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Vol. 10

July 1, 2005

## Editorial

Last month, the Global Betans Community observed the First Year Anniversary of the betans2125 mailing list, or the “Tambayan”. There is no doubt in my mind that this communication engine is responsible for the virtual interactions between brothers from different parts of the world. As I wrote on the opening page of the Tambayan, “this is the site where Betans from all over the world congregate and communicate with each other”.

Some Brods (and Sis) chose to be vocal and some chose to be just the observer. There are also those who come in between. It is amazing how personalities interact with each other especially those who have not met in person. I believe that you really cannot judge a person’s personality by just basing on his or her writings. Some people are just too lazy to sit down in front of the computer and express their ideas. However, meet them in person and they could be as opinionated as Bill O’Reilly.

I remember when I was in college that our Engineering teacher himself said that Engineers do not need to speak nor communicate too well. I noticed that we have a lot of brothers in our circle who were former teachers as well. I don’t know if they share the same philosophy but I beg to disagree. In fact, I was thinking that our English subjects including Public Speaking, Project Study and Proposal Writing should be given equal emphasis as with the other “major” subjects. You know why? How many times did you use Integral or Differential Calculus to solve an Engineering problem? In my 14 years as Mechanical Design Engineer, my answer is zero. However, I cannot count the number of times I used verbal and written communication to defend my design vigorously in front of other

consultants who were just waiting for a single misstep on your part to bring you down.

I bet a lot of us had brilliant ideas in the course of fulfilling our careers. Some might be thinking, "My boss was not too receptive" or at the worst-case scenario diverted into some misguided opinion like racism, etc. Did it ever occur to you that maybe you did not present your ideas very well?

My point in bringing up this subject is we should take advantage of our fraternal situation right now. I mentioned before that we are congregating and communicating in exclusivity. Although some of us have not met before we are still part of a fraternity. We might not agree on all issues but our Brods are educated and matured enough to accept you no matter how twisted your theories are.

Interaction with fellow Betans is a blessing. Our interaction might be virtual but it is still interaction. You learn from other people's idea, you develop and you grow. Take advantage of the situation by expressing your opinion through written communication. Speak at Betans meetings. I always look at our congregation as a training ground. Everyday is a learning process. Include the Tambayan and the **Newsletter** in this process. Volunteer as Editor of the **newsletter**. Contribute written materials. Unleash your thinking side and express it.

Last month, one of the hot topics was about "Love of the Philippines" fueled by Brod Benny Pasaporte's posting of a Korean opinion. I am glad the participation on that topic was almost unprecedented. It was a difficult subject to discuss considering the fact that we as Filipinos have a lot of sensitivities in our culture. We should welcome such topic wholeheartedly and participate actively. By doing these little things we might be able to fuel a gigantic idea. I believe in the process we are training ourselves and at the same time helping our mother country.

We are Betans. We should welcome every challenge like it's our chance of a lifetime. Why are we not afraid of the "Betans Walk" and the "chalk-blowing", just to name a few of our challenges when we joined the fraternity, yet we worry about other people's reactions to our opinion, or the thought of writing something is scary, or the writing deadline is terrifying. Where is the Betans spirit in those thoughts?

Life is a constant struggle. All of us have heard this many times. We are survivors. We will overcome whatever challenges lies ahead of us. We will not quit. In our solitude, let us remind ourselves of the things that made us Betans. Let's appreciate life and the opportunity that it gave us. Let us consider being a Betan as an opportunity and let us make the most of it.

Bro. Lochinvar "Ching" Bucane  
USA 1979 Batch 3  
Editor-in-Chief

## News from the Betans Global Community

- "Tambayan" First Year Anniversary Observed

Toronto, Ontario, Canada. On June 16, 2005, Betans from all over the world observed the First Anniversary of the betans2125 mailing list, also called "Tambayan". Everybody who had the

opportunity sent email messages of congratulations. Bro. Mar Saquian from Toronto, Canada noted that his anniversary greeting is the 5588th message in the mailing list.

