How to use technology to lengthen the life of lead-acid batteries in the field of electric power storage

Lead-acid battery is indispensable for building infrastructure for information technology and telecommunications in non-electrified regions. This presentation will introduce our efforts to minimize waste and reduce cost of lead-acid battery.

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Executive Advisor

Japan Battery Regeneration,Inc.

Information on our technology

Super-K Patented Battery Additive for lead-acid battery

P type Super-K activator
for vehicle batteries

A type Super-K activator
for tubular type & deep cycle batteries

- Super-K developed by Dr. Akiya Kozawa and ITE researcher group.
- Our ITE lead-acid battery regeneration technology using Super-K activator aims world's most economical way of battery **regeneration** and re-use of old abandoned batteries.
- Extend battery life up to 10 years max. when Super-K is used in batteries deteriorated by sulfation.

- Useful for electric power storage for building infrastructure for information technology and telecommunications as well as off-grid electrification in non-electrified regions in developing countries.
- Making best use of limited natural resources and reducing cost for battery replacements.

Advantages of using Organic Polymer as Activator

- Soluble in sulfuric acid electrolyte
- Safe, no damage, no harm to the battery when added
- Activator is oxidative decomposed and disappear completely in a year or two (for P type) and in 3 - 4 years (for A type).
- Ideal for additive/activator brings no impurity

"Super-K" Activator for lead-acid battery

Features & Benefits

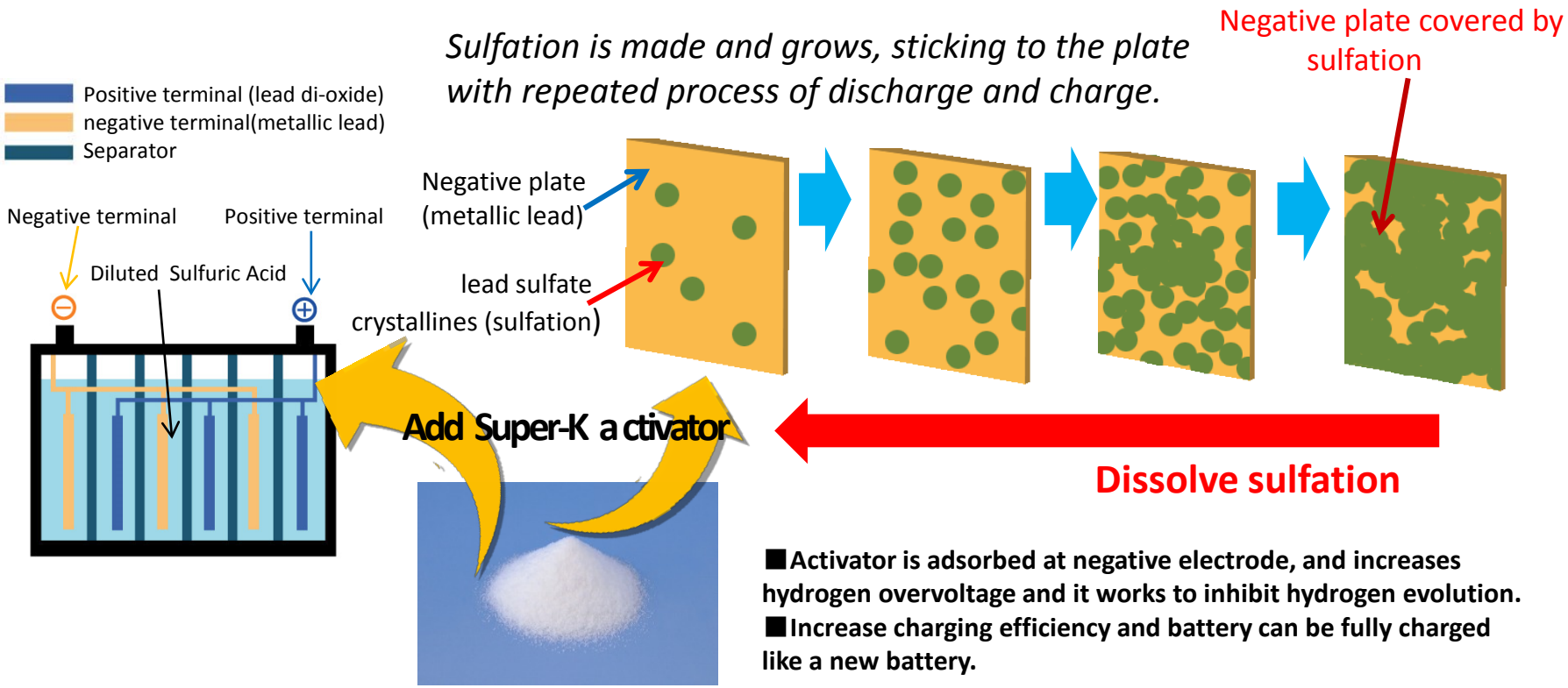
- Extend battery life up to 10 years
  with ITE regeneration technology with Super-K.
- Extend battery life by 3 – 5 years when used in running old batteries.
- Batteries with 20 – 30 % remaining capacity will increase to 70 – 100 %

- Super-K effectiveness lasts for one year (P type) and for 2-3 years(A type).

