling bottles and labeled with axle numbers
- ✓ Gearbox Oil Temperature Reading Record Checklist, RST T1-T5 Scheduled Maintenance Checklist, [R00.OMR.M14100.PT.0002.*]. Refer Attachment 1.

3.3 Oil Sampling Technique

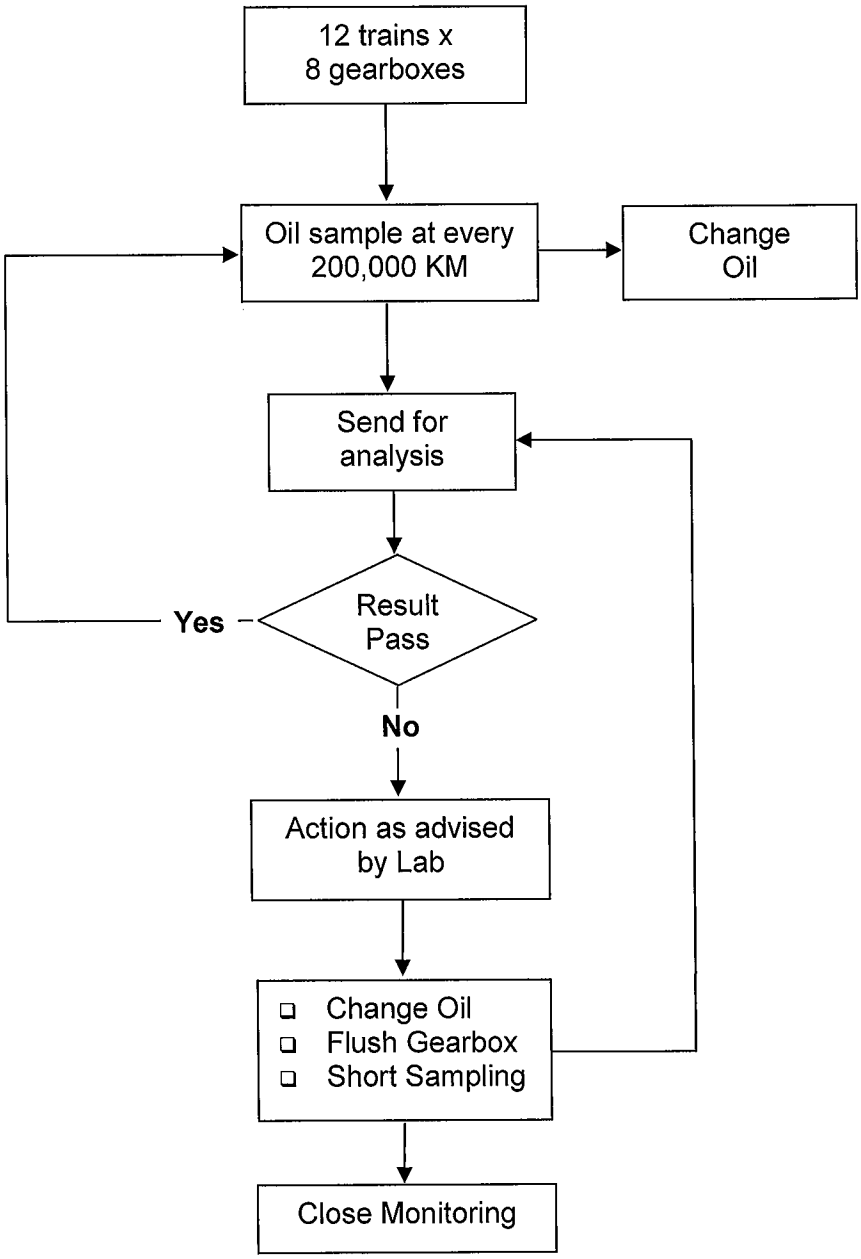
The oil sample collected is representative of all the oil in the gearbox. Therefore the instructions are outlined and must be followed in order to avoid sample contamination.

When drawing oil samples, it is important to use a new plastic tube and new bottle in order to avoid sample contamination.