- PBEFI Visayas Chapter Fund-raising activities

Iloilo City, Philippines. The PBEFI Visayas Fellowship and Fundraising took place at Brod. Leo Villanueva's place in Cheerokee, Iloilo City on June 15, 2005. The event was followed by the film-showing of "Batman Begins" at Shoemart Cinema 2. Proceeds of the fund-raising will be allocated for the Scholarship Project of the Visayas Chapter Betans.



Brod. Ely P. Bagtasus, Visayas Betans President, delivering his Executive Report during the fund-raising activity.

- Matthew Lagon's Christening

Toronto, Ontario, Canada. Brod Rory and Sis Johanna Lagon celebrated the christening of their son "Matthew" last June 26th at St. Anthony Church, 1041 Bloor St. West, Toronto. In attendance were Brod Arlette Jarencio, Brod Allan and Sis Edith Belga, Brod Meloy Perez with son Lester.

- List of PBEFI Registered Members

Toronto, Ontario, Canada. Brod Arlette Jarencio, Membership Committee Chairman released the list of PBEFI Registered Members to date. The list is accessible through [http://www.betans.com/forms/PBEFI\\_Reg.\\_Members.xls](http://www.betans.com/forms/PBEFI_Reg._Members.xls).

## Featured Betan

The featured Betan for this month is Bro. Danilo "Danny" Feniola, UI BSME 1981, PBE Batch 16, September 24, 1978. Bro. Danny wrote:

When the phone rang one day and Brod Ching said "Brod, you're the Featured Betan for the month", I can't find no excuse so here I am refreshing my memory of those wonderful days in college. Back in the 70's, Brod Arnold Gallaza, who happened to be from the same town I came from - Dumalag, Capiz, recruited me to join Phi Beta Epsilon Fraternity. We were also members of the UI Marching Band together with Brods Nelson Mangyan and Leo Aliparo.

I have no idea why I joined but I did it anyway. Of course, Brod Hernan Sausa, our MEB at the time was at the top of our class so it's a plus (if you know what I mean). Back then, the process was though physical, mental and emotional test that if withstood would be carried on throughout your whole life. Out of the twenty two recruits, five of us survived that initiation. By the way, Brod Hernan's better half, Sis Haide was our Fraternity Sweetheart. We were very active in school activities being members of UI Choral Group, Santa Maria Church Choir, tutorial group in UI Technology Department and other activities.

After graduation, I landed a job at Mayer Steel Pipes Corp., Bulacan where five of the Brods, Vic Koa, Arnold Gallaza, Nelson Mangyan, Saint Gray Paulino and Hernan Sausa were already employed and of course Brod Vic Koa's father was the Personnel Manager of the plant so interview was not an employment requirement.

We were close to Brod Narsing Gregorios who was starting out his food business at the time. At one point, we took a tricycle and delivered "Fried Tapa" to different supermarkets in Metro Manila. I am happy and elated that soon his business became a huge success.

The following year I moved on to take another job at Hitachi Philippines, took and passed the Mechanical Engineering Board Exam only to lose my job a year later with a less than a year old daughter to feed. I really appreciated the fact that Brods visited and helped us out during hard times. With the unemployment situation in Manila, opportunity in Saudi Arabia was hard to pass on and that was where I spent the next six years. Saudi provided the job opportunity but at the same time presented challenges in all aspects of my life.

I moved here in the States in 1990 . I have 3 children , Florelie, 21 yrs old, a nursing student. Danison, 19 yrs old, Biotech Student and Leah , 11 yrs old, 6th grade. My wife Daisy, a Nurse, is from Alimodian, Iloilo. The following is my brief resume:

1981	Graduated BSME at University of Iloilo.
1982	Worked as Quality Control at Mayer Steel Pipes Corp., Valenzuela ,Bulacan
1983	Passed Mechanical Eng'g. Board Exam. Worked at Hitachi (Phils) as Design Staff Engineer, Novaliches, Quezon City.
1984 - 1989	Employed by several companies in Saudi Arabia: <ul style="list-style-type: none"> <li>- Maintenance Engineer, Algosaipe Eng'g. Company, Ministry of Health Hospital Maintenance Project</li> <li>- Site Engineer for Delta/Danya Corp., Saudi Telecom Maintenance Project</li> <li>- Site Maintenance Manager , Electrolux Corporation, Swedish Embassy, Riyadh</li> </ul>
1990	Immigrated to the U.S.
1991 -1994	HVAC Service Technician, Geriatric & Medical Company, Philadelphia, PA
1994 - Present	Senior Engineer, Plant Operations, Childrens Hospital of Philadelphia,Philadelphia, PA

Lastly, I would like to take this opportunity to laud the efforts of all Brods from all over the world that made the PBE International a cornerstone to strengthen and unify all chapters, spend there precious time and resources to bring and contribute to this enormous undertaking and set ideals and examples to the younger generation that would promote a true Brotherhood among us and our society. Someday, in our small way we might make a difference in our lives and the society where we live in.

My address	14 Sassafras Drive, Sicklerville, NJ 08081 USA
E-mail	dannyf466@yahoo.com
Mobile	(856) 904-7868

## Feature Story

[The Story of the Original Betans Logo](#)  
by Bro. Ismael "Maing" Ausmolo

The original Betans logo as we know today came into being during our time in 1967. As most Betans

know by now, my contemporaries are Brods Abay, Papang, Nat and Jessie to name a few. The need to have a logo arose during social events like the induction ceremonies and other functions where we needed to be identified as a fraternity. We realized then that we should have a symbol that represents us.

Consequently, it was decided during one of our regular meetings that it is time one has to be made. It certainly was a joint decision as to how the components of the logo would look like as well as the colors used. The brothers put on their thinking caps and the result was certainly a consensus of all present. It also took us a long time to arrive at the final design.



The Phi symbol provided the main frame of the logo with the circle containing the remainder of the symbols. It was decided to use the tower to represent a solid foundation, an anchor that is unshakable as the ideals that defined the bonds uniting all of us within the brotherhood. On the other hand, it also looked prettier than a simple slash across a circle that represents the Greek symbol. We also added the torch to represent the flame that burns within our hearts as well as the collective wisdom accumulated during our time and passed on from generation to generation, that the passage of time will never extinguish, and will forever guide and illuminate our visions toward capturing opportunities that would enrich the environment we live in, today as well as in the future, and proclaim to the rest of the world that we as Betans are proud contributors in those enrichment. That we, in the engineering society are agents of positive changes in our world, and the torch will always remind us not to drop the ball during our watch, but to keep on going on, as the saying goes. *(Left: The USA version of the original logo still being used at schools today.)*

I was assigned to paint a sizable model on canvas. The plan was to paint the logo through several colors of the humble enamel paint and the lowly paintbrush. I was busy the whole day in the class as a student so the only time available for me to do the painting was at night, and what better place to do that than the Engineering Shop Building in the company of friends and brothers who would also be my critics during the process.

The Engineering Shop Building used to be located near the original library, Roblee Hall, Franklin Hall, and the power plant. It had been a tradition for the Betans to come here in the evenings to catch up on their studies. We would lay our books and go through our course assignments although most of the time it would end up in chitchats until the wee hours. Nevertheless, there was no shortage of attendees to our unusual activity. One can tell that each and everyone enjoys each other's company.

Also it was during these activities that a nightly ritual was woven into our "Engineering Shop Experiences". After everyone has gathered and the evenings' activities start heating up, it never failed that a few have come without supper yet. To solve the problem, as well as maintain our energies late into the night, it was agreed to start a collection and send a few brothers and friends downtown near the Central Market. We unofficially nicknamed the place as Pan de Boho, because this place baked the most delicious "pan de sal" late in the evening, which just suited our nightly activities quite well. You would talk to somebody through a hole on a wall, give your order, pay your bill, and stand there and wait the pan de sal to go through the hole. It created a weird feeling for first-timers. Probably

because you are at a dark alley while ordering and the only available light comes from inside the bakery through that hole on the wall.

