



GSC News

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Monthly News Letter of Gujarat State Center

June 2015



Dear Esteemed members,

Greetings!

We are pleased to place our very first e-News letter before you with lots of material and information. Besides giving detailed account of events of the past month, we shall be giving similar account as Recap starting November 2014 in each issue till we catch up with current issue, so that whatever we could not give you in printed version is covered. Wherever presentations or videos are available, we shall be providing links so that by clicking the same, you can view them.

This issue provides under "Tech Briefs" some technical news that happened in the past month the world over. There are two non-technical articles that might be liked by you.

In our endeavor to be more helpful to our members, we seek your valuable suggestions. We shall try to act upon the same to the extent possible.

Looking to the fact that there are many women taking to engineering these days, it is felt appropriate to have separate programmes as per their choice. Most probably their very first meeting in July would yield some useful results in that direction.

Engineering colleges have completed their exams and season for result has set in. We shall try to get as many young engineers enrolled as possible. To spread our wings amongst students, we shall continue our attempts to open up new Students' Chapters. Faculties have been contacted and they are very keen to support us. In that case, our programmes may shift to college campuses.

Guidance classes for AMIE Diploma A stream shall commence from 10th July. It is expected that the number of students shall increase looking to the response we got at our first attempt. The IEI is going to be an University as the President has set the ball rolling.

S.J.Desai
Chairman

C.V.Nadpara
Hon secretary

IN THIS ISSUE

- 2 News of June '15
- 7 Recap of Nov '14
- 11 Tech Briefs
- 19 Coming Events
- 20 Announcements
- 24 New Enrollments
- 26 Inculcating Engineering Habits of mind
- 28 Four Things to consider before dismissing that suggestion or idea

NEWS OF JUNE 2015

All India Seminar on Safety evaluation & remedial measures for existing civil engineering Structures



All India Seminar on Safety Evaluation and Remedial Measures for existing civil engineering structures was inaugurated on 12th June at Ahmedabad by Shri B.N.Navlavala, Adviser to the Chief Minister of Gujarat and also Adviser to the Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India. Shri V.B.Patel, ex-Chairman, Central water Commission graced the occasion as Special Guest and Shri P.N.Jain, Secretary Roads and Buildings Department as Guest of Honour besides Shri S.J.Desai, Chairman, GSC; Shri C.V.Nadpara Hon Secretary, GSC; Shri Navin Vasoya, Council Member; Shri Bharatbhai Patel, past Chairman & Shri V.P.Kapadia, Organizing Secretary of the seminar.

In his address Shri Navlavala stressed the need for such a seminar and cited the

example of Ganga canal in Uttarakhand which is the oldest system built by the Britishers. He stated that proper upkeep and periodic maintenance and supervision of civil engineering structures could avert any major mishap. He also insisted on observance of stricter quality control during construction as was being practiced in good old days so as to prevent or minimize hazardous situation resulting out of poor construction. He wished the seminar grand success.

Shri V.B.Patel who had worked with the State Government as Irrigation Secretary before moving to the Government of India advised the participant to keep their eyes open while inspecting the structures. He stated that by doing so impending failure could be mostly averted. Timely action is the key according to him.



Shri P.N.Jain made a presentation giving facts and figures of failures/ mishaps and presented a very good analysis.

Earlier, Shri S.J.Desai welcomed the dignitaries and the delegates as well as distinguished speakers and explained the importance of the seminar. Shri Kapadia gave session wise outline of the programme. Shri C.V.Nadpara concluded the Inaugural session by proposing a vote of thanks.

The Technical Sessions were taken up thereafter as under:

Technical Session I : Safety of Dams

This session was chaired by Prof S.R.Gandhi, Prof Civil Engineering Department, IIT, Madras. 3 papers were presented. These were:

- (a) Common Distresses in dams & safety measures-- Case studies by Prof Gandhi
- (b) Safety measures in dams by Shri S.R.Toley, Retd Chief Engineer, Central water Commission, New Delhi
- (c) Integrated geophysical approach for dam health checks & dam condition monitoring by Shri Sanjay Rana, Professional Engineer, Geo Technique & Dam Safety

Technical session II: Safety of Canals

This session was chaired by Shri Sanjay Rana. Following 2 papers were presented:

- (a) Safety issues for foundation of aqueduct: a case study of restoration of Sardar Sarovar Project : by Shri V.P.Kapadia, Managing Director, Gujarat water resources Development Corporation
- (b) Safety evaluation of structures by Shri B.V.Harsoda, Retd DEE, R&B Department, Govt of Gujarat

Technical Session III : Safety of Buildings

This session was chaired by shri S.R.Toley.

Following two papers were presented:

- (a) Inspection of buildings & remedial measures: Case study of renovation of Administrative building of GERI, Vadodara by Smt Prasanna Chari, Executive Engineer, GERI
- (b) Scar of multi-storied buildings by Shri Vijay Kumar, Retd Engineer, Space Application Center, ISRO

Technical Session IV: Safety of bridges and canal structures

Shri S.K.Patel, Superintending Engineer, Roads & Buildings Designs Organisation chaired the session. Three papers were presented as under:

- (a) Failure of obligatory span of flyover bridge-- a case study by Shri S.K.Patel
- (b) Use of Ground penetrating radar for concrete inspection by Shri Sanjay Rana
- (c) Health check, problems and remedial measures for Mechanically Stabilized Earth (MSE) Approaches by Shri Mangesh Shinde, Regional head, Reinforced Earth India Pvt Ltd, Navi Mumbai

Valedictory session was held on 13th June. Chairman, GSC welcomed the delegates to the session, Shri Kapadia read out the recommendations that came during the session which are listed below. Shri Nadpara proposed a vote of thanks.

Recommendations:

- For dams, canals, canal structures, bridges, buildings, etc. there is no mandatory norms for inspection and health monitoring which are essential and the state governments should consider it seriously as safety of many lives and performance of the projects depend on their condition.
- There are several dams, bridges, etc. which are older than 50 years which are required to be thoroughly inspected as



the baseline survey and thereafter their periodical inspection should be done.

Their repairs should also be planned accordingly. All the state governments should take up these activities because old assets are still having potential of delivering a lot.

- Sometime the considerations made at the design stage for structure do not hold good during the actual usage or they go completely wrong and the structure or foundation is endangered. It is necessary to inspect the structure in this context to avoid a sudden catastrophe. Large structures on canals and bridges are required to be monitored with this aspect for which the state governments and municipal corporations are needed to pay proper attention.
- **Non-destructive testing in earthwork and concrete like radar penetration, tomography, etc. can be very useful and economical as compared to conventional techniques and hence those techniques should be explored by all the state governments and municipal corporations for health monitoring of their assets.**
- During the life span of structures and buildings, many services are required to be installed but that installation is done by the workmen having no or only little knowledge about structural engineering and hence they drill the holes through reinforcements. Before drilling any hole or chiseling the concrete surface, location of reinforcement should be known through non-destructive testing and accordingly the drilling or chiseling should be allowed. There is an urgent need of spreading awareness amongst the users, workmen and civic authorities.

Sensitization of the entire society on this issue is needed.