- ✓ Measure and record the temperature on the gearbox as indicated point in the - Gearbox Oil Temperature Reading Record Checklist, RST T1-T5 Scheduled Maintenance Checklist, [R00.OMR.M14100.PT.0002.*]
- ✓ Insert the tube through the head of the Oil Sampling Pump and tighten Knurled Knob. Don't let the end of the tube to emerge in the oil in the bottle, because it will contaminate the pump after remove the tube and causing cross contamination.
- ✓ Install a new sample bottle onto the Oil Sampling Pump and tighten firmly.
- ✓ Open the Filling plug and measure the oil temperature and record.
- ✓ Insert the sampling tube and rod trough the filling plug. Use new sampling tube for each sample. Refer to Figure 1.
- ✓ Start to draw oil sample by push and pull the plunger. Continue pumping until sample bottle is 80 % full. Then push Release Valve to let the oil in the tube returns to oil sump.

  Important:
  Holds the Oil Sampling Pump with the bottle upright, and do not pump while oil is full the bottle. In both cases there is a risk for oil to enter the cylinder of the pump, resulting cross contamination and need for cleaning.
- ✓ Unscrew the sample bottle from the Oil Sampling Pump and place the cap back on the sample bottle and tighten firmly.
- ✓ Remove the tube and rod from the gearbox. Unscrew Knurled Knob on the Oil Sampling Pump, remove and properly dispose used tube.
- ✓ Fill up the Sample Information Form (SIF) and send the sample to the Lab. The forms number must be the same with the bottle number.
  Example: Sample Information Form with Bottle ID 1075532. Refer Attachment 2.

3.6 Oil Sampling Process Flow



Attachments

Attachment 1 - Gearbox Oil Temperature Reading Record Checklist, RST T1-T5 Scheduled Maintenance Checklist, [R00.OMR.M14100.PT.0002.I]

Attachment 2 - Sample of completed Sample Information Form (SIF).

Attachment 3 - Sample of Oil Analysis Report.

Attachment 1

Rolling Stock Maintenance Department

Gearbox Oil Temperature Reading Record

200K Km

E-MAS
Effective Railway Operations; Reliable System Maintenance

Train No : _____

Work Order No. : _____

Date : _____

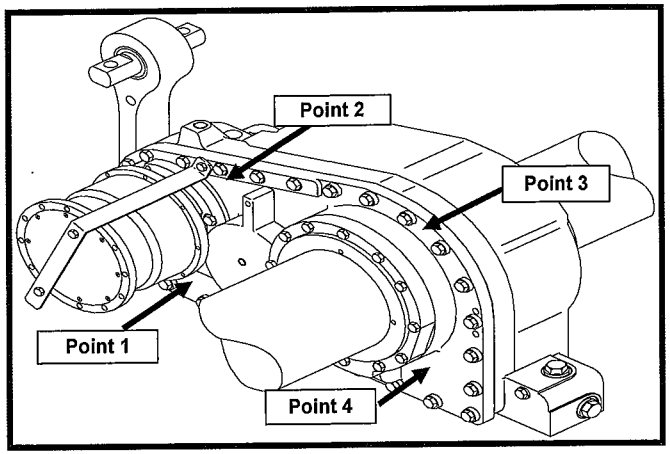
Time Start : _____

Train Mileage : _____ KM [A]

Train Mileage Last Oil Replacement : _____ KM [B]

Mileage of Oil Service : _____ KM [C]

C = A - B



Note:

- ☐ Take Gearbox oil sample & change oil.
- ☐ Take Gearbox oil sample only - without change oil.

Axle No.:	1	2	3	4	7	8	9	10
G/box S/N:								
Temp. of Point 1	°C	°C	°C	°C	°C	°C	°C	°C
Temp. of Point 2	°C	°C	°C	°C	°C	°C	°C	°C
Temp. of Point 3	°C	°C	°C	°C	°C	°C	°C	°C
Temp. of Point 4	°C	°C	°C	°C	°C	°C	°C	°C
Temp. of G/box Oil	°C	°C	°C	°C	°C	°C	°C	°C

Done By :

Stamp

Stamp

Authorised Person (Inspector & above) :

I hereby confirm the work is done according to existing work processes and therefore declare that this unit is fit for service.