I normally started painting around 9 PM. Gradually, Betans and friends alike start arriving to join the fun. I would place the canvas on the wall of the shop which was made of plywood. It certainly took me many nights of brush strokes after brush strokes until the logo was finished. I believe it was one of those last nights of putting the canvas on the wall using thumb tacks when the accident happened. One of the tacks' head failed and it pierced my thumb instead. Everybody was nervous because blood was squirting out of my thumb. As I was watching it bleed profusely, I fell down and lost consciousness. My head almost hit the corner of the nearest table. I learned later that some witnesses thought I was pretending to have passed out that nobody dared help me. I regained consciousness later while still lying on the floor. Everybody was around me and asking if I was okay. Up to now, I still feel a different emotional attachment to the original logo. Probably because some of its red portions was actually colored by my own blood.

After the logo was done, all of us certainly felt a certain sense of pride to display the logo on all of our social activities. Since then we carried it with honor and pride. I am definitely overjoyed by the fact that the new logo came about at the same time as the creation of PBEFI. That no more thumb tacks are needed to make one as a result of the availability of new technologies. A new breed of artists, the graphic artists (Brods Meloy and Jess Bacera this time doing the honors of creating the new logo digitally), have risen from the ranks of the brotherhood. Still, the ideals it represents are ever the same. I encourage all of our brothers to feel proud to be a part of our fraternity and the legacy we uphold.

## **This Month's Birthdays**

A very Happy Birthday to the following brothers:

Bro. Lydio "Jun" Trasporto, July 4  
Bro. Julie Asma, July 4  
Bro. Lochinvar "Ching" Bucane, July 11  
Bro. Patrick Henry Divinagracia, July 15  
Bro. Dennis Legarde, July 16  
Bro. Julito "Tristan" Gancho, July 17  
Bro. Marcelino "Marz" De La Cruz, July 19  
Bro. Felix "Panoy" Pennacerrada, July 25

## **Special Announcements**

- Bro. Jun Trasporto, Ways and Means Committee Chairman announced that the location of the 2005 Toronto Betans Family and Friends Picnic & BBQ has been reserved and finalized. In behalf of the Toronto Betans, he is inviting everyone including their family and friends on Sunday, July 3, 2005 at the Toronto Centre Island Park, Picnic Area #21.
- A Betans Reunion and Award Presentation is planned for August 4, 2005 in Puerto Real, Lapaz,

Iloilo City. This is one of the projects by the US West Coast Betans as discussed during the Vista meeting at Bro. Rene Cardinal's residence last May 8, 2005. The date was chosen so that it takes place just after the CPU Centennial Celebrations. It is expected that this event will be one of the largest Betans gathering this year.

- The US East Coast Betans will have a Summer Picnic this coming July 9, 2005 at South Beach, Staten Island, New York. Announcement comes from US East Coast President Brod Mario San Luis.
- Brod Benny Pasaporte, Manila Betans President, is inviting everyone to the Manila Betans Membership Meeting on July 3, 2005, 2 pm at Manong's (Dencio's) Restaurant, Filinvest Alabang Drive Range, Alabang Commercial Center. The following are the agenda:
  1. Review of membership
  2. Financial Report by the Treasurer
  3. Iloilo, August 4 Betans Day and Night.
  4. Other topics
- The US East Coast Betans through our Professional Enhancement & Development Committee Chairman Brod Mario San Luis will sponsor an in-house training seminar for Concrete Quality Control and Assurance, Nuclear Density Gauge (for soil compaction) and film showing this coming August 6, 2005 in Iloilo City.

