The IEEE Stationary Battery Committee and its Documents

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IEEE History[1]

The Institute of Electrical and Electronics Engineers (IEEE) was founded as the American Institute of Electrical Engineers (AIEE) in the spring of 1884. Since the electrical industry of that time consisted primarily of just the telegraph, the founding members and leaders were mostly from the telegraph industry. Early industry giants and noted entrepreneurs such as Thomas Edison (electrical power) and Alexander Graham Bell (telephone) were among its first members.

As electrical power and the telephone increased in popularity and availability, they gradually became the focus of the institute and it played a major role in their development through publications, technical committee meetings and standards.

When the "wireless" (eventually called radio) industry came into being in the early 1900's, an organization similar to the AIEE was needed to support it and the Institute of Radio Engineers (IRE) was founded in 1912. The IRE focused on the promotion of this new technology and eventually electronics in general.

Through the ensuing five decades, the use of electrical power, telecommunications and electronics grew to play a major role in society and both organizations provided great support to their respective industries. Over these years, the industries matured and interrelated such that the roles of the two organizations became redundant in some areas. When it became obvious that the organizations were overlapping in these areas, the two merged in 1963 to form the IEEE.

By the turn of the 21st century, the IEEE had grown to include 38 societies, 130 journals/magazines and over 900 active standards. In 2010, the IEEE had 395,000 members in 160 countries and today, is the largest technical society in the world.

IEEE Structure[2]

The IEEE is comprised of Societies; Technical Councils; Technical Committees; The Standards Association and Working Groups; and Virtual Networks.

Societies allow specialization into specific fields of interest. The 38 Societies are listed in Appendix A - Table A1. Each society has its own leadership, direction and purpose and caters to the needs of its members.

Technical Councils are groups of Societies working together in broad areas. The 7 Councils are listed in Appendix A - Table A2.

Technical Committees are set up to cover rapidly changing technologies. The 2 current Committees are listed in Appendix A - Table A3.

The Standards Association (SA) sets priorities and promotes the development of standards. The SA Working Groups are generally sponsored by Societies or Technical Councils. They are comprised of different areas and have committees that are responsible for standards development and upkeep. The 20 Working Group Areas are listed in Appendix A - Table A4.

Virtual Networks are web based groups of individuals sharing a common interest. The 6 current Virtual Networks are listed in Appendix A - Table A5.

IEEE Documents[3]

Most everyone refers to all IEEE documents as standards. However, there are actually three different types of documents.

- Standards - contain mandatory requirements
- Recommended Practices - outline preferred procedures
- Guides - offer suggestions for working with a technology

Stationary Battery Committee

The Stationary Battery Committee (StaBatt) is sponsored by the Power and Energy Society (PES) and is in the Power and Energy Working Group Area. It meets twice a year, generally in January and June. See Appendix D, Figure D1 -for a typical StaBatt meeting agenda.

The StaBatt is primarily responsible for the development, revision, and interpretation of the stationary (non-mobile) battery documents for the IEEE. Note that it also has responsibility for a few "mobile" battery documents as well. Its scope is stated as, "Treatment of all matters in which the dominant factors are the design, manufacturing, sizing, selection, installation, maintenance, testing, and operation of storage batteries and associated dc systems used in stationary applications, such as generating stations, substations, energy storage, industrial control, emergency/standby generator sets, emergency lighting, telecommunications, and uninterruptible power supplies. Battery types include rechargeable lead-acid, nickel-cadmium, and other types used or proposed for use in stationary applications."[4]

StaBatt meetings are open to the general public, i.e. you don't have to be a member of the committee to attend and participate. However, you do have to be a member to vote on items brought before the committee. StaBatt membership requirements include active committee participation and both IEEE and IEEE PES membership. Membership in the IEEE Standards Association (SA) is required to vote on standards generated or revised by the committee.

The StaBatt is comprised of all members of the committee. It is headed by the StaBatt Chair, Vice Chair and Secretary. These officers serve in an upward rotation with the Chair moving off, the Vice Chair moving to Chair, the Secretary moving to Vice Chair and a new Secretary appointed by the StaBatt Executive Committee (Chair, Vice chair and Secretary) every two years.