Stamp:.....

Date:.....

Attachment 2

FOCUSLAB™

Fluid & Oil Analysis Technology

Sample Information Form (SIF)

แบบฟอร์มกรอกรายละเอียดข้อมูลของตัวอย่างน้ำมันหล่อลื่น

URS · UKAS · ISO 9001 : 2008 Certified

X107   Axle #1

CUSTOMER

- Customer/Code ข้อมูลลูกค้า/รหัส: 14018
- Address ที่อยู่: FRL
- Name ชื่อ: Mohamed
- Telephone โทรศัพท์: Ext
- Mobile มือถือ:
- E-mail อีเมล:
- Date of Sample วันที่เก็บตัวอย่าง: 26.03.16

Has this sample (from this Unit ID) been delivered and tested by Focuslab before? ตัวอย่างน้ำมันของเครื่องจักรนี้ เคยส่งทำการวิเคราะห์ หรือ มีประวัติเดิม หรือไม่?

- [ ] Yes ใช่
- [x] No ไม่เคย

EQUIPMENT

- UNIT ID เครื่องจักรเลขที่: Gbox #1 1207878
- UNIT Type ชนิด หรือ แบบ ของเครื่องจักร:
  - Engine: Diesel / Gasoline
  - Gas Engine: Natural Gas / Bio Gas / CNG/LPG / Other
  - Hydraulic: Mobile / Industrial / EHC / Fire-Resistance
  - Gearbox (selected): Mobile / Industrial / Other: Agitator
  - Compressor: Air / Refrigerant / Gas
    - Rotary Screw
    - Reciprocating
    - Centrifugal
    - Other
  - Bearing: Pain/Journal/Sleeve / Roller Element Bearing / Other
  - Turbine: Gas / Steam / Hydro / Aeroderivative
  - Pump / Motor
  - Heat Transfer
  - Other
- UNIT Model เครื่องจักรรุ่น: 32 16
- UNIT Maker ผู้ผลิตเครื่องจักร: Vertli Turbo

LUBRICANT

- Lube Brand / Type น้ำมันยี่ห้อ / ประเภท: Shell Spirax S A90
- Viscosity Grade เกรดความหนืด:
  - ISO 32 / 46 / 68 / 100 / 150 / 220
  - ISO 320 / 460 / 680 / Other
  - SAE 30 / 40 / 50 / 15W40 / 20W50
  - SAE [x] 90 / 140 / Other
- Lube System Capacity ปริมาณทั้งหมดของระบบหล่อลื่น: 6 Liters ลิตร
- Sample Taken From ตำแหน่งการเก็บตัวอย่าง:
  - [ ] Sump / Reservoir
  - [ ] Crankcase
  - [ ] Returnline
  - [ ] Drainline
  - [x] Gearbox
  - [ ] Bearing
  - [ ] Filter
    - [ ] Before
    - [ ] After
  - [ ] Other (describe)

Complete Equipment Information and Lube Type / Viscosity Grade on the first oil sample and / or anytime that its change

มีความถูกต้องตามข้อความสมบูรณ์ของข้อมูลเครื่องจักรและข้อมูลยี่ห้อน้ำมัน ความหนืดในการส่งตัวอย่างครั้งแรก และ / หรือหากมีการเปลี่ยนแปลง

Machine or Equipment (Unit ID) Service in Hours or KMS อายุหรือชั่วโมงการทำงานของเครื่องจักร เป็นชั่วโมง หรือ กิโลเมตร	2,487,694	Hours or KMS ชม. หรือ กม.	
Filters Hours or KMS อายุการทำงานของกรอง เป็นชั่วโมง หรือ กิโลเมตร	–	Hours or KMS ชม. หรือ กม.	
Oil Service in Hours or KMS อายุหรือชั่วโมงการทำงานของน้ำมัน เป็นชั่วโมง หรือ กิโลเมตร	206,658	Hours or KMS ชม. หรือ กม.	
Oil Added (oil make up rate) มีการเติมน้ำมันเพิ่มเติม	–	Liters ลิตร	