The lecturers will be Brods Jairus & Tristan. PBEFI will issue a training certificate signed by Brod Tristan who is a Practicing Civil Engineer in the State of Utah. The following topics for in-house training seminar are:

For Concrete Quality Control and Assurance:

- a. ASTM C 1064 - Temperature of freshly mixed hydraulic -cement concrete.
- b. ASTM C 172 - Sampling freshly mixed concrete.
- c. ASTM C 143 - Slump of Hydraulic-cement concrete.
- d. ASTM C 138 - Density, Yield and Air content (gravimetric) of concrete.
- e. ASTM C 231 - Air content of freshly mixed concrete by the Pressure Method.
- f. ASTM C 173 - Air content of freshly mixed concrete by the Volumetric Method.
- g. ASTM C 31 - Making and curing concrete test specimens in the field.

For Nuclear Density Gauge:

- a. Atomic Physics
- b. Radiation Safety
- c. Dose/Shielding Calculations
- d. Accidents/Storage
- e. 49 CFR transportation
- f. Risk
- g. Measurement Theory
- h. Operation
- i. Field Applications
- j. Calibration

## k. Maintenance

### For Film Showing:

"Why the Twin Towers Fail" - This film is very educational. The purpose of the production is to test our good engineering judgement and expertise. PBEFI encourages all Betans to watch this film.

- The 2125Betans News is also available on the world wide web. The URL of this **newsletter** is:

<http://www.betans.com/news/news.htm>

- Please visit The Betans Store for a variety of Betans merchandize for sale.

<http://www.betans.com/store/store.html>

## Inside Engineering

### Concrete Basics

Contributed by Bro. Jairus Cancel, PBEFI Treasurer  
Reference: Portland Cement Association

In its simplest form, concrete is a mixture of paste and aggregates. The paste, composed of portland cement and water, coats the surface of the fine and coarse aggregates. Through a chemical reaction called hydration, the paste hardens and gains strength to form the rock-like mass known as concrete.

Within this process lies the key to a remarkable trait of concrete: it's plastic and malleable when newly mixed, strong and durable when hardened. These qualities explain why one material, concrete, can build skyscrapers, bridges, sidewalks and superhighways, houses and dams.

### Proportioning

The key to achieving a strong, durable concrete rests in the careful proportioning and mixing of the ingredients. A concrete mixture that does not have enough paste to fill all the voids between the aggregates will be difficult to place and will produce rough, honeycombed surfaces and porous concrete. A mixture with an excess of cement paste will be easy to place and will produce a smooth

surface; however, the resulting concrete is likely to shrink more and be uneconomical.

A properly designed concrete mixture will possess the desired workability for the fresh concrete and the required durability and strength for the hardened concrete. Typically, a mix is about 10 to 15 percent cement, 60 to 75 percent aggregate and 15 to 20 percent water. Entrained air in many concrete mixes may also take up another 5 to 8 percent.

Portland cement's chemistry comes to life in the presence of water. Cement and water form a paste that coats each particle of stone and sand. Through a chemical reaction called hydration, the cement paste hardens and gains strength. The character of the concrete is determined by quality of the paste. The strength of the paste, in turn, depends on the ratio of water to cement. The water-cement ratio is the weight of the mixing water divided by the weight of the cement. High-quality concrete is produced by lowering the water-cement ratio as much as possible without sacrificing the workability of fresh concrete. Generally, using less water produces a higher quality concrete provided the concrete is properly placed, consolidated, and cured.

### Other Ingredients

Although most drinking water is suitable for use in concrete, aggregates are chosen carefully. Aggregates comprise 60 to 75 percent of the total volume of concrete. The type and size of the aggregate mixture depends on the thickness and purpose of the final concrete product. Almost any natural water that is drinkable and has no pronounced taste or odor may be used as mixing water for concrete. However, some waters that are not fit for drinking may be suitable for concrete.

Excessive impurities in mixing water not only may affect setting time and concrete strength, but also may cause efflorescence, staining, corrosion of reinforcement, volume instability, and reduced durability. Specifications usually set limits on chlorides, sulfates, alkalis, and solids in mixing water unless tests can be performed to determine the effect the impurity has on various properties. Relatively thin building sections call for small coarse aggregate, though aggregates up to six inches (150 mm) in diameter have been used in large dams. A continuous gradation of particle sizes is desirable for efficient use of the paste. In addition, aggregates should be clean and free from any matter that might affect the quality of the concrete.