- In geo-reinforced earth walls, i.e. mechanically stabilized walls, regular inspection of the drainage condition, bulging of outer surface, cracking of facia, etc. should be conducted after monsoon to avoid their failure.
- In large projects of the government, private design consultants are appointed for the purpose of design but sometime their design is not properly validated and hence a proof check is must. The administrative machinery of the government should take this point in to consideration to avoid failures.

VIDEOS OF ALL THE PAPERS PRESENTED CAN BE VIEWED BY CLICKING

<https://www.facebook.com/IEIGSC/videos>





WORLD ENVIRONMENT DAY



World Environment Day 2015 was celebrated at Bhaikaka Bhavan, Ahmedabad on June 5, 2015. This year Theme was "Seven Billion Dreams. One Planet. Consume with Care." The Keynote speakers were Prof. Dr. N. S. Varandani, Principal Research Scientist, Env & Energy Efficiency RW, GERMI, Gandhinagar and Mr. S. D. Vora, IFS, Retired Chief Conservator of Forest, Government of Gujarat.

Mr. C. V. Nadapara, Hon. Secretary, IEI, GSC welcomed the keynote speakers and the audience.

Prof. Dr. N. S. Varandani explained the theme in general and stressed on careful assessment of each and every word of the theme. He explained that human beings must consume daily needs i.e. of food, air and water with care and that as the human population is increasing day by day we have to sustain natural resources. Economic growth can be achieved by rationally using the natural resources like air, land and water which are very much important for human survival.

He also stated that as the air pollution is increasing due to industrial growth and increasing vehicles day by day we have to use

energy efficient vehicles and rationalize the use of fuel resources. We have to save energy by using LED lights etc, use fuel efficient vehicle, public transportation, use small car and good quality fuel.

He also said that we shall have to grow more food for increasing population. And for increasing food production, we shall have to increase the crop yield with the use of synthetic fertilizers & pesticides. He therefore stressed the need to consume food with care and to minimize wastage of food etc.

He also said that water is important for human survival, but we are already living in water scarce area. Therefore for economic use of water, he said, we shall have to reduce wastage of water during supply to cities and agriculture, conserve water, use water rationally, conduct awareness programmes for saving of water, adopt reuse & recycle for treated sewage and industrial waste water.

Shri S. D. Vora, retired Chief Conservator of Forest explained the important of social, economic and environmental development in details. He explained the concept of sustainable development implemented in Sardar Sarovar Project with different types of illustrations.

Talk on Modern Recharging Techniques



- Increases ground water level by recharging.
- Rejuvenation of dried bore wells.
- Reduces Salinity and Fluoride contents in the bore well.
- Reduces storm water discharges, urban floods and overloading of sewage treatment plants.
- Reduces stress on urban water supply.

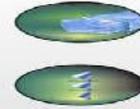


Front view of 'V' Wire Screen

THE SALIENT FEATURES

Continuous Slots
The special design gives continuous slot opening across the periphery and length of screen.

Non Clogging Slots
V shape wire gives inwardly widening V-shape slots. This shape does not give space for any sand particle to get stuck inside the slot and hence these screens are non clogging.



ANATOMY

- The V wire screen is of stainless steel material, grade SS-304, Cage type trapezoidal wire wound screen.
- Screen is evenly distributed continuous slot opening of 0.75 MM, so that it has more open area for minimum turbulence and loss of energy.
- The trapezoidal V shape inwardly widening slots are non clogging, so that sediments have only point contact.
- The diameter of the V wire screen is 150 mm, length 0.5 Metre.

INJECTION WELL TO RECHARGE GROUND WATER THROUGH 'V' WIRE TECHNOLOGY





RECAP OF NOVEMBER 2014

Talk on inspection of manufacturing & laying of pipelines



Er Manoj Raghavan, Principal Manager, SGS India Pvt Ltd delivered a talk cum presentation. He discussed Quality Concept an errors affecting quality; Objective of inspection; outcome of inspection; when, where, how and how much to inspect; Quality Assurance Plan; Procurement inspection; raw material testing; inspection of welding and welding procedure specs, welding positions and defects in welding; inspection of pipes; inspection of coating; procurement inspection of mechanical and electrical items; TPI of QC & QA of site construction work; inspection of pipe laying; construction supervision of pumping stations and commissioning of the project. **Presentation can be seen at <http://www.slideshare.net/IEIGSC/quality-control-quality-assurance-of-ms-pipeline>**



Film show on India's Mars Orbiter Mission



Dr. S.S.Sarkar, Director, Payload Division, Space Application Center, Indian Space Research Organisation came to GSC with his whole team and made a presentation cum film show on India's most prestigious and successful Mars Orbiter Mission (MOM) on 14th November at Vasvik Auditorium, Bhaikaka Bhavan.

Marking India's first venture into the interplanetary space, MOM will explore and observe Mars surface features, morphology, mineralogy and the Martian atmosphere. Further, a specific search for methane in the Martian atmosphere will provide information about the possibility or the past existence of life on the planet.

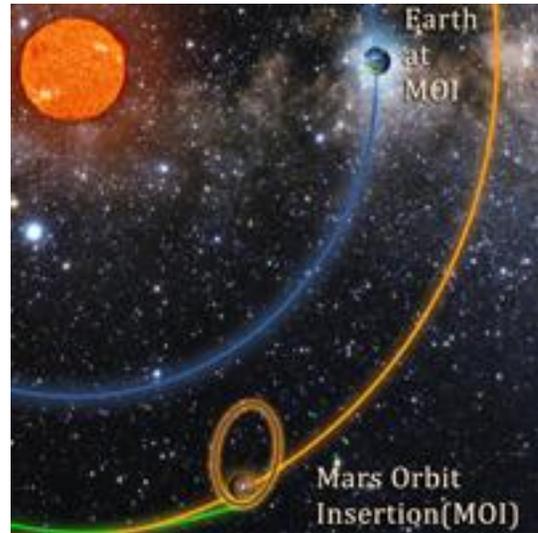
The enormous distances involved in interplanetary missions present a demanding challenge; developing and mastering the technologies essential for

these missions will open endless possibilities for space exploration. After leaving Earth, the Orbiter will have to endure the Interplanetary space for 300 days before Mars capture. Apart from deep space communications and navigation-guidance-control capabilities, the mission will require autonomy at the spacecraft end to handle contingencies.

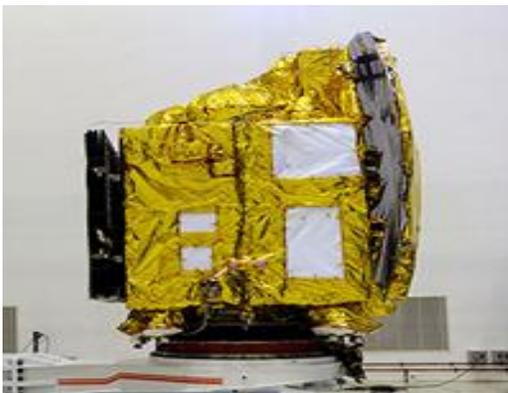
Once India decided to go to Mars, ISRO had no time to lose as the nearest launch window was only a few months away and it could not afford to lose the chance, given the next launch would present itself after over 780 days, in 2016. Thus, mission planning, manufacturing the spacecraft and the launch vehicle and readying the support systems took place swiftly.



