JSP-010 (BATTERY MAINTENANCE AND QUALIFICATION)
JOB SPECIFIC PROCESS

Locomotive Type: ALL MODELS

Valid for Road Numbers: (All Models)

Overview: This job process sheet will assist with the maintenance and qualification of batteries.

SPECIAL TOOLS OR EQUIPMENT:

SEQUENCE OF JOB STEPS	Please print your name, NO signatures
1. Ensure the locomotive is shutdown, discharged, all of the circuit breakers are open and the battery knife switch is open.	J. Martin
Battery Qualification/Maintenance	
2. NOTE: If batteries are dead, connect the charger until the charge rate falls below 10 amps to determine state of charge. Readings under 20 V are suspect for units with just 2 batteries.	
3. Insert hose stem into battery cell and squeeze bulb.	
4. Release pressure until enough acid solution is drawn into the tube allowing the float to float freely. Be sure float does not touch rubber stopper at the top of the tube.	
5. The float reading at the water line is the uncorrected charge level of the battery.	
6. Read and record the specific gravity of all 16 pilot cells. "record readings below": acceptable range is 1.225 – 1.300 (if out of this range notify tech support) **Note 1**: the sheet below is set up for 2 or 8 batteries as some units have 8 batteries. **Note 2:** accurate readings cannot be obtained if water has recently been added to cells. Differences of 50 points or more between readings in battery cells may indicate pending battery failure.	
7. Based on the above specific gravity readings, do any batteries need replaced? Remember, if the unit came in with already dead batteries, an attempt to charge the batteries must be made before taking the specific gravity readings. YES	
8. Return acid to cell from which it was drawn.	
9. Be sure all vent plugs are replaced and tight.	
10. With Unit shut down measure the voltage reading across each battery at the terminals, record readings on the chart below.	
11. Make a general check of the battery as to proper blocking, clean and tight connections at all points, and any unusual appearance or condition. If any unusual appearance or conditions exit, like corrosion, clean with scotch-brite buffer or wire br	
12. Apply approved protective coating to connections after terminals are cleaned and dried	
13. Add water as required (Add water to bottom of filler neck).	
Battery Cranking Voltage Test	
14. Close battery knife switch, and circuit breakers.	
15. Open the injector toggle switch, on EUI units to prevent unit from starting. **NOTE: Battery cranking voltage readings do not need to be taken on Air Start Locomotives.**	

16. On MUI engines, pull the Governor button and hold back the Lay-shaft while cranking the engine over to prevent unit from starting.

18. Based on the cranking voltages, is any battery suspect of needing replaced? YES NO

2 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
Battery 1	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	o
Section A						✓		
Section B	1295					✓		
Section C						✓		
Section D						✓		

2 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
Battery 2	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	o
Section A						✓		
Section B	1250					✓		
Section C						✓		
Section D						✓		

8 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	o
Battery 1								
Battery 2								
Battery 3								
Battery 4								
Battery 5								
Battery 6								
Battery 7								
Battery 8								

BATTERY CRANKING VOLTAGE CHART

	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Battery Voltage	33.6	34.4						

	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Battery Voltage								

	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
CrankingBattery Voltage								
Battery Voltage								

	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
CrankingBattery Voltage								

Unit: 5078 Date: 3-8-12

DEFECTS FOUND DURING INSPECTION

DEFECT Tm#2 Top Cover missing	INSPECTED BY: Roy B.
REPAIR New Cover Installed	CORRECTED BY: ?
DEFECT Far left aspirator tube is loose	INSPECTED BY: [illegible]
REPAIR	CORRECTED BY:
DEFECT Tm#6 Cut pinion - Coming Out	INSPECTED BY: [illegible]
REPAIR	CORRECTED BY:
DEFECT Outer slip ring brushes on Main Gen short	INSPECTED BY: [illegible]
REPAIR Replaced 3 short brushes	CORRECTED BY: J. Kut
DEFECT R1, R6, L3, L6 No shock - but there is a shock mount	INSPECTED BY: T Pbourdeau
REPAIR	CORRECTED BY:

Unit: _____ Date: _____

DEFECTS FOUND DURING INSPECTION

DEFECT R1, R5, L6, L3 Exc. piston travel R4, R6 worn out B-shoes	INSPECTED BY: TPGoodlet
REPAIR Replaced WORN out shoes Adj. All Exc. piston travels	CORRECTED BY: TPGoodlet

DEFECT Exc. Gap in Journal box to pedestal liners R1, R3, L6 pedestal liners worn alot	INSPECTED BY: TPGoodlet
REPAIR	CORRECTED BY:

DEFECT R6, L6 Brake cyl. innerslide bushing worn out & broken	INSPECTED BY: TPGoodlet
REPAIR Replaced both inner slide bushing & bolts	CORRECTED BY: TPGoodlet

DEFECT R2 G-Case bolt loose R5 " " "	INSPECTED BY: TPGoodlet
REPAIR Tightend Both loose G-Case bolts	CORRECTED BY: TPGoodlet

DEFECT R4, R1 support box cracked 2-3" Long leaking o	INSPECTED BY: TPGoodlet
REPAIR	CORRECTED BY:

LOCOMOTIVE 5078

DATE 3-10-12

	Start Readings				Has Shims			END READING				Has Shims	
	Flange Height	Flange Thickness	Rim Thickness	Witness Grove	YES	NO		Flange Height	Flange Thickness	Rim Thickness	Witness Grove	YES	NO
L#1	2-18	0-0	2.28				L#1						
L#2	0-20	0-0	3.00				L#2						
L#3	3-21	4-0	2.12				L#3						
L#4	0-18	0-0	3.00				L#4						
L#5	0-19	0-0	3.00				L#5						
L#6							L#6						
R#1	2-18	0-0	3.00				R#1						
R#2	0-20	2-0	2.30				R#2						
R#3	0-20	0-0	2.14				R#3						
R#4	0-18	0-0	3.00				R#4						
R#5	0-19	0-0	3.00				R#5						
R#6							R#6						

OLD GAUGE

FLANGE THICKNESS MEASUREMENT

0 – on 0 – 1 - 17/64"
1 – on 0 – 1 - 15/64"
2 – on 0 – 1 - 7/32"
3 – on 0 – 1 - 5/32"
4 – on 0 – 1 - 7/64"
5 – on 0 – 1 - 3/64"
6 – on 0 – 1 - /32"
7 – on 0 – 63/64"
8 – on 0 – 15/16"

OLD GAUGE

FLANGE HEIGHT MEASUREMENT

0-on-0---1"
0-on-1---1-1/16"
0-on-2---1-1/8"
0-on-3---1-3/16"
0-on-4---1-1/4"
0-on-5---1-5/16"
0-on-6---1-3/8"
2-on-6---1-13/32"
4-on-6---1-7/16"
6-on-6---1-31/64"

WEAR LIMITS FOR ROAD & SWITCH LOCOMOTIVES – MINIMUM DAILY REQUIREMENTS

FRA 1 ½"	MMA 1 7/16"	Flange Height
FRA 7/8"	MMA 15/16"	Flange Thickness
FRA 1"	MMA 1 1/16"	Rim Thickness
FRA 5/16"	MMA ¼"	Tread Wear

RF 1/8 LF 1/8
RR 1/4 LR 1/8

TP Goode

NEW GAUGE

FLANGE HEIGHT MEASUREMENT

0-on-17---1-1/16"
0-on-18---1-1/8"
0-on-19---1-3/16"
0-on-20---1-1/4"
0-on-21---1-5/16"
0-on-22---1-3/8"
2-on-22---1-13/32"
4-on-22---1-7/16"
6-on-22---1-15/32"
8-on-22---1-1/2"

WEAR LIMITS – ROAD & SWITCH LOCOS – MIN 92 DAY REQ

FLANGE Height	Flange THICKNESS	Rim THICKNESS		Tread WEAR
FRA 1 ½"	FRA 7/8"	FRA 1"		FRA 5/16"
MMA 1 7/16"	MMA 1 1/32"	MMA 1 1/8"		MMA ¼"

WEAR LIMITS – PASSENGER LOCOS – MIN 92 DAY REQ

Flange HEIGHT	Flange THICKNESS	Rim THICKNESS	Tread WEAR
FRA 1 ½"	FRA 7/8"	FRA 1"	FRA 5/16"
MMA 1 7/16"	MMA 1"	MMA 1 ⅛"	MMA ¼"

CONVERSION CHART FOR WHEEL DIAMETER

8=	37"	15=	37 7/8"	22=	38 ¾"	29=	39 5/8"	36=	40 ½"
9=	37 1/8"	16=	38"	23=	38 7/8"	30=	39 ¾"	37=	40 5/8"
10=	37 ¼"	17=	38 1/8"	24=	39	31=	39 7/8"	38=	40 ¾"
11=	37 3/8"	18=	38 ¼"	25=	39 1/8"	32=	40"	39=	40 7/8"
12=	37 ½"	19=	38 3/8"	26=	39 ¼"	33=	40 1/8"	40=	41"
13=	37 5/8"	20=	38 ½"	27=	39 3/8"	34=	40 ¼"	41=	41 1/8"
14=	37 ¾"	21=	38 5/8"	28=	39 ½"	35=	40 3/8"	42=	41 ¼"