### Hydration Begins

Soon after the aggregates, water, and the cement are combined, the mixture starts to harden. All portland cements are hydraulic cements that set and harden through a chemical reaction with water. During this reaction, called hydration, a node forms on the surface of each cement particle. The node grows and expands until it links up with nodes from other cement particles or adheres to adjacent aggregates.

The building up process results in progressive stiffening, hardening, and strength development. Once the concrete is thoroughly mixed and workable it should be placed in forms before the mixture becomes too stiff.

During placement, the concrete is consolidated to compact it within the forms and to eliminate potential flaws, such as honeycombs and air pockets. For slabs, concrete is left to stand until the surface moisture film disappears. After the film disappears from the surface, a wood or metal handfloat is used to smooth off the concrete. Floating produces a relatively even, but slightly rough, texture that has good slip resistance and is frequently used as a final finish for exterior slabs. If a

smooth, hard, dense surface is required, floating is followed by steel troweling.

Curing begins after the exposed surfaces of the concrete have hardened sufficiently to resist marring. Curing ensures the continued hydration of the cement and the strength gain of the concrete. Concrete surfaces are cured by sprinkling with water fog, or by using moisture-retaining fabrics such as burlap or cotton mats. Other curing methods prevent evaporation of the water by sealing the surface with plastic or special sprays (curing compounds).

Special techniques are used for curing concrete during extremely cold or hot weather to protect the concrete. The longer the concrete is kept moist, the stronger and more durable it will become. The rate of hardening depends upon the composition and fineness of the cement, the mix proportions, and the moisture and temperature conditions. Most of the hydration and strength gain take place within the first month of concrete's life cycle, but hydration continues at a slower rate for many years. Concrete continues to get stronger as it gets older.

### The Forms of Concrete

Concrete is produced in four basic forms, each with unique applications and properties. Ready mixed concrete, by far the most common form, accounts for nearly three-fourths of all concrete. It's batched at local plants for delivery in the familiar trucks with revolving drums. Precast concrete products are cast in a factory setting. These products benefit from tight quality control achievable at a production plant. Precast products range from concrete bricks and paving stones to bridge girders, structural components, and panels for cladding.

Concrete masonry, another type of manufactured concrete, may be best known for its conventional 8 x 8 x 16-inch block. Today's masonry units can be molded into a wealth of shapes, configurations, colors, and textures to serve an infinite spectrum of building applications and architectural needs. Cement-based materials represent products that defy the label of "concrete," yet share many of its qualities. Conventional materials in this category include mortar, grout, and terrazzo. Soil-cement and roller-compacted concrete-"cousins" of concrete-are used for pavements and dams. Other products in this category include flowable fill and cement-treated bases. A new generation of advanced products incorporates fibers and special aggregate to create roofing tiles, shake shingles, lap siding, and countertops. And an emerging market is the use of cement to treat and stabilize waste.

### Safety Corner

#### Explosion Risks in UPS Battery Rooms

Contributed by Bro. Anastacio J. Jaranilla, Jr., CPU 1981 Batch 39

Member: National Fire Protection Association (NFPA) 1999

It is the common practice to have the UPS backed by battery in the modern technology world. However, the ventilation issues are not adequately understood and addressed while designing UPS rooms. This note highlights few issues concerning explosion risk in battery room and design features that need to be incorporated during construction stage.

Hydrogen gas is evolved during the charging phase of battery operation. Hydrogen in air mixture of 4% or greater substantially increases the risk of an explosion. The concentration of Hydrogen should be kept below 1%. Explosions can occur due to issues like inadequate ventilation/absence of flameproof equipment. Several battery room explosion incidents support this fact.

During risk assessment studies that were conducted in industries and various official/commercial complexes, the most common discrepancies observed include the ventilation issues in battery rooms such as:

1. No ventilation/fans are switched off in battery rooms (zero/air changes).
2. Ordinary type exhaust fans, and electrical accessories are provided.
3. HVAC re-circulated air is supplied to kitchen, lavatories and battery room through a common duct system.
4. Exhaust fans are not provided for rooms where Sealed Maintenance Free (SMF) batteries are installed.