Launch Vehicle



Mission profile



The Space craft



Ground Segment

The Orbiter is being tracked by the Indian Deep Space Network (IDSN), located outside Bangalore. IDSN's 32 m and 18 m diameter antennas are being complemented by NASA - JPL's Deep Space Network



Talk on Micro Irrigation Systems



Micro irrigation known in common parlance as Drip or Sprinkler irrigation is the latest technology in agriculture and horticulture which is employed to save water and enhance irrigation efficiency as well as crop yield. When employed properly, it can pay back all the investment made on it within a period of 3 years put conservatively. As water is given in a measured volume and as liquid fertilizer can be injected through this system, there is saving from wastage of manure and most importantly, the land is saved from salt extrusion. Micro irrigation has given life to countries like Israel which is having most of its soil on which nothing could be grown if traditional methods are followed. Similar example could be set by Gujarat which is

deficient in rains and having 75 % of its area classified as drought prone. These were the words of Er Chirag Shah, M E (Civil) with specialisation in Environment engineering having fourteen years of experience in micro irrigation industry and other allied activities. Er Shah enlightened an audience of 35 engineers on 28th November in a talk cum presentation given at Bhaikaka Bhavan.

TECH BRIEFS

1 **World's largest particle collider busts record**



As reported by the European Organisation for Nuclear Research (CERN) protons collided in the Large Hadron Collider (LHC) at the record-breaking energy of 13 TeV (teraelectronvolts) for the first time. The collisions took place at the giant lab, housed in a 27-kilometre (17-mile) tunnel straddling the French-Swiss border.

The LHC's previous highest energy for collisions was eight TeV, reached in 2012. In April, it started up again after a two-year overhaul designed to pave the way to experiments at 13 TeV. It has the potential to be cranked up to 14 TeV.

Experiments at the collider are aimed at unlocking clues as to how the universe came into existence by studying fundamental particles, the

building blocks of all matter, and the forces that control them. Before the upgrade, the LHC was used to prove the existence of the Higgs Boson, also known as the God particle, which confers mass.

That discovery earned the 2013 Nobel physics prize for two of the scientists who had theorised the existence of the Higgs back in 1964.

The LHC allows beams containing billions of protons traveling at 99.9 percent the speed of light to shoot through the massive collider in opposite directions. Powerful magnets bend the beams so that they collide at points around the track where four laboratories have batteries of sensors to monitor the smashups.

One tera-electronvolt is roughly equivalent to the energy of motion of a flying mosquito, But within the LHC, the energy is squeezed into an extremely small space—about a million, million times smaller than a mosquito. It is this intensity which causes the particles to be smashed apart.

2 **RESEARCHERS DEVELOP IMPROVED TUNNEL FIRE PROTECTION**

A team has developed a method of greatly increasing the amount of steel fibers embedded in shotcrete, a development that could significantly boost fire protection in tunnels.



A research team at Ruhr-University Bochum in Germany has developed a method of spraying steel-fiber-infused shotcrete onto the surface of tunnels, greatly enhancing the ability to withstand high-intensity fires, explosive blasts, or a combination of the two. The method shows promise in bolstering the security performance of critical infrastructure.

The research team is led by Goetz Vollmann, Ph.D., Dr.-Ing., an assistant professor at the university's Institute for Tunnelling and Construction Management. The project, funded by the German Federal Ministry for Education and Research, began as an examination of the security of critical bridges and tunnels with a focus on finding ways to enhance that security. *"We took an all-hazard approach and naturally fire and explosion—and especially a combination of both—are the most severe threats, especially for tunnels,"* said Vollmann, who provided written answers to questions posed by *Civil Engineering* online.

The researchers found that although there are several methods available for increasing the resiliency of concrete or steel infrastructure, most are so highly specialized they focus either on fire or blast resiliency, bolstering one quality at the expense of the other. *"For instance, high-performance concrete, whose strong matrix has a positive effect in terms of explosion, might be too brittle in a fire threat scenario, leading to increase spalling,"* Vollmann explained. *"[And,] most of the products can only be manufactured as prefabricated boards due*

to their complicated manufacturing principles."

The team focused on shotcrete because it can be applied to a variety of surface shapes and materials, and is especially well-suited to tunnel applications. From earlier research, the team knew that shotcrete with many embedded steel fibers and a smaller amount of synthetic fibers would provide the compressive strength they wanted to achieve.

"The problem was naturally the workability of the shotcrete with the needed levels of steel and PP [polypropylene] fibers," Vollmann said. The team was attempting to use 140 kg/m³ of steel fibers and another 3 kg/m³ of PP fibers, when the conventionally accepted limit is closer to 70 kg/m³. Additionally, the team focused on ultrahigh-performance concrete, which is much stiffer than typical shotcrete.

"For months we struggled with the workability of the wet mix. As expected, the high amounts of fibers ... together with the basic mix design made the concrete stiff and not workable at all, at least not for the application that we had in mind," Vollmann said. To solve the workability issue, the team experimented with adding high levels of air-entraining chemicals to the concrete mixture.

Although air entrainment is common in the concrete industry and is often used to bolster performance in applications that will be exposed to freeze-thaw cycles, the team went far beyond the typical levels for this application. *"For our test series, we simply ignored the normal levels of air in a*



concrete mixture and instead tried to go to extremes, looking at how much air we could add and how the mixture would react," Vollmann said. The team found they could exceed 20 percent air by volume and still have a stable mixture. The air bubbles function as ball bearings, releasing the fibers to move more freely within the shotcrete and enabling the team to spray the mixture more effectively.

The shotcrete is applied via a high-pressure nozzle at speeds of 50 to 80 km per hour, forming layers as much as 35 cm thick. An accelerating agent is added to the mixture as it emerges from the nozzle to enable the application of thick layers and to increase the shotcrete's early compressive strength. A defoaming agent is also added at the nozzle. *"The aim is to extract the previously added air on the concrete's way from the nozzle to its application target,"* Vollmann said.

In early testing conducted at the Fraunhofer Ernst-Mach-Institute in Freiburg, Germany, the mixture greatly enhanced blast protection. A coated slab exposed to a blast retained 60 percent of its bearing capacity, compared to just 20 percent for an untreated slab. Fire performance also improved. The slab showed no spalling when exposed to fire that reached 1,200°C within 5 minutes, burned feely for 55 minutes, and then endured a long cool down phase.

The shotcrete is still in the prototype stage; the research team and its industrial partner, MC-Bauchemie—a chemical manufacturer headquartered in Bottrop, Germany—are working on

additional refinements to the mixture and its workability.

"We are still not sure that we have reached the limit state of fiber content or workability," Vollmann said. "We also envision that there are other applications of a fiber concrete with huge amounts of fibers, where you don't need these enormous contents, but still more than you would normally expect." Bridge repairs are one such area, he said. "We are already formulating new proposals for additional research."

3 Desalination: the quest to quench the world's thirst for water

Technological advances have made removing salt from seawater and waste water less energy-intensive, but will they simply encourage us to use more?