- Significantly reduce battery costs, maintenance costs and disposal costs.

How Super-K activator works to extend battery life

(1)Lead-acid Battery deteriorated by Sulfation



■Activator is adsorbed at negative electrode, and increases hydrogen overvoltage and it works to inhibit hydrogen evolution.
■Increase charging efficiency and battery can be fully charged like a new battery.

(2) Super-K activator dissolves Sulfation and Battery becomes like New !

Battery life can be doubled with Super-K. Effective for one or two years.

Technology for extending battery life for ICT infrastructure

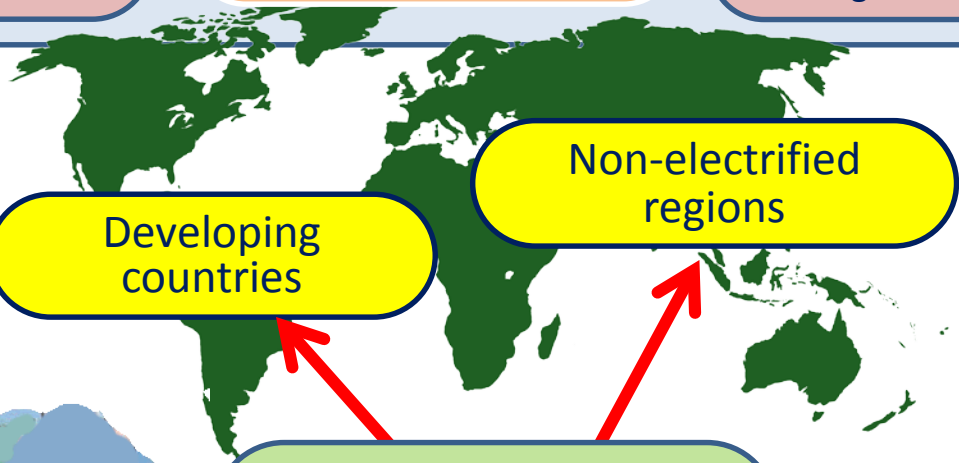
Developing countries/non-electrified regions

Huge demand for communication equipments

ICT products for everybody and everywhere

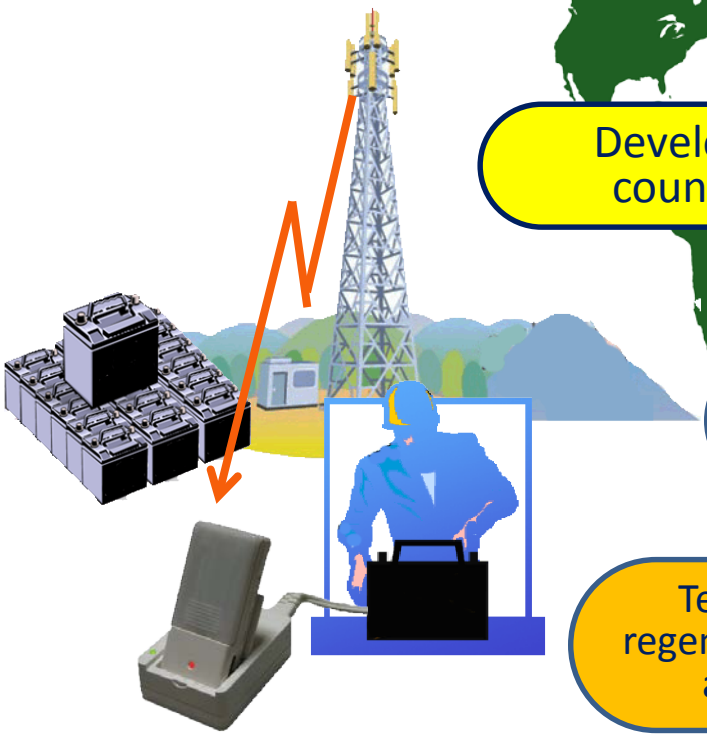
Electric power supply for non-electrified regions

Small scale electric power generation system



Developing countries

Non-electrified regions



Low cost electric power supply system

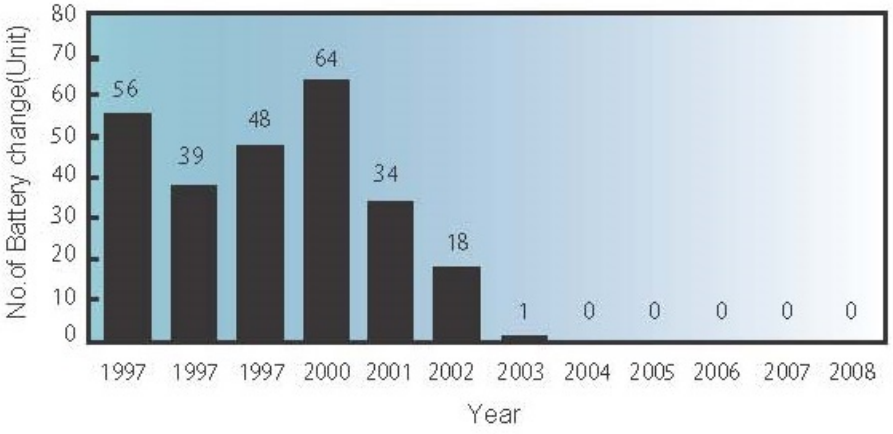
Technology for regeneration of lead-acid battery

Solar PV/wind electric power generation

Long-term Practical Truck Tests

Based on the research and studies over 15 years since 1990, we tested Super-K ITE organic activator in 200 working truck batteries used by the Sanwa Transportation Corp. located in Tokyo, Japan.