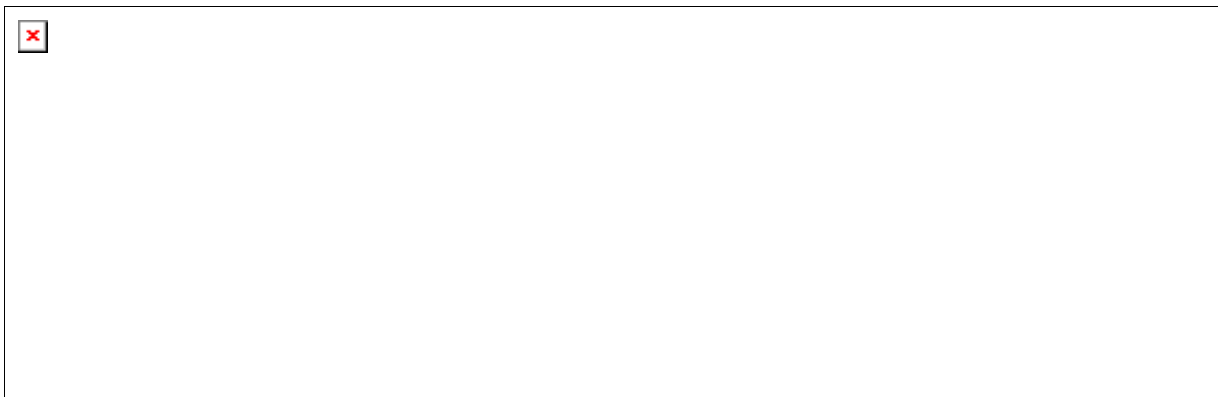
Below are some ventilation requirements for battery room as recommended in various applicable standards:

1. NFPA 76 – Battery Room exhaust fan capacity in cubic feet per minute (CFM) should be the room area (in square foot),
2. ASHRAE 62 – 1 CFM per charging ampere to be provided but not less than 6 air changes per hour.
3. IS:12332 –
  - i. 12 air changes per hour for battery room.
  - ii. Forced air supply & positive exhaust system.
  - iii. Use of flameproof electrical fittings.
  - iv. Air inlets to be located near the floor and outlet openings at the high point in the room

Note:

Sealed Maintenance Free (SMF) Batteries (Valve Regulated Lead Acid –VRLA) also liberate Hydrogen (lesser than what is liberated from conventional batteries) and are designated to operate in a maximum temperature of 30 degree centigrade. Hence the SMF battery room risks should also be treated in the same manner as that of rooms with conventional batteries.

Way of Air Circulation in Battery Room:



### Case Study:

The affected building where a major explosion occurred was formerly a large computer/data center with battery room and emergency generators. The company vacated the building, moved out the computer equipment; however the back-up battery system was left behind. This accident is a very good example of what can happen when you lose ventilation in a battery charging room. The explosion blew 400 SF +hole in the roof, collapsed numerous walls and ceiling throughout the building, and significantly damaged a large portion of the building, and significantly damaged a large portion of the 50,000 +SF building. The ventilation for the battery room appeared to be interlocked with the Hydrogen monitoring system. The Hydrogen sensor was in alarm upon emergency responders arriving at the scene (post-explosion). There appears to have a local alarm, as it was not relayed to the Fire Department. Given how slowly the batteries generate Hydrogen ( $1.3 \times 10^{-7}$  m/s per amp cell), it appears as though batteries were charging for a long period of time with no ventilation. Due to extensive damage caused to the UPS Room, it could not be ascertained whether exhaust fan was switched off or failed to operate. There was no dearth of ignition sources in the room since it was full of batteries and electrical equipment.

What could have prevented this accident?