PR. No. / PO. No. เลขที่ใบขอซื้อ / เลขที่ใบสั่งซื้อ	

Remark : Additional information / comments / others หมายเหตุ : ข้อมูลเพิ่มเติม / คำแนะนำ / อื่นๆ

Recent maintenance ? Abnormal condition ? High noise ? ซ่อมแซมครั้งล่าสุด ? อาการผิดปกติ ? เสียงดัง ?

Date of Change Oil / Change Filter / Top up ? วันเปลี่ยนถ่ายน้ำมัน / เปลี่ยนกรอง / เติมน้ำมันเพิ่ม ?

Testing Package แพ็คเก็จการทดสอบ	Optional Test if needed ทดสอบเพิ่มเติม ถ้าจำเป็น

Bottle ID ขวดเลขที่
1075532

Testing details - see back page รายละเอียดการทดสอบ ดูด้านหลัง

Accurate and faster lead time of analysis is dependent upon complete Sample Information Form (SIF)

กรุณากรอกแบบฟอร์มรายละเอียดของตัวอย่างน้ำมันให้สมบูรณ์ เพื่อผลและความรวดเร็วของการตรวจวิเคราะห์

Address : 120/41-42 King Kaew Road, Soi 21/2, Rajateva, Bangplee, Samutprakan 10540 Thailand.

ที่อยู่ : 120/41-42 ถนนกิ่งแก้ว ซอย 21/2 ตำบลราชาเทวะ อำเภอบางพลี สมุทรปราการ 10540

E-mail : focuslab@focuslab.co.th   Website : www.focuslab.co.th

Lab : Tel : 66 (02) 750 4187   Fax : 66 (02) 750 4186

Office : Tel : 66 (02) 361 8600-3   Fax : 66 (02) 361 8567

FM-1.7

Yellow Copy - Customer File Copy

ฉบับสีเหลือง - สำหรับลูกค้าเก็บไว้ตรวจสอบ

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Attachment 3

FOCUSLAB™ Fluid & Oil Analysis Technology

ISO9001:2008 Certified

FocusLab Ltd.

CUSTOMER
Code : 14018
Name : Express Rail Link Maintenance & Support
Address : Express Rail Link Sdn. Bhd.
Kompleks Rel Udara, Bandar Baru
Salak Tinggi, 43900 Sepang
Site : X107
Location : Axle 1
Test code : G804 604

EQUIPMENT
Unit ID : Gearbox 1207878
Unit Type : Gearbox Railcar
Unit Make : VOITH TURBO GMBH
Unit Model : Spurwheel Axle SZ16

OIL
Oil type / Viscosity : SHELL SPIRAX S2 A SAE 90
Oil System Capacity : 6 Liters

NORMAL

Notes (Finding, Evaluation, Interpretation, Suggestion and Recommendation)

All wear conditions and wear tests appear in normal working range.
All oil conditions and oil tests appear in normal working range.
All contaminant conditions and contaminant levels appear in normal ranges.
Continue routine sampling interval.

Wipaporn A. / Somchai J.

Condition History	Test Method	Result	Current Sample Wear	Current Sample Oil	Current Sample Cont.	Previous Sample Wear	Previous Sample Oil	Previous Sample Cont.	Wear	Oil	Cont.
			N	N	N	N	C	N	C	N	N
Lab ID			334891			316191			302944		
Bottle ID			1075532			1076139			1061632		
Date Sampled			26-Mar-16			30-Sep-15			07-May-15		
Oil Hours (Kms)			206658 kms			201529 kms			194892 kms		
Unit Hours (Kms)			2487694 kms			2280815 kms			2079286 kms		
Oil Change											
Oil Added (Liters)											
Filters Hours (Kms)											