NEW GAUGE

FLANGE THICKNESS MEASUREMENT

0 – on 0 – 1 - 17/64"
1 – on 0 – 1 - 15/64"
2 – on 0 – 1 – 7/32"
3 – on 0 – 1 – 5/32"
4 – on 0 – 1 – 7/64"
5 – on 0 – 1 – 3/64"
6 – on 0 – 1 – 1/32"
7 – on 0 – 63/64"
8 – on 0 – 15/16"

LOCOMOTIVE RAIL CLEARANCE

COUPLER HEIGHT		FRONT	PILOT HEIGHT		FRONT	HEIGHT OF HORIZONTAL END HANDHOLD OR UNCOUPLING LEVER IF USED AS HORIZONTAL HANDHOLD	LOCO RAIL CLEARANCE
FRA	MAX 34 ½" MIN 31 ½"	33	FRA	MAX 6" MIN 3"	5	FRA MIN 30" MMA MIN 30" FRA MAX 50" MMA MAX 50"	FRA MIN 2 ½" MMA MIN 3"
MMA	MAX 34 ½" MIN 32 ½"	REAR 33½	MMA	MAX 6" MIN 3 ½"	REAR 5		

WHEEL DIAMETER MEASUREMENTS ARE TAKEN FROM THE TOP OF THE WITNESS GROOVE **40" DIAMETER WHEELS WITNESS GROVE = 36"**
42" DIAMETER WHEEL WITNESS GROOVE = 38"

WHEEL MATCHING STANDARDS FOR 6 AXLE LOCOMOTIVES (FRA & MMA STANDARDS ARE THE SAME)

¾" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITHOUT SHIMS.
1 ¼" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITH SHIMS APPLIED.
1 ¾" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS ON DIFFERENT TRUCKS.

NOTE
WHEN FIGURING THE DIFFERENCE IN WHEEL DIAMETER, TO DETERMINE IF SHIMS ARE REQUIRED, YOU MUST USE THE AVERAGE WHEEL DIAMETER FIGURES
REMEMBER THIS RULE
0 TO 5 DIAMETER DIFFERENCE NO SHIMS REQUIRED 6 TO 19 DIAMETER DIFFERENCE ADD APPROPRIATE SHIMS TO BOTH BOXES ON BOTH SIDES OVER 19 IN DIAMETER DIFFERENCE REQUIRES WHEEL CHANGE OR TRUED ***NOTE:*** *ON EMD LOCOMOTIVES USE ONLY ONE ¾" SHIM EMD PART NUMBER 8455981 SHELLED TREAD AND FLAT SPOTS MUST BE TRUED OR CHANGED WHEN FOUND ON PERIODIC OR UNSCHEDULED MAINTENANCE. KCS CONDEMNING LIMITS FOR SHELLED TREAD ON A SERVICE TRACK*
• ONE SHELLED SPOT 1" OR GREATER IN LENGTH • ONE SHELLED SPOT WITH A DEPTH OF ¼" OR MORE.

EMPLOYEES SIGNATURE TP Goode

SUPERVISORS SIGNATURE

Maine Maritime Academy Railroad
Locomotive

Date

3 Month Federal Air Work

Signature

1. Inspect and repair air piping and valves for leaks..... J. Martin

2. Test all air gauges with gauge tester and set if required..... J. Martin

3. With full brake pipe pressure, make a 20lb. reduction, move the cutoff valve to "OUT" position and move the lead – dead valve to "DEAD" position. Brakes must remain applied for 5 minutes.....

4. Cover each trainline hose coupling with hand and test for leakage through valve, then apply blank dummy couplings to the trainline hoses on each end of the unit and open trainline valves. Make a 20lb. reduction with the Automatic, move the cutoff valve to "OUT" position and check for brake pipe leakage. Leakage shall not exceed 5 lb. per minute.....

5. Reduce main reservoir pressure to 85 lbs. by draining #2 main reservoir.(*) Check cab gauge for leakage from main reservoirs and piping for 3 minutes. Leakage must not exceed an average of 3 lb. per minute during th test.....

6. Drain #1 main reservoir (*) completely and test check valve between reservoirs. Pressure should remain on the main reservoir gauge in the cab as #1 main [illegible] is drained.....

7. Check all MU valve handles to ensure the locking devices work properly. Lubricate or replace as necessary.....

8. Check brake shoe thickness and replace as necessary..... TODD G.

Note (*) If reservoir is without the check valve 2 to 3 with the check valve

9 test and CALIBRATE Air Flow Meter TODD G.

Toilet clean & dump refill

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