The average Briton uses 150 litres of water a day; the average American gets through 570 litres of the stuff. The world is getting thirstier and the global demand for fresh water is rising by 640bn litres a year. Population growth is one factor, not only the need for drinking water and sanitation but also the need to produce more food. Agriculture accounts for 70% of water use.

Even the push for biofuels to reduce consumption of fossil fuels has an unexpected consequence: between 1,000 and 4,000 litres of water are needed to produce just one litre of biofuel. While reducing consumption is one way of helping to address the water crisis on an individual level, it is far from the complete solution. Something on a larger scale is also needed: **desalination.**



As climate change makes rainfall less predictable and droughts more common, a growing number of countries are turning to desalination. The term is used to refer to removing salt from both seawater and subterranean "brackish" water, as well as the treatment of waste water (aka sewerage) to make it drinkable. Some environmentalists have long opposed desalination because of the energy the process demands, as well as other considerations such as the impact of sucking in large quantities of seawater from the ocean.

But technological advances in recent years have altered the equation. **The most common form of desalination is reverse osmosis; it involves forcing water through cartridges that contain thin-film composite polyamide membranes, which trap salt and other impurities but allow the fresh water through.**

Randy Truby, comptroller of the International Desalination Association, says that advances in manufacturing processes have allowed 450 sq ft of membrane to be crammed into each cartridge, compared with 300 sq ft when they first came on the market. But treating seawater still requires pressure of about 80 bar, 40 times more than car tyres. That is why treating seawater is more energy-intensive than brackish or waste water, which require less force. The location of a seawater desalination plant also makes a difference, Truby adds: while the salt content of water off the coast of California is about 34,000 parts per million, the figure in the Middle East is more like 40,000.

No alternative

Saudi Arabia is the country that relies most on desalination – mostly of seawater. The US is in second place. It uses mainly brackish and waste water although later this year it will open one of the world's largest seawater desalination plants in Carlsbad, San Diego. Truby says: *"In many places there is no alternative – certainly the Middle East and places like Singapore, the Canary Islands and the Caribbean have to look to the sea. Those that have a choice, like Europe and the US, China, Japan, will try conservation and re-use and brackish treatment and use [seawater] desalination as a way to top-up and provide some drought-proofing."*

Desalination remains about twice as expensive as treating rainwater or waste water, at about \$3 (£1.95) per cubic metre, but the economics depend on a number of variables, explains Professor Raphael Semiat of Technion, the Israel Institute of Technology, in Haifa. He says *3.5 kilowatt hours (kWh) of electricity are needed to desalinate 1 cubic metre of seawater – 1.3kWh to pump seawater to the plant and 2.2kWh for the reverse osmosis process.*

Pumping a cubic metre of fresh water distances of more than 200km requires more energy than desalinating the same amount of seawater, according to Semiat. In addition, many plants produce the bulk of their water at night when there is less demand for electricity, and thus utilise power that would otherwise go to waste.

Philip Davies, reader in mechanical engineering and design at Aston University in Birmingham, argues that



desalination is not an expensive way of producing drinking water. He adds: *"The trouble is most distribution systems don't allow us to distinguish between drinking water or water used for sanitation. It's also very difficult to put differential costing on water to reflect merits of its use, because at the end of the day you've got to make water affordable to everybody. There are much cheaper ways to economise on water than desalination ... we should be re-using water for sanitation or irrigation."*

Davies points out that reverse osmosis is not ideal for developing countries because the maintenance of the membranes required to keep them running effectively is more problematic in a country like India. Most desalination on the subcontinent is of brackish water that contains high levels of impurities, meaning the membranes can easily become clogged: "They are just filters and they get blocked up like anything else unless you have the right sort of pre-treatment."

The expense of operating a desalination plant is another issue in developing countries. While NGOs can provide seed funding, they are less able to cover running costs. One solution could be a micro-enterprise project Davies has been involved with near Jodhpur in India. As well as producing desalinated water, it generates incomes from farmers who pay to have their seeds pressed to produce castor oil, and provides refrigeration for ripening bananas. There is also a growing effort to reduce the environmental impact of desalinating brackish water. The salt recovery rate is typically about 50%, meaning that the waste salty brine

is often injected back into the ground in places such as India and Pakistan.

Saltwater greenhouses

Such a strategy is not sustainable because it increases the salinity of soil or rivers further downstream. Davies says increasing the amount of salt being removed to between 70% and 90% solves that problem, but requires more energy – although he has devised a system of solar power to keep usage to a minimum.



Seawater greenhouse technology is well suited to arid parts of the world.
Photograph: Seawater Greenhouse

The academic is also involved in a project in [Somaliland](#), which faces the twin challenges of rapid population growth and limited water resources. **It is one area using seawater greenhouses, which produce water for irrigation by pumping seawater into the greenhouse and piping it over honeycomb cardboard pads that provide a large area for evaporative cooling.**

According to Charlie Paton, who founded [Seawater Greenhouse Ltd](#) two decades ago, a seawater greenhouse cools the air by up to 15 degrees and



increases humidity to as much as 90% even in some of the world's most arid places. Davies says they can reduce the amount of water needed to produce a kilogram of produce from hundreds to tens of litres.

Researchers continue to seek to improve the technology behind reverse osmosis. Adel Sharif, professor of water engineering and process innovation at the University of Surrey, co-developed a new form of desalination called manipulated osmosis in 2003. He says the technique helps to remove impurities such as limescale before the reverse osmosis process, which reduces the amount of energy needed by as much as 30%, as well as increasing the lifespan of the membranes and reducing maintenance costs.

The first plant using manipulated osmosis began operating in Gibraltar in March 2009. A second opened in Oman later that year, and another opened in 2010. The company founded by Sharif to commercialise the technology, [Modern Water](#), is listed on the AIM stock market in London, but he admits it has struggled to win contracts and may end up being bought by a larger desalination player. Many desalination companies are eyeing China, which has just 7% of the world's freshwater but a fifth of its population. About 400 cities face serious water shortages and Beijing aims to quadruple its seawater desalination capacity to 3.6bn litres a day by 2020.

Even London now has a seawater desalination plant. The city and the southeast of England is a "water-stressed area", says Simon Earl, head of water

production for Thames Water. However, the plant is not routinely used and is there "in case of severe drought", like the one that occurred in 2011 and 2012 after two dry winters. Surprisingly, there is no wastewater recycling in London, although Earl says building that capacity – or a new reservoir or pumping water from other parts of Britain – are options for coping with rising demand.

As the world's population continues to rise, the pressure on water resources are only going to increase. It is yet to be seen whether technological advances will be able to meet the demand.

4 Bladeless Wind Turbines May Offer More Form Than Function

Startup Vortex Bladeless makes a turbine that looks intriguing, but it may not solve wind power's challenges.



Vortex says its bladeless turbines will generate electricity for 40 percent less than the cost of power from conventional wind turbines.

Wind power has become a legitimate source of energy over the past few decades as larger, more efficient turbine designs have produced ever-increasing



amounts of power. But even though the industry saw a record \$99.5 billion global investment in 2014, turbine growth may be reaching its limits.

Transportation is increasingly challenging because of the size of the components: individual blades and tower sections often require specialized trucks and straight, wide roads. Today's wind turbines are also incredibly top heavy. Generators and gearboxes sitting on support towers 100 meters off the ground can weigh more than 100 tons. As the weight and height of turbines increase, the materials costs of wider, stronger support towers, as well as the cost of maintaining components housed so far from the ground, are cutting into the efficiency benefits of larger turbines.