Under the StaBatt umbrella are Working Groups (WG) and Task Forces (TF). Both WGs and TFs meet at the StaBatt general meetings, as needed. There is one WG for each document within StaBatt's responsibility. These WGs are responsible for the development, approval, revision, and interpretation of their document. Each WG is headed by a Chair, Vice Chair and Secretary. The WG Chair is appointed by the StaBatt Chair and the WG Vice Chair and WG Secretary are appointed by the WG Chair. WG meetings are open to the general public, but membership in the WG is required to vote on the documents in the meetings. StaBatt membership is not required for WG membership. However, becoming a WG member (and maintaining membership) requires active participation in the WG as certified by the WG chair.

TFs are comprised of a group of members with specific common interests, e.g. the Nuclear TF. These are used to share information and discuss topics of general interest. Each TF has a chair appointed by the StaBatt Chair. TF meetings are open to the general public and there are no membership requirements as no voting takes place within them.

StaBatt Documents

As stated earlier, the StaBatt is responsible for all of the IEEE stationary battery documents (including a few "mobile" documents). These documents are intended to provide information to the user on the selection, sizing, installation, maintenance, operation, testing, and disposal of stationary batteries and their installations. The 20 currently active StaBatt documents are listed in Appendix B - Table B1.

Note that there are only a couple "Standards" in the list as the documents are generally intended for use by the entire battery user industry - which has various requirements and expectations. Placing mandatory requirements on them is outside the authority of the IEEE. StaBatt's documents are mostly "Recommended Practices" and “Guides” that show users the "best way" to perform an activity as determined by the collective knowledge of a large group of industry experts over a long period of time.

When the potential need for a new document is identified to StaBatt, its need and identified scope are discussed by the members and a vote is taken on whether to undertake the creation of the document. If approved, a WG Chair is selected and interest in WG membership is requested. The WG Chair, supported by the Vice Chair and Secretary, takes the lead to assemble the WG members, work with the IEEE to obtain a document number, draft the document, address comments, and move it forward for approval.

Existing documents are required to be revised at least every ten years to either validate that they are still relevant and their contents are still correct or to make any necessary changes to bring them up to date.

Currently, StaBatt has documents supporting:

- Specific chemistries
  - Lead Acid
    - Vented (Flooded) - 450, 484, 485
    - Valve Regulated (VRLA) - 1187, 1188, 1189
  - Nickel Cadmium (Ni-Cad) - 1106, 1115

- Specific industries
  - Nuclear Power - 535
  - Generating Stations - 946
  - Uninterruptible Power Supplies (UPS) - 1184
  - Portable Batteries - 1625, 1725
  - Cycling Service - 1660
  - Emerging Technologies - 1679

- General industry - 1375, 1491, 1578, 1635, 1657

IEC[5]

Along with the IEEE, the International Electrotechnical Commission (IEC) produces consensus based "standards" that are also used around the world. The IEC was founded in1906 and consists of National Committees which then appoint delegates to support specific roles. Each member country has one vote on the contents of the IEC "standards." The 13 IEC battery documents are listed in Appendix C - Table C1.

Within the IEC, Technical Committee (TC) 21 is responsible for secondary cells and batteries. Its scope is "To prepare product standards for all secondary cells and batteries, irrespective of type or application. All electrochemical systems are considered. To support other technical committees standardizing application oriented systems using secondary cells and batteries."[6]

Under TC 21 is Subcommittee (SC) 21A which is specialized on secondary cells and batteries containing alkaline or other non-acid electrolytes. Its scope is " To prepare standards regarding product and test specifications for all secondary cells and batteries of sealed and vented designs containing alkaline or other non-acid electrolytes. To support other technical committees standardizing application oriented systems using secondary cells and batteries."[7]

IEEE vs. IEC

The first obvious difference you will note when opening an IEC document is that it is written in two languages – French and English – some with the different languages on side-by-side pages and others with one language following the other. While the side-by-side documents are a little harder to get through and both are twice as large, it does allow the IEC to only publish one document to support two languages.

As far as I can tell, the major difference between the two groups is that the IEEE documents are tailored more for the users and their needs (e.g. maintenance, testing, selection, etc.) while the IEC standards appear to be directed more to manufacturing and qualification testing. Both styles fill certain requirements and have their benefits.