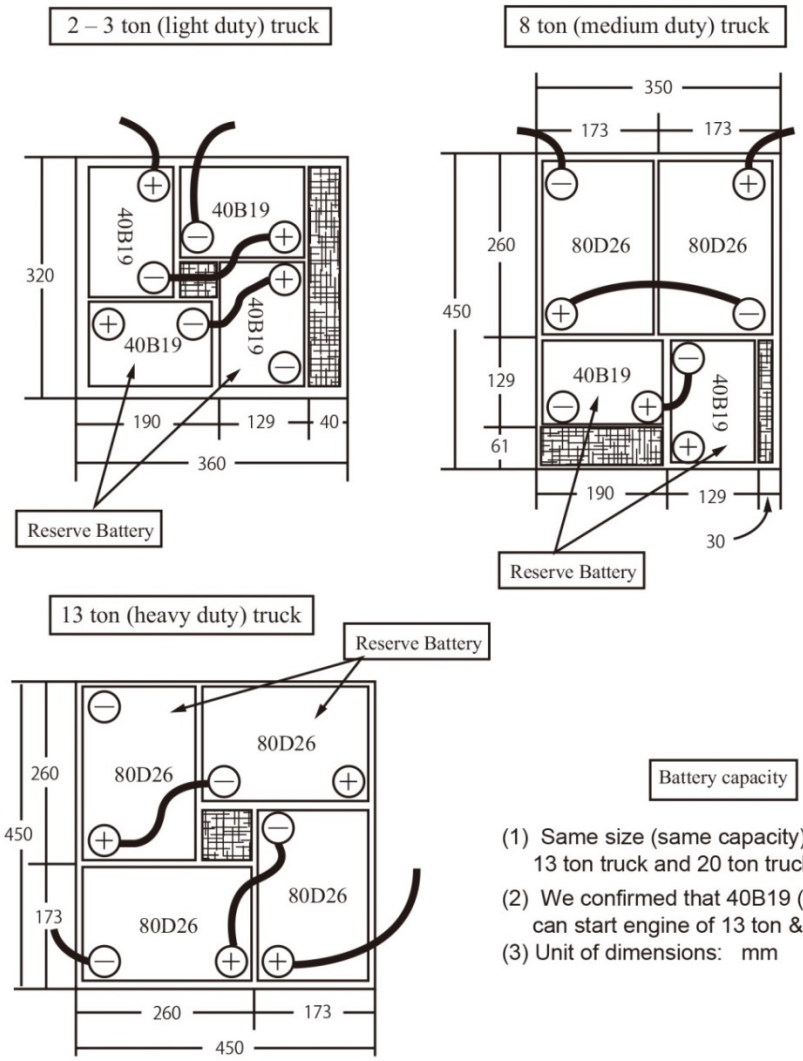
- Number of purchased replacement batteries by year.
  (See graph below) (for 200 trucks where Super-K was put in at the Sanwa Transportation)
- After start putting in Super-K for 200 trucks once every year, they needed to buy **only one new battery from 3rd year, and needed to buy none from 4th year .**
- Before using Super-K, the **average battery replacement was 52**.
- This transportation company **does not need to buy new batteries at all** for more than 10 years



Battery changes per year for 200 trucks from the Sanwa Transportation Co. in Tokyo

Large scale practical tests in trucks with half capacity battery + Super-K

- One example of Super-K effectiveness proved by large scale practical tests done at Sanwa Transportation.
- Dr. Kozawa's idea to use half capacity battery (= half cost battery) for trucks using Super-K
- Super-K activator was added in 50% smaller capacity batteries on 20 trucks for five years:
- 5 Year test had excellent results ! It was not necessary to use any reserve batteries.
- The test confirmed that 50% smaller than originally equipped batteries can last for 5 years with our Super-K activator.



For the Future

- Power generation utilizing renewable energy is our goal
- Huge growth is expected for Solar PV and wind power generation
- Large scale power generation systems require huge cost and time
  Need to make inexpensive small scale power storage systems

- Battery cost and replacement battery cost for storing electric power are huge and heavy burden to the people
- Promote penetration of small scale power generation system by lowering the costs necessary for batteries

【World's lowest cost solution for extending the life of lead-acid batteries and re-use of abandoned lead-acid batteries by regeneration charging with Super-K】By【ITE Technology for lead-acid batteries 】has big possibilities for use in various situations and will contribute to the utilization of renewable energy for power generation and power storage systems.