The alternative energy industry has repeatedly tried to solve these issues to no avail. But the latest entry promises a radically different type of wind turbine: a bladeless cylinder that oscillates or vibrates. Spanish startup Vortex Bladeless has developed turbines that harness vorticity, the spinning motion of air or other fluids. When wind passes one of the cylindrical turbines, it shears off the downwind side of the cylinder in a spinning whirlpool or vortex. That vortex then exerts force on the cylinder, causing it to vibrate. The kinetic energy of the oscillating cylinder is converted to electricity through a linear generator similar to those used to harness wave energy.

David Yáñez, one of the company's cofounders, first came across the concept as a student studying the collapse of the Tacoma Narrows Bridge in Washington.

The bridge collapsed in 1940 due to excessive vibrations formed by the spinning motion of wind as it blew past the bridge and is a textbook engineering failure. Yáñez, however, learned a different lesson. "This is a very good way to transmit energy from a fluid to a structure," he says.

Vortex's lightweight cylinder design has no gears or bearings. Yáñez says it will generate electricity for 40 percent less than the cost of power from conventional wind turbines. The company has received \$1 million in private capital and government funding in Spain and is seeking another \$5 million in venture capital funding. Yáñez says the company plans to release a four-kilowatt system in 2016 and a much larger one-megawatt device around 2018. The Vortex turbine sounds promising, but like any radical new alternative energy design, bladeless turbines have plenty of skeptics.

"If you have a common propeller-type wind turbine, you have a big area swept by the blades," says Martin Hansen, a wind energy specialist at the Technical University of Denmark. *"Here you just have a pole." In addition to capturing less energy, oscillating cylinders can't convert as much of that energy into electricity,* Hansen says. A conventional wind turbine typically converts 80 to 90 percent of the kinetic energy of its spinning rotor into electricity. Yáñez says his company's custom-built linear generator will have a conversion efficiency of 70 percent. Yáñez concedes that the oscillating turbine design will sweep a smaller area and have a lower conversion efficiency, but says significant reductions in manufacturing



and maintenance costs will outweigh the losses.

As Vortex builds bigger devices that catch higher-speed winds further from the ground, it will also run up against other challenges inherent to the physics of fluid mechanics. Air or other fluids moving at low speeds past small-diameter cylinders flow in a smooth, constant motion. Increase the diameter of the cylinder and the speed at which the air flows across it, however, and the flow becomes turbulent, producing chaotic eddies or vortices. The turbulent flow causes the oscillating frequency of the cylinder to vary, making it difficult to optimize for energy production.

"With very thin cylinders and very slow velocities you get singing telephone lines, an absolutely pure frequency or tone," says Sheila Widnall, an aeronautics and astronautics professor at MIT. *"But when the cylinder gets very big and wind gets very high, you get a range of frequencies. You won't be able to get as much energy out of it as you want to because the oscillation is fundamentally turbulent."* Widnall also questions the company's claim that its turbines will be silent. *"The oscillating frequencies that shake the cylinder will make noise,"* she says. *"It will sound like a freight train coming through your wind farm."*

Oscillating cylinders are just one of several emerging technologies aimed at harvesting more of the wind for less. Makani Power is developing a tethered "energy kite" (see "[Flying Windmills](#)"). It flies in a large circle similar to the tip of a conventional turbine blade while harnessing wind power via smaller

onboard turbines. Astro Teller, head of Google X, Google's semi-secret research facility that acquired Makani in 2013, said in March that the company would soon begin tests of a full-scale, 600-kilowatt kite.

John Dabiri, an aeronautics and bioengineering professor at Caltech, is testing different configurations of vertical axis turbines, which are essentially windmills that spin like a merry-go-round rather than on a horizontal axis like a bicycle wheel. Typically wind turbines are placed far apart from each other to optimize energy production. **Drawing on the same principles that fish use to conserve energy by schooling, Dabiri found that turbines placed close to each other could produce more energy than those that are far apart.** "You can coordinate the operation of multiple wind turbines such that the whole is greater than the sum of its parts," he says. Dabiri says such synergistic effects could also apply to conventional, horizontal axis windmills or even oscillating turbines. The latter pose a greater challenge because the wake of such turbines is very chaotic but also a potential benefit because the wake packs a lot of energy, he says.

Much remains to be seen with Vortex's oscillating turbine, Dabiri says, but he adds that he is excited by the company's concept. "Anyone who says the three-bladed turbine is the best we can do is lacking in vision."



Forthcoming Events

- **03/07/2015**
One Day Seminar : Safety examination, O & M of gates for dams, canals, drains & other structures
- **10/07/2015**
Guidance to new batch of AMIE Students & Commencement of Classes
- **17/07/2015**
Talk on role of engineers post retirement
By Prof S Mashruwala, AMA
- **24/07/2015**
Women Engineers' Programme
- **07/08/2015**
Talk
By Prof S Mashruwala, AMA
- **15/08/2015**
Independence Day-- Flag Hoisting in collaboration with GICEA
- **22-23/08/2015**
All India Seminar :Polymer Processing, reclamation & its End -of-life impact on Environment
- **30-31/08/2015**
National Conference of Civil Engineers
Innovative concepts emerging in modern construction technology and use of smart materials for construction
Associates : ASCE
- **11-12/09/2015**
All India Seminar : Lean management techniques & the application for textile MSME
- **15/09/2015**
Engineers' Day
Engineering challanges for knowledge era
- **03/10/2015**
World Habitat Day

Forthcoming Events.....

- **14/10/2015**
World Standards Day
- **31/10-01/11/2015**
All India Seminar : Internet of things: Trends that affect lives
- **19-21 /11 / 2015**
13th edition of Green Building Congress 2015

In association of IGBC at Mahatma Mandir, Gandhinagar
- **14/12/2015**
Energy Conservation Day
- **29-30/01/2016**
National Conference of Agriculture Engineers

Agro-Tech Industries:Status, Scope & Strategies for Food Security

Venue: Gujarat Agriculture University, Anand

**Art without
engineering is
dreaming.
Engineering
without art is
calculating.**

- Steven Roberts

**AFTER JOINING ENGINEERING.
I REALLY APPRECIATE MY BRAIN
WHICH IS DIVIDED IN TWO PARTS
RIGHT & LEFT.**

- 1. IN RIGHT NOTHING IS LEFT.....**
- 2. IN LEFT NOTHING IS RIGHT....**



ANNOUNCEMENTS

EDUCATIONAL

A) 3-year diploma courses in different engineering disciplines of GTU under distance mode shall be now considered as equivalent to 3-year regular diploma course for Senior Technician membership provided the membership application of an individual be supported with an equivalence certificate issued by Technical Examination Board, Gujarat. (Decision of Council in its 685th meeting dated 4--5 April 2015)

B) Evening Coaching classes for Section A –Diploma stream of the candidates appearing for Winter 2015 AMIE Examination will commence from 10th July 2015.

Admission started.