Conclusion

The "world" of stationary batteries is extremely large and diverse. Even though battery technology has been around for over a century, not everyone can or should be an expert. There is a lot of misperception and misinformation that leads to confusion for the users who, generally, realize they aren't battery experts, or, even worse, think they know everything about batteries since they have one in their car!

Stationary batteries are expensive, high maintenance "necessary evils" that provide backup power to critical systems. Even so, they are largely ignored and not properly cared for due to reduced maintenance budgets and limited knowledge about their needs. Also, they typically just sit in the corner and don't bother anyone so the tendency is to not pay them much attention. This is a drastic mistake because if they weren't important or you didn't need them, you wouldn't have them. It is up to us to continue to push to make their proper use and care important to those making the decisions on what should and should not be cut from the maintenance budgets.

For those who already "know-it-all", use of these documents will hopefully keep them from getting into too much trouble. For the rest of us, they provide a much needed, technically sound, industry approved method for taking care of our batteries.

Bibliography

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6. http://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID:1290. [Online]
7. http://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID:1410. [Online]

Appendix A

Aerospace and Electronic Systems	Instrumentation and Measurement
Antennas and Propagation	Intelligent Transportation Systems
Broadcast Technology	Magnetics
Circuits and Systems	Microwave Theory and Techniques
Communications	Nuclear and Plasma Sciences
Components, Packaging, and Manufacturing Technology	Oceanic Engineering
Computational Intelligence	Photonics
Computer	Power Electronics
Consumer Electronics	Power and Energy
Control Systems	Product Safety Engineering
Dielectrics and Electrical Insulation	Professional Communication
Education	Reliability
Electron Devices	Robotics and Automation
Electromagnetic Compatibility	Signal Processing
Engineering in Medicine and Biology	Society on Social Implications of Technology
Geoscience and Remote Sensing	Solid-State Circuits
Industrial Electronics	Systems, Man, and Cybernetics
Industry Applications	Ultrasonics, Ferroelectrics, and Frequency Control
Information Theory	Vehicular Technology

Table A1 - IEEE Societies

Biometrics	Superconductivity
Electronic Design Automation	Systems
Nanotechnology	Technology Management
Sensors	

Table A2 - IEEE Technical Councils

Earth Observation	RFID (Radio Frequency Identification)

Table A3 - IEEE Technical Committees

Aerospace Electronics	Internet of Things (IoT)
Bioinformatics	Microwave Theory and Techniques
Broadband Over Power Line	National Electrical Safety Code
Communications	Portable Battery Technology
Components and Materials	Power Electronics
Earth Observation	Power and Energy
Electromagnetics	Quantities, Units, and Letter Symbols
Environmental Assessment	Terms and Definitions
Information Technology	Transportation Technology
Instrumentation and Measurement	Voting Systems

Table A4 - IEEE SA Working Group Areas

Emerging technologies / New Technology Connections Portal	Facebook
Engineering for Change	IEEE Islands in Second Life
Online communities/Technical collaboration	LinkedIn

Table A5 - IEEE Virtual Networks

Appendix B

Document	Title
450-2010	Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications
484-2002 (R2008)	Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications
485-2010	Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications
535-2006	Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations
946-2004	Recommended Practice for the Design of DC Auxiliary Power Systems for Generating Systems
1106-2005	Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications
1115-2000 1115A-2007	Recommended Practice for Sizing Nickel-Cadmium Batteries for Stationary Applications Amendment 1: Additional Discussion on Sizing Margins
1184-2006	Guide for Batteries for Uninterruptible Power Supply Systems
1187-2002	Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications
1188-2005 (R2010)	Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications
1189-2007	Guide for Selection of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications
1375-1998 (R2003)	Guide for the Protection of Stationary Battery Systems
1491-2012	Guide for Selection and Use of Battery Monitoring Equipment in Stationary Applications
1578-2007	Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management
1625-2008	Standard for Rechargeable Batteries for Multi-Cell Mobile Computing Devices
1635-2012	Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications
1657-2009	Recommended Practice for Personnel Qualifications for Installation and Maintenance of Stationary Batteries
1660-2008	Guide for Application and Management of Stationary Batteries Used in Cycling Service
1679-2010	Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications
1725-2011	Standard for Rechargeable Batteries for Cellular Telephones

