

Battery Testing Results 28-March-2013

FRC team 1640's batteries were tested over the past week, using two test methods:

1. Discharge test at fixed current (7.5 A) using West Mountain Radio's CBA III (Computerized Battery Analyzer). This test tracks voltage and Amp Hours (A·hr) during a fixed current discharge to 10.5 volts. More A·hr is better. Each measurement requires about 2 hours and discharges the battery.
2. Battery Beak voltage measurements at 3 current loads (0, 1 & 18 amps) is used to determine the battery's internal resistance. A rating of Good, Fair or Bad is assigned based on the internal resistance value. The Battery Beak also indicates whether a battery is charged or not. The Battery Beak is from Cross The Road Electronics. Measurement is fast and does not significantly discharge the battery tested.

Results of testing:

Battery	In service since	CBA III A·hr	Battery Beak Assess	Int. Ω
A	2011	13.09	Fair	0.029
B	2010	15.25	Good	0.025
C	2010	14.53	Good	0.021
D	2010	13.73	Good	0.022
E	2009	11.59	Fair	0.028
I	2011	13.04	Good	0.019
J	2011	14.70	Good	0.019
L	2012	13.55	Good	0.017
M	2012	15.25	Fair	0.031
O	2012	13.73	Good	0.023
P	2012	15.60	Good	0.018
Q	2013	14.19	Good	0.022

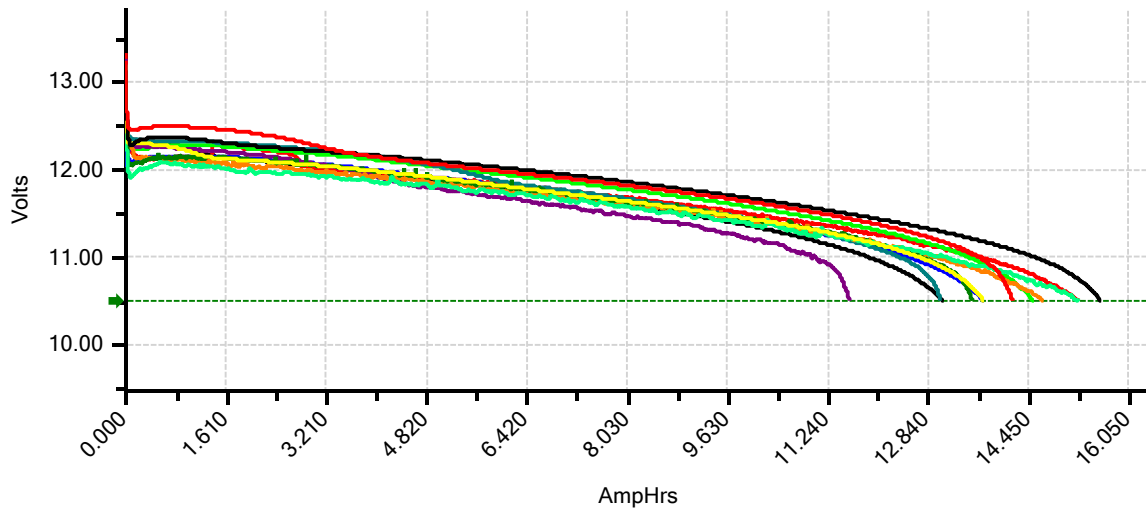
Testing indicates that three batteries, A, E & M, should be taken out of competition service. These batteries may still be used for practice and pit purposes.

Our "Pit" battery, C, can return to competition service.

Two new batteries have been ordered to replace those retiring from competition service.

West Mountain Radio - CBA III

— A-130323: 6 Lead Acid cells, 17.2 Ah @ 7.50A	— B-130324: 6 Lead Acid cells, 17.2 Ah @ 7.50A
— C-130320: 6 Lead Acid cells, 17.2 Ah @ 7.50A	— D-130327: 6 Lead Acid cells, 17.2 Ah @ 7.50A
— E-130324: 6 Lead Acid cells, 17.2 Ah @ 7.50A	— I-130321: 6 Lead Acid cells, 17.2 Ah @ 7.50A
— J-130324: 6 Lead Acid cells, 17.1 Ah @ 7.50A	— L-130322: 6 Lead Acid cells, 17.2 Ah @ 7.50A
— M-130323: 6 Lead Acid cells, 17.2 Ah @ 7.50A	— O-120323: 6 Lead Acid cells, 17.2 Ah @ 7.50A
— P-130323: 6 Lead Acid cells, 17.2 Ah @ 7.50A	— Q-130322: 6 Lead Acid cells, 17.2 Ah @ 7.50A



A-130323:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/23/2013 12:13 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.08 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:44:12
Tested Capacity: 13.085 Ah

B-130324:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/24/2013 5:09 AM
Discharge Rate: 7.50 A
Starting Voltage: 13.33 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 02:01:24
Tested Capacity: 15.249 Ah

(continued on next page)

West Mountain Radio - CBA III

C-130320:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/20/2013 10:10 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.20 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:55:38
Tested Capacity: 14.526 Ah

D-130327:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/27/2013 10:01 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.03 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:49:19
Tested Capacity: 13.732 Ah

E-130324:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/24/2013 12:23 AM
Discharge Rate: 7.50 A
Starting Voltage: 13.26 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:32:17
Tested Capacity: 11.589 Ah

I-130321:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/21/2013 9:58 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.18 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:43:48
Tested Capacity: 13.038 Ah

J-130324:

Description: 6 Lead Acid cells, 17.1 Ah @ 7.50A
Started At: 3/24/2013 9:52 AM
Discharge Rate: 7.50 A
Starting Voltage: 13.13 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:56:59
Tested Capacity: 14.695 Ah

West Mountain Radio - CBA III

L-130322:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/22/2013 8:32 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.14 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:47:54
Tested Capacity: 13.554 Ah

M-130323:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/23/2013 9:10 AM
Discharge Rate: 7.50 A
Starting Voltage: 13.20 V
Ending Voltage: 10.49 V
Total Time (hh:mm:ss): 02:01:23
Tested Capacity: 15.248 Ah

O-120323:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/23/2013 6:17 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.04 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:49:19
Tested Capacity: 13.727 Ah

P-130323:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/23/2013 8:53 PM
Discharge Rate: 7.50 A
Starting Voltage: 13.13 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 02:04:13
Tested Capacity: 15.600 Ah

Q-130322:

Description: 6 Lead Acid cells, 17.2 Ah @ 7.50A
Started At: 3/22/2013 3:34 AM
Discharge Rate: 7.50 A
Starting Voltage: 13.24 V
Ending Voltage: 10.50 V
Total Time (hh:mm:ss): 01:53:00
Tested Capacity: 14.192 Ah