

Joint Service Power Expo 2011

**Battery Management
and Sustainment System**

Presented by:
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- Most 24V systems are made up of multiple batteries in series or series parallel
- Failure occurs for a variety of reasons
 - Received “new” in an undercharged condition
 - Never fully recharged
 - Key off loads
 - Parasitic drains
 - Environmental
 - Battery set imbalance
 - 12 Volt Taps
 - Dissimilar Chemistries

Effects

1. Premature Battery Failures
2. Premature Alternator Failure
3. Differing Internal Resistance

Causes

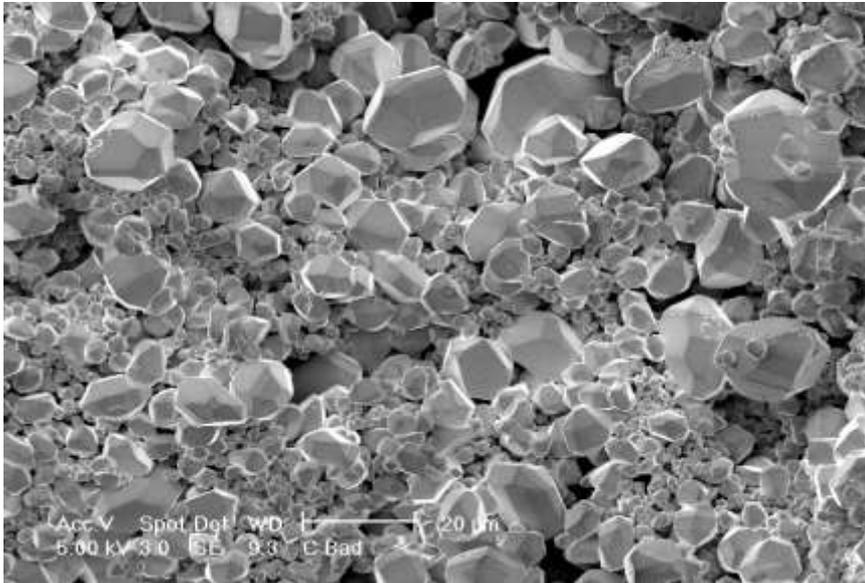
1. 12 Volt Taps
2. Lack of Testing – *new* and used batteries
3. Mismatched Installs

Corrective Actions

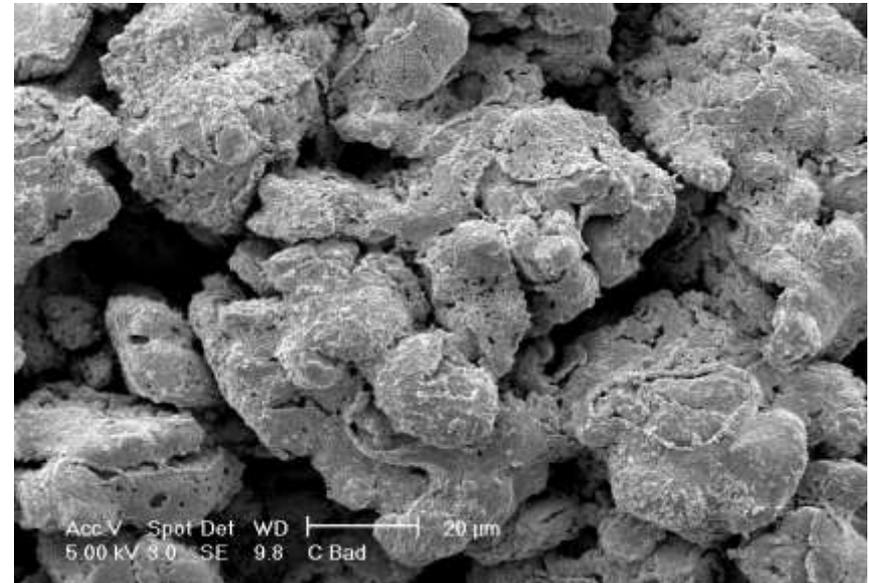
1. Testing
2. Matching battery set/pack voltages
3. Recharging low SOC battery in the pack *before* attempting 24v charging (either charger or alternator)

- Lead Sulfate Build up---Enlarged Crystals
- All L/A batteries create PbSO_4
 - AGM – slower formation
 - Flooded Cell- faster formation
 - Heat accelerates self discharge/crystal formation

Ohio State University 5-yr. old fully charged batteries



Cathode crystalline structures remaining after charging **without** pulsing



Cathode after charging **with** pulsing

- Overall capacity is reduced
 - Starting issues begin to increase
 - Heat
 - Cold
 - Shorter “silent watch” times
 - Insulating layer of crystals
 - **Premature battery replacement**
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- Equipment Not Mission Capable
 - Shrinking O&M budget spent on batteries
 - Man-hours wasted on replacing batteries
 - HAZMAT requirements
 - RBE whole fleet battery replacement
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- Goals
 - Minimize handling batteries
 - Keep them in the vehicles
 - Training at every level
 - Testing
 - Preventive Maintenance
 - Corrective Maintenance
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490 PT and MBT-1

Part Nos. 741x490 and 741x800

(NSNs: 6130-01-510-9594 and 6130-01-463-8499)



PM Goal

KEEP BATTERIES IN VEHICLES

- Solar Chargers



- Pro-HD's



- When batteries are too far gone to be recharged/recovered in the vehicle
 - Caused by:
 - Imbalanced set
 - Short run times
 - Too many add-on loads
 - Low output alternator
 - Mixed chemistries
 - Sitting too long without Solar Maintenance Charging (RBE)
 - How long is too long?



HD Pallet Charger
Part No. 746x820

NSN: 6130-01-532-7711



Redi-Pulse Pro HD
Part No. 746x800

NSN: 6130-01-500-3401



Pulse Charger/World Version
Part No. 746x725
NSN: 6130-01-477-4703



490PT
Part No. 741x490
NSN: 6130-01-510-9594



Redi-Pulse Pro-12
Part No. 746x912
NSN: 6130-01-535-2718

Battery Service Equipment Set (BSES)

- 1 – HD Pallet Charger
- 1 – Redi-Pulse Pro-HD 12/24V Charger
- 1 – Redi-Pulse Pro-12
- 10 – MBT-1 Battery Testers
- 1 – 490PT Battery Analyzer

“Initially we didn’t think it was going to be anything other than additional charging stations, but immediately we found that we could recover twice as many batteries using the technology incorporated into the BATTCAVE Chargers.”

DOL – Fort Lewis

- Test all batteries-new or used prior to installation and disposal
- Attempt recovery on all batteries to be disposed of (except those with bad cells or physical damage)
- Ensure battery packs have batteries of the same construction
- Match battery voltages
- Ensure terminals and cable clamps are clean and tight
- Test batteries during weekly PM to catch potential problems before they start to destroy capacity
- Keep batteries clean to prevent external shorts caused by acid or ferric compounds
- Avoid 12v taps on 24v systems – (step down transformers)

- **Many battery failures are preventable**
- AGM (Hawker, Optima) can have over 6 yr service life
- Flooded Cell (6T's, 2/4HN, Grp 31's) can have over 3 yr service life
- Stop by PulseTech Products Booth 215 for more information!