For details contact :The Institution of Engineers (I), Gujarat State Center, Bhaikaka Bhavan, Opp Ellisbridge Gymkhana, Near Law Garden, Ahmedabad 380006
Phone: 079 26400811

C) Candidates who passed MSc in Computer Science/ Electronics or in any other disciplines & subsequently obtained ME/ MTech degree or any higher degree in an engineering discipline from any recognised Indian University and are Corporate members of IEI, shall be permitted to appear in Section B examination directly in the same batch in which they passed their ME/ MTech or higher degree in engineering as decided in 685th meeting of IEI Council (4--5TH April 15)

Library facility at GSC

Our technical library with over 15,000 books remains open daily 6 to 8 pm except on Sundays.

We are constantly adding latest titles & journals/magazines. Proceedings of Seminars / Conventions/ Workshop are also being added. We request members to avail of library facility to the maximum.

Candidates getting direct lateral entry in second year of 4-year BE/BTech courses in relevant field of engineering of recognised

Indian University, by virtue of passing B.Sc/BCA, shall be considered for appropriate grade of corporate membership of IEI (Decided in 685th meeting of Council, April 15)

23rd IEI Convocation and Technicians'/Students' Convention at Dharwad (Karnataka) on October 10-11 2015

Theme: Innovative Indigenous Technology Pathways for successful Accomplishment of National Program "Make in India"

For registration and other information:

www.ieidharwad.org

Email

ieiconvocationdharwad2015@gmail.com

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General Information About AMIE Examinations

Only members of The Institution of Engineers(India) are permitted to appear at the examinations conducted by the Institution in conformity with their eligibility and qualifications. The Institution conducts the following examinations :

Section A (Non-Diploma Stream)
Section A (Diploma Stream)
Section B

in the following branches of engineering :



- ❖ Chemical Engineering
- ❖ Civil Engineering
- ❖ Computer Science & Engineering
- ❖ Electrical Engineering
- ❖ Electronics and Communication Engineering
- ❖ Materials and Metallurgical Engineering
- ❖ Mechanical Engineering
- ❖ Mining Engineering
- ❖ Production Engineering
- ❖ Textile Engineering

The Institution Examinations are held twice a year, generally in June and in December — termed as SUMMER and WINTER Examination. The exact dates of examinations, the programmes thereof and the period of submission of examination application forms shall be notified and displayed at the Center.

ELIGIBILITY & DETAILS OF EXAMINATIONS

SECTION A (NON-DIPLOMA STREAM) EXAMINATION

Technician members enrolled with the Institution are eligible to apply for appearance in the Institution examination within the stipulated period. The enrollment includes registration for examination in Section A (Non-diploma). A candidate shall be required to pass in 10 (ten) subjects.

SECTION A (DIPLOMA STREAM) EXAMINATION

Senior Technician members enrolled with the Institution are only eligible to apply for appearance in the Institution examination within the stipulated period.

The enrollment includes registration for examination in Section A (Diploma).

A candidate shall be required to pass in 4 (four) subjects. A candidate may be required to qualify in less number of subjects provided such a candidate, in consideration of his academic credentials, is given exemption in one or more subjects by the Institution.

SECTION B EXAMINATION

Technician/Senior Technician members enrolled with the Institution who have passed Section A of the Institution Examination or any other examination recognised by the Council as exempting therefrom OR Associates and corporate members, who have passed Sections A & B of Institution Examinations in one branch of engineering or secured exemption therefrom for appearing in another branch of engineering, are only eligible to apply for appearance in the Institution examination within the stipulated period.

A candidate shall be required to qualify in 9 (nine) subjects — 6 (six) compulsory and 3 (three) optional, except in Marine Engineering branch, where a candidate is required to pass in 10 (ten) compulsory subjects and 1 (one) optional subject, out of the two.

For appearing in the examination please log in to our website for downloading the appropriate form.Or else visit the center nearest to you.



The Institution of Engineers (India) Gujarat State Center, Bhaikaka Bhavan, Opp Law Garden, Near Ellisbridge gymkhana, Ahmedabad helps the student community by conducting **free evening Guidance Classes for AMIE Section A (Diploma Stream) examinations**. One time enrolment fees for the classes Rs. 1000/- There shall be no other charges to be paid.

Senior Technician members enrolled with the Institution are only eligible to apply for appearance in the Institution examination within the stipulated period.

Classes shall be conducted from Mondays through Thursdays from 7 pm to 9 pm. Classes shall commence from 10th July 2015 for:

- ❖ Fundamentals of Design & Manufacturing
- ❖ Material Science & Engineering
- ❖ Electrical Science, electronics and instrumentation
- ❖ Mechanical science

More particulars and Application Form for Registration can be had from the office .

Be the voice of female engineers

A number of barriers exist to the progression of larger numbers of women in engineering, and these can be represented by the analogy of hurdles in a running race. These exist at every career stage. We at IEI need to work hard to lower these hurdles, but they will only disappear altogether when we get sufficient numbers of 'runners' in the race to knock them down. This is why the work that is done in the early career stages is very important. We cannot address all of these barriers to progression, but we have tried to identify a number of ways that can make a difference.

- To motivate girls to consider careers in engineering
- To organize annual two day student conference called Engineering Inspiration
- To promote engineering role models
- To discuss difficulties being faced at workplace and possible solutions
- To upgrade knowledge continuously through seminars/ workshops/ talks/ presentations
- To scout opportunities in private sector
- To arrange for personality development lectures



NEW ENROLMENTS

F

SAMIR SAHA

M

AMIRUDDIN MOHAMMED SIDDIQ MOULVI
ARUN KUMAR MINOCHA
ATUL MAHASHUKHALAL TALSANIA
BHASKERKUMAR MOHANLAL PATHAK
DHADIYA RAJESHKUMAR MAGANBHAI
DHANDHUKIYA NILESH VINODRAI
DHARMESHKUMAR RAMANLAL GAMIT
GAJJAR CHINTAN BALVANT
JETHWA JIGNESH NIRANJAN
JOSHI RUTVIJ CHANDRAKANT
MAHESHWARI VISHAL VISHNUKUMAR
MAKADIA REENAKUMARI NANUBHAI
PATEL AMRAT MANILAL
PATIL RAKESHKUMAR RAMDAS
RAJESH RAMANLAL MODY
VIVEK DEVIDAS KALYANKAR

AM

ADROJA FALGUN NARANBHAI
ANKURBHAI DHANSUKHBHAI CHAUDHARI
BHAVSAR PARTH MAHESHBHAI
BINJAYKUMAR BHIKHABHAI PATEL
CHOKSI ROSHANI RAJESHKUMAR
DABHI ASHOKKUMAR JIVRAJBHAI
GANVIT FALGUNI BABUBHAI
GEVARIA KAUSHALKUMAR MOHANLAL
GOPANI HARIKRISHNA PANKAJKUMAR
HIRAPARA RONAKKUMAR JAYANTIBHAI
HIRAPARA TARUN PRAVINBHAI
JADEJA RATNADEEPSINH MAHENDRASINH
JOSHI ANAND RAMESHBHAI
KACHA NIRAJ DEVSUKHLAL
KEVADIYA JAYDEEPKUMAR SHAMJIBHAI
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NILESHKUMAR VISHNUBHAI PRAJAPATI
PANCHAL RAVI SURESHKUMAR
PARSANIA PRATIK ARVINDBHAI
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PATEL CHIRAG VINODBHAI
PATEL HARDIKKUMAR RAMESHBHAI
PATEL JAYDEEPKUMAR JAYANTILAL
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RATHOD MANISH KISHORBHAI
RAVAL BHAVESHKUMAR BHOLABHAI
RUPANK MUKHI
SHAH JAY SNEHALBHAI
SOLANKI JAYRAJSINH BALVANTSINH
SUNILKUMAR ASHOKKUMAR DOMADIA
SURYAKANT DIPCHAND PATEL