1. Un-interrupted ventilation, interlocked with Hydrogen alarm.
2. Alarm signal interfaced with the existing Fire Alarm System.
3. Periodic checking of the detection and alarm system.

Recommended Layout Feature of UPS Room:

1. Installation – Electrical installation in the battery rooms should be limited to:

- i. Lighting
- ii. Charging Facilities
- iii. Ventilation
- iv. Hoisting and lifting provisions

2. Smoke/Gas Detection – Smoke detectors may be installed in battery rooms. In rooms where vented type lead acid batteries are installed. Hydrogen detectors may be installed. Fan operation may be interlocked with Hydrogen detector actuation. If Hydrogen detector are not installed, the fan shall run continuously.

3. Battery Room Ceiling – Preferably the room should be flat to ensure that pockets of trapped

Hydrogen gas do not occur, particularly at the ceiling, to prevent the accumulation of an explosive mixture, as per NFPA 70.

4. Ventilation – This should be as per standard and a back up fan may be considered.
5. Fire Protection – Carbon Dioxide portable fire extinguisher to be provided.
6. Lighting – Light fittings should be fixed to the wall or suspended at more than 50 cm from the ceiling, but not vertically above the batteries or charging units. Light fittings as well as any other equipment should be of closed type to prevent accumulation of gas. However, watertight fittings with flameproof construction are recommended because of possible corrosive and flammable gas environment.
7. Electrical Equipment - Electrical hoisting equipment should be used with non-conductive hoisting belts.

#### General Safety Tip:

1. Only trained person are authorized to connect and disconnect the facilities, take density of the electrolyte and charging batteries.
2. Safety instruction detailing the hazards of the work to be carried out must be available in charging areas.
3. No equipment should be placed with in 1 meter of battery or directly above it, in which hot surfaces or sparks may occur.
4. Welding, drilling and grinding work should not be carried out when the charging process is taking place. These works should be carried out 2 hours after the charging has stopped and the ventilation has been running.
5. For large battery storage areas consider providing eyewash fountain.
6. Personal Protective Equipment should be provided to operators working in this area.
7. Appropriate warning signs should be displayed near the entrance to the UPS room.
8. UPS room must be laid out in such a way that there is adequate space for work to be carried out with appropriate tools.
9. If it is unavoidable to keep the batteries in the office space, the areas should be indicated by stripes on the floor.
10. Switch off battery charger before connecting or disconnecting batteries.
11. Always disconnect negative terminal first and positive terminal last.
12. UPS isolation switch should be identified and located in a accessible location.

## Quotes to Live By

The aim of an argument or discussion should not be victory, but progress. - Joseph Joubert

## Trivia Time

Why is the Eiffel Tower made of wrought iron instead of steel?

When the Paris landmark was constructed in 1887, steel was a new "wonder material" but wrought iron was cheaper, and architect Gustave Eiffel was more familiar with its properties. He went with what he knew, and although the tower was intended to be a temporary exhibit for the 1889 International Exhibition, it has certainly stood the test of time.

## Joke Time

An engineer was crossing a road one day when a frog called out to him and said, "If you kiss me, I'll turn into a beautiful princess. He bent over, picked up the frog and put it in his pocket. The frog spoke up again and said, "If you kiss me and turn me back into a beautiful princess, I will stay with you for one week." The engineer took the frog out of his pocket, smiled at it and returned it to the pocket. The frog then cried out, "If you kiss me and turn me back into a princess, I'll stay with you and do ANYTHING you want." Again the engineer took the frog out, smiled at it and put it back into his pocket. Finally, the frog asked, "What is the matter? I've told you I'm a beautiful princess, that I'll stay with you for a week and do anything you want. Why won't you kiss me?" The engineer said, "Look I'm an engineer. I don't have time for a girlfriend, but a talking frog, now that's cool."

The 2125Betans News is published by PBEFI Information Committee. Members/Editors are Lochinvar 'Ching' Bucane, Edgar 'Bong' Orleans, Patrick Henry Divinagracia, Ric 'T-loy Docil and Pascual 'Pax' Delgado.  
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