Table B1 - StaBatt Documents

Appendix C

Document	Title
IEC 60896-11* Edition 1.0 (2002-12-04)	Stationary lead-acid batteries - Part 11: Vented types - General requirements and methods of tests
IEC 60896-21* Edition 1.0 (2004-02-05)	Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test
IEC 60896-22* Edition 1.0 (2004-02-05)	Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements
IEC 61056-1* Edition 3.0 (2012-02-22)	General purpose lead-acid batteries (valve-regulated types) - Part 1: General requirements, functional characteristics - Methods of test
IEC 61056-2* Edition 3.0 (2012-02-22) Corrigendum 1 Edition 3.0 (2012-10-30)	General purpose lead-acid batteries (valve-regulated types) - Part 2: Dimensions, terminals and marking
IEC/TR 62060* Edition 1.0 (2001-09-27)	Secondary cells and batteries - Monitoring of lead acid stationary batteries - User guide
IEC 62485-2* Edition 1.0 (2010-06-16)	Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries
IEC 60622+ Edition 3.0 (2002-10-10)	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-cadmium prismatic rechargeable single cells
IEC 60623+ Edition 4.0 (2001-09-26)	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells
IEC 60993+ Edition 1.0 (1989-08-15)	Electrolyte for vented nickel-cadmium cells
IEC 61434+ Edition 1.0 (1996-10-03)	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Guide to designation of current in alkaline secondary cell and battery standards
IEC/TR 61438+ Edition 1.0 (1996-11-28)	Possible safety and health hazards in the use of alkaline secondary cells and batteries - Guide to equipment manufacturers and users
IEC 62259+ Edition 1.0 (2003-10-28)	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Nickel-cadmium prismatic secondary single cells with partial gas recombination
*Sponsored by Technical Committee (TC) 21 - Secondary cells and batteries +Sponsored by Subcommittee (SC) 21A - Secondary cells and batteries containing alkaline or other non-acid electrolytes	

Table C1 - IEC Battery Documents

WINTER 2014

Where two "2 hr" sessions are scheduled the first listed occurs during the first two hours, e.g.:

B1: 1:00-3:00
B2: 3:00-5:00

SUNDAY – JANUARY 5

1:00-5:00
Technical Panel Sessions:

A) Topic 1: Charging Schemes
Chair: Bruce Fountain

B) Topic 2: Long Runtimes for Standby Batteries for Disasters
Chair: Steve Clark

5:15-6:00
Officers Meeting (AdCom)

MONDAY – JANUARY 6

8:00-noon
General Committee Meeting
- Call to Order & Introductions
- Host Welcome
- Approve the Minutes
- Document Status
- Coordination Reports
- Site Selection Subcommittee
- Technical Sessions Selection
- New Business
- Recess Business Meeting

MONDAY – JANUARY 6

1:00-5:00
Breakout sessions:
A: (4 hr) WG P1881 Glossary

B1: (2 hr) WG 1188 VRLA Maint
B2: (2 hr) WG Charger / PE5

TUESDAY – JANUARY 7

8:00-12:00
Breakout sessions:
A: (4 hr) WG 1189 Battery Selection

B1: (2 hr) WG 1106 NiCd Install
B2: (2 hr) WG 1115 NiCd Sizing

1:00-5:00
Breakout sessions:
A: (4 hr) WG 946 DC Systems

B1: (2 hr) 1491 Monitoring
B2: (2 hr) 1657 Technician Qual

WEDNESDAY – JANUARY 8

8:00-12:00
Breakout sessions:
A1: (2 hr) 484 VLA Install
A2: (2 hr) 1184 UPS Batteries

B: (4 hr) 1679.1 Lithium

1:00-5:00
Breakout sessions:
A: (4 hr) WG Nuclear Power

B: (4 hr) WG 1679.2 Sodium Batteries

THURSDAY – JANUARY 9

8:00-11:30
Breakout sessions:

A: (4 hr) SDS Working Group

B1: (2 hr) WG 1189 Battery Selection
B2: (2 hr) WG 946 DC Systems

11:30-12:00
Wrap-Up and Working Group Reports

To record attendance at all meetings: https://imat.ieee.org/my-site/home

Scope: Treatment of matters in which batteries and associated DC systems are used in stationary applications.

Figure D1 - Typical StaBatt Meeting Agenda