THAKAR JATINKUMAR RAJENDRAKUMAR
TOPIWALA HETAL JINENDRAKUMAR
VAMJA DIPAKKUMAR GOBARBHAI
VARUNBHAI RANCHHODDBHAI CHAUDHARI
VASAVA RATILALBHAI SINGABHAI
VASHI JAYDIPSINH VIKRAMSINH
VIMALKUMAR AMRUTLAL PATEL
VIPULKUMAR ARVINDBHAI CHAUDHARI

ST

KALAVADIYA YASHKUMAR BHARATBHAI
DHAKE VAIBHAVKUMAR VENUPRASAD
ISRANI MAHENDRA KISHANBHAI
SUTHAR RIPALKUMAR JAYANTIBHAI
SUTHAR PRITESHKUMAR DINESHCHANDRA
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MALEK MAKSUDAHEMAD GULAMNABI
BHOI ATULBHAI LALLUBHAI
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PARMAR HINABEN GULABSINH
RAJPUT SANDEEP DILIPSINGH
HIRALBEN RAMESHBHAI RANA
SHAIKH JISHAN AJIJMAHAMMAD
PRAJAPATI VISHALKUMAR MANUBHAI
VAGHELA CHANDRAPALSINH VAJESANG
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SAVANI KRUNAL BABUBHAI
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RATHOD ANALKUMARI CHANDULAL
TANK PRAVINCHANDRA BHAGVANJI
GHADA ASIF HANIFBHAI
VYAS VISHAL VIJAYBHAI
BHANDERI RAVI CHHAGANBHAI
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PRAJAPATI NAVINBHAI BHIMAJIBHAI
KASHYAPKUMAR MAHENDRABHAI PATEL
SINGH SURAJKUMAR SANTOSHKUMAR
DODIA JIGNESHKUMAR BHAVANBHAI
KARAR MEHUL SHISHIR
JADHAV PRADIP BHIKHABHAI
PATEL RAHULKUMAR VINODBHAI
LASHKARI HIMEN MANSUKHLAL
PUROHIT BHUSHAN ASHWINBHAI
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INCULCATING ENGINEERING HABITS OF MIND

By *Professor Bill Lucas*

It's not just what engineers do that is important – it is how they think. And this is something that can be taught to young people of all ages, says Professor Bill Lucas.

It is widely believed that we need more engineers. And it is frequently asserted that people have a poor grasp of what engineering is all about.

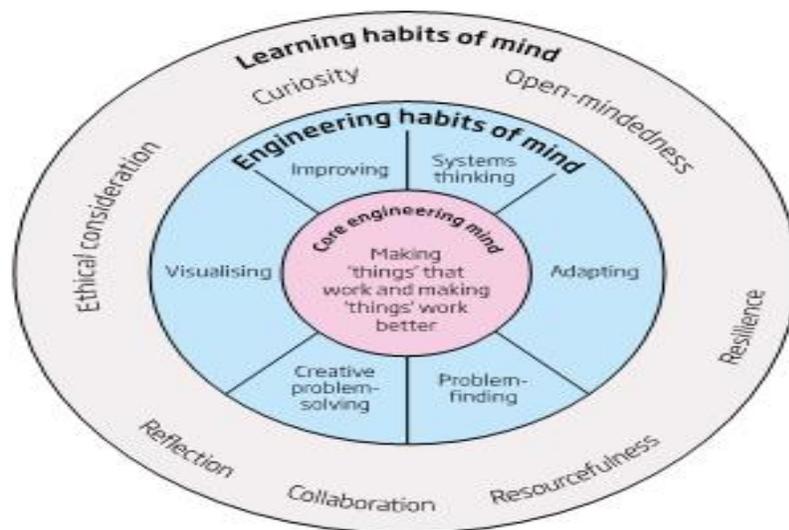
Just as the scientific method is integral to science, so there are ways of thinking and doing that epitomise engineering.

Rather than sticking to an outdated supply-and-demand model, which plainly is not working, we should be focusing instead on embedding engineering thinking and doing skills into young people's education – nudging more down the engineering pathway while also enhancing general technological literacy.

This was the premise that underpinned our 'engineering habits of mind' project for the Royal Academy of Engineering. Through wide consultation and discussion, and by exhaustively trawling through what had already been written, we attempted to come up with a consensus on what engineers do and how they think – something we called 'engineering habits of mind'.

We settled on a simple description of what engineers do: being an engineer is all about 'making 'things' that work and making 'things' work better'. We found surprising levels of agreement about our proposed six levels of engineering habits of mind:

- Systems thinking
- Adapting
- Problem-finding
- Creative problem-solving
- Visualising
- Improving





We also considered the processes in which these habits are applied, and stirred seven more generic 'learning habits of mind' into the mix.

Notably, these habits of mind are strikingly apparent in the way primary-age children naturally behave – young children are little engineers. Yet we make little effort to exploit this natural propensity – quite the reverse – and by secondary school we distance children even more from the world of engineering, encouraging abstraction and more academic pursuits.

If we want to nurture engineering habits of mind, we are going to have to rethink our approach to education. This can be done, even within the constraints of existing content-heavy, outcome-oriented curricula and without a specific place for engineering within the curriculum.

Indeed, in our project we identified many examples of good teaching and learning practice that promoted the development of engineering habits of mind – particularly problem-based and project-based active-learning approaches.

Our hypothesis is that it is feasible to implement these approaches routinely in schools and that they will be at least as good as traditional teaching methods, in terms of students' academic achievement, while also enhancing our desired engineering habits of mind.

We are testing this hypothesis in a range of schools, primary and secondary, across the UK. At primary level, engineering-oriented problem-based learning is something that all children can engage with.

The main challenge is to give primary teachers the confidence to use unfamiliar

approaches to teaching and address potentially unfamiliar subject material. At secondary level, more sophisticated approaches may mean focusing on more restricted groups of students.

We have identified suitable resources and are working with a range of schools and teachers who are introducing new methods in action learning projects, tracking impact on attainment and the development of their students' thinking skills.

Where do we go next? Hopefully we will generate hard evidence that engineering subject-specific pedagogy has a beneficial impact on students' learning – that we really can inculcate engineering habits of mind.

Adopting our approach more widely would be challenging, but the proof of principle has been established. We have created a platform for transforming young people's exposure to engineering thinking – we now need policy-makers to be equally open to new ways of thinking.

Professor Bill Lucas (Bill.Lucas@winchester.ac.uk) is Director of the Centre for Real-World Learning and Professor of Learning at the University of Winchester. He led the team that produced the Royal Academy of Engineering report '[Thinking like an Engineer: Implications for the Education System](#)'.