Baseline and Alarm Limit

BASELINE

Alarm Limit

Alarm Limit Matrix -Set Name (Equipment type / oil type)

Gearbox Railcar Spirax S2 A 90 (Siemens)

Wear Condition Wear Element	Method	Unit	Current Sample Fine Wear (RDE)	Current Sample Coarse Wear (RFS)	Previous Sample Fine Wear (RDE)	Previous Sample Coarse Wear (RFS)	Baseline Fine Wear (RDE)	Baseline Coarse Wear (RFS)	Baseline (TNO)	Fine Wear (RDE) U-Caution	Fine Wear (RDE) U-Warning	Coarse Wear (RFS) U-Caution	Coarse Wear (RFS) U-Warning
Iron	D-6595	PPM	22.0	0.1	16.7	4.2	59.1 C	43.1	0	>45	>67	>193	>296
Chromium	D-6595	PPM	0.0	0.1	0.0	0.1	0.4	0.1	0	>1	>2	>2	>3
Lead	D-6595	PPM	0.0	0.1	0.0	0.1	0.0	0.1	0	>2	>3	>4	>6
Copper	D-6595	PPM	0.5	0.1	0.4	0.1	0.7	2.8	0	>42	>50	>33	>52
Tin	D-6595	PPM	0.3	0.1	0.0	0.0	0.0	0.1	0	>1	>2	>6	>9
Aluminum	D-6595	PPM	0.2	0.1	0.1	0.1	0.5	0.1	0	>3	>5	>19	>31
Nickel	D-6595	PPM	0.0	0.1	0.1	0.1	0.6	0.1	0	>1	>2	>2	>3
Silver	D-6595	PPM	0.0	0.1	0.0	0.1	0.0	0.1	0				
Molybdenum	D-6595	PPM	0.0	0.1	0.0	0.1	0.5	0.1	0				
Titanium	D-6595	PPM	0.1	0.1	0.0	0.1	0.0	0.1	0				

Oil Condition	Method	Unit	Current Sample	Previous Sample	Baseline	TNO	L-Warning	L-Caution	U-Caution	U-Warning
Viscosity @ 40°C	D-445	cSt	142.4	140.8 C	154.0	149.1	<134.2	<141.6	>164	>178.9
Viscosity @ 100°C	D-445	cSt	14.8	14.8	15.3	14.7				
Oxidation	E-2412M	Abs	10.2	10.4	13.2	11.6			>14.5	>17.4
Nitration	E-2412M	Abs	10.4	10.8	15.6	15.4			>19.2	>23.1
TAN	D-974	mg KOH/g.	1.12 C	0.93	0.80	0.86			>1.06	>1.86
TBN	D-4739	mg KOH/g.								

Contamination	Method	Unit	Current Sample	Previous Sample	Baseline	TNO	U-Caution	U-Warning
Water	T-H2O	% (Wt.)	0.021	0.011	0.021	0.023	>0.04	>0.06
Sodium	D-6595	PPM	0	0	0	0		
Silicon	D-6595	PPM	0.2	0.3	0.5	0	>34	>53

Additive Element	Method	Unit	Current Sample	Previous Sample	Baseline	TNO	U-Caution	U-Warning
Boron	D-6595	PPM	0	0	0	0		
Magnesium	D-6595	PPM	0	0	0	0		
Calcium	D-6595	PPM	0	1	4	0		
Barium	D-6595	PPM	0	0	0	0		
Phosphorus	D-6595	PPM	251	100	241	196		
Zinc	D-6595	PPM	4	2	6	0	>50	>53

Additional Test	Method	Unit	TNO	L-Caution	L-Warning	U-Caution	U-Warning
Flash Point	D-3828	°C					
Viscosity Index	D-2270						

Note: Alarm Limits are variable and dependent upon dataset size and to be used as general guideline.
No Sign or N : NORMAL , C or O : CAUTION (first level warning limit) , W or W : Warning (second level warning limit)
Accuracy of interpretation and recommendation are based on representatives sample and information supplied.
No warranty is expressed or implied for this report.