Issue No. 2017/03-04

IEI - TLC - NEWS

IN-HOUSE NEWS LETTER OF

THE INSTITUTION OF ENGINEERS (INDIA)

TIRUCHIRAPPALLI LOCAL CENTRE

www.ieitiruchi.org

CHAIRMAN: Er. R. SELVARAJ, FIE HON. SECRETARY: Er. S. LAKSHMANAN, MIE

CHAIRMAN SPEAKS.....

Dear Engineers,

Very happy to meet all of you through our IEI-TLC E Newsletter.

It is a great pleasure for me to appreciate that the editorial team of IEI-Tiruchirappalli Local Centre in bringing out the third issue by taking lot of initiatives

From April 2017, so far we have conducted & covered the following seven Engineering disciplines technical programmes. (I.e.)

Chemical Engineering, Computer Engineering, Electrical Engineering, Electronics & tele. comm. engg, Mechanical Engineering, Marine Engineering, Production Engineering and also about Goods & Services Act in General & Inter Disciplinary area. We are taking all out efforts to arrange lecture in other areas too. I request all the members to attend the forthcoming technical programs & get benefitted.

Our Centre has got approval from ELDB & IEI- HQ to conduct 33rd National convention of Electrical Engineers in the emerging topic "Hybrid AC/DC Power System for effective Utilization of Renewable Energy" from 24th & 25th Nov 2017 at NIT-T in association with BHEL-Tiruchirappalli & National Institute of Technology, Tiruchirappalli.

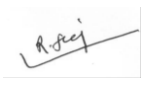
32nd INDIAN ENGINEERING CONGRESS is going to be conducted in DECEMBER. 2017 by our Tamil Nadu State Centre. We have to extend all our support for the same.

I request all our members to motivate new members to join our IEI to increase our strength.

We are requesting, Expediting & trying to motivate all the engineering colleges and polytechnics in our zone to establish student chapters

We solicit your support to make our local centre to be the best to disseminate the Engineering knowledge to this part of our country.

With Best Wishes.



(R. SELVARAJ)

SECRETARY DESK.....

Dear Readers,

Our momentum to create a skillful engineering society have to be made vibrant. Understanding of things in the emotional level will make the skill to develop faster. For which clarity in understanding things should be improved. To improve clarity, imagination while studying is important. While reading, give importance to each sentence. Give time to imagine. Only after getting clarity move to the next sentence. Prefer to study original author books. That will give good flow of language and improves imagination. One good thing in book reading is that we can get the view of renowned leaders by reading their writings. We can have our own speed of reading while reading books. But, while listening to audio and/or video this is not possible.

To develop skill on your own...

- Prefer reading original author books at your speed until understood.
- Practice the understood things on your own.
- Learn to forget unwanted things and keep your mind clear.

With Best Wishes.

With Warm Regards,

(S. Lakshmanan)

THE INSTITUTION OF ENGINEERS (INDIA)

TIRUCHIRAPPALLI LOCAL CENTRE

Cordially invites you on 5th June 2017

Faculty: Dr. G Swaminathan, NITT

CONTENTS

33rd National Convention of Electrical Engineers 2017

Tiruchirappalli Local Centre of The Institution of Engineers (India) is organizing the Thirty third National Convention of Electrical Engineers 2017 and National Seminar on "Hybrid AC/DC Power Systems for Effective Utilization of Renewable Energy" during 24-25 Nov. 2017 at Tiruchirappalli. As you are aware, National convention is a major event of IE (I) and is conducted once in a year, in a particular division of Engineering. More than three hundred practicing Engineers, Academicians, Consultants, Scientists, Industrialists, Students from all over the country are expected to participate in this seminar. Memorial lecture, State of the art lecture, Invited lectures, technical presentations, case studies etc. will be presented during this seminar by leading organizations/personalities. For additional details please see the brochure at www.ieitiruchi.org

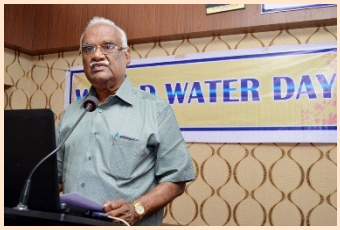
NEWS FROM HQ