To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the engineer, the glass is twice as big as it needs to be.

- Unknown





Four Things to Consider Before Dismissing That Suggestion or Idea

JACK DUNIGAN, COURTESY: QUALITY DIGEST

It didn't work then. Does that mean it won't work now?

If it didn't work then, will it work now? Elephant syndrome is what I call it, the tendency to never forget. But I'm not referring to a good memory; I'm talking about a faulty forgetter.

Like the elephant in the photo, we remain tied with string to obstacles we could readily overcome. That elephant was tied to an object when it was little but doesn't now understand what happened and what it could do to break out.

Consider this: You are the leader of a company on its way to fulfilling its purpose. One of your associates suggests an idea that



you've already tried. You've tried it before, and it didn't work. What would you do?

Most of us would reject it outright. We tend to have elephant syndrome. We remember

those things that stymied us before, those tactics that failed, those efforts that fell short. And there could be a good reason not to pursue them again.

On the other hand, it might be more effective to take another look at it.

Why?

1. Because that was then, and this is now.

The circumstances, components, and dynamics that stopped you back then might not exist anymore. When the economy crashed here in the United States in 2009, it was virtually impossible to get a business loan. Many business owners simply gave up trying. But that was then. The economy has changed, and lenders are loaning again. Just because it didn't work then doesn't mean one shouldn't try now when things are different. Like the elephant, you could be tied with string. What you remember as being insurmountable then is well within your power to do now.

2. It's impossible to steer a ship when it's not moving.

In organizations beset by inertia and stagnation, the principle effect you want is movement. You want people to think, to project, to create, to propose, to experiment,



to act. When the ship moves it can be steered.

Your role as a leader is not to stand at the helm looking splendid in your captain's uniform. No, your role is to guide and steer the ship. Everyone else gets to make it move. Let them do your job while you do yours.

3. Never stomp on someone's idea outright.

It may indeed be a bad idea, but don't take the mere suggestion of it personally. Those who work for you and with you can either be associates or lackeys. How you respond to their suggestions says a lot about what you think about them, about yourself, and about your authority. People who have an inflated opinion of themselves and their position tend to dismiss others. But remember what I've written earlier, that leaders' circle of concern

is greater than their circle of ability. They need, indeed you need, others to extend your reach, multiply your effectiveness, and divide your work.

4. If it's really an unworkable idea, the mere suggestion of it suggests a teachable moment.

So teach already. Define your objections, analyze and verify their validity, explain your reasons, invite participation and feedback in the discussion and—this is important here—come to the same conclusion together. There's more to getting things done than just doing things. You're also in the process of developing capable people as well.

There are, of course, some things that will never work. But you need to be fair about discerning what they are. There's more at stake here than just exercising your authority.

WANT TO OPEN STUDENTS' CHAPTER AT YOUR COLLEGE?

Object of opening a Students' Chapter

The Student Chapter shall be constituted for initiating and imbibing the feeling of belongingness into fraternity of engineering to which the students of engineering are destined. The Students Chapters may provide a learned workshop/clinic for the development of socio-techno intellectual qualities of the members as well as for encouraging their urge and surge for knowledge in a disciplined and guided system.

Minimum strength required to open a chapter

The minimum number of members in each of the Chapter shall be twenty. This strength of membership shall be obligatory for opening as also for continuing a Students Chapter.

Eligibility for membership

All engineering students studying in an engineering college or polytechnic are eligible for membership of the Chapter.



How the Chapter works?

Prospective Colleges/Polytechnics have to function under the overall guidance of a particular State/Local Centre of IEI whose address will be mailed to the Advisers of the Chapter with a copy to the Chairman of the designated Centre of IEI. The Centre will then be requested to extend all possible support to rope in more student members to IEI fold and enrich their knowledge and skills by organizing more technical discourses, such as, technical quiz, technical film show, industry visit, lecture, seminar, group discussion, display of technical information and model competition, etc.

Activities of a Students' Chapter

The activities of the Students Chapter shall be primarily technical and shall include:

Organising lectures by corporate members and others on the subject of engineering interest;

Organising paper meetings, discussions, seminars and technical filmshows on selected subjects;

Organising visits to engineering projects, construction sites, factories, workshops, laboratories etc;

Organising competitions on technical subjects including annual paper writing, model building and quiz competitions;

Promotion of social contacts among the students;

Any other activity conducive to the technical and intellectual advancement of the students.

How to open a Students' Chapter ?

An engineering College or a Polytechnic can make a written request to the Secretary & Director General, The Institution of Engineers (India) Head quarters at Kolkatta expressing a desire to open a Students' Chapter. Name of the branch/ branches of engineering shall have to be mentioned. On obtaining written permission from IEI, with specific code number, necessary form can be downloaded from www.ieindia.info.

Acknowledgement of the request shall be made by the Secretariat of IEI. A copy of the Rules for opening of a Chapter may be downloaded (www.ieindia.info) by the prospective Engineering College/Polytechnic Chapter with the following criteria to be made subsequently:

- Appointment of Branchwise Advisor by the Management of Engineering College
- Appointment of an Adviser by the Management of the Polytechnic
- Dissemination of details of fee structure (given below) for both engineering college/polytechnic students along with Headquarters' share of individual members
- Generation of a chapter code by IEI (for the purpose of all future communication) and inform the same to adviser of engineering college/polytechnic
- Access of Guidelines for conducting technical activities
- Membership form [for engineering college Students' Members (ECSC) and Polytechnic Students' Member (PSC)] (given below)



After receiving the **final request** from an Engineering College/a Polytechnic duly authenticated and approved by IEI, the Chapter may download the Membership Form for the purpose of enrolment of student members. The duly filled-in Application forms (either the ECSC or the PSC) the respective Advisor/s of the Engineering College/Polytechnic will then put the membership no. (in three places on the form itself) and then the bottom portion be de-linked from the original form. The bottom portion of the form has two parts – one for the purpose of retention by the Chapter (for official records) and the other part for the respective student member of the Chapter. The entire bunch of upper portion of all forms (duly filled-in) along with a complete list of student members of the Chapter (in the following format) are to be forwarded to the Secretariat for the purpose of record for future reference. The amount related to Headquarters' share shall be made by a demand draft to be drawn in favour of '**The Institution of Engineers (India)**', payable at **Kolkata**.

Serial Number	Name of the Student	Membership Number	Year of Enrolment/Renewal	Branch	HQ Share
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All communication related to Chapter can be made through e-mail (chapters@ieindia.org).

Fee Structure for members of Students' Chapter:

Fee Structure for Members of Engineering College Students' Chapter

One-time Membership Fee for Students of	Subscription, Rs.	Share of students' Chapter, Rs.	Share of HQs, Rs.
First Year	70+60+60+60=250	180	70
Second Year	70+60+60=190	130	60
Third Year	70+60=130	80	50
Fourth Year	70	40	30

Fee Structure for Members of Polytechnic Students' Chapter

One-time Membership Fee for Students of	Subscription, Rs.	Share of students' Chapter, Rs.	Share of HQs, Rs.
First Year	70+60+60=190	135	55
Second Year	70+60=130	85	45
Third Year	70	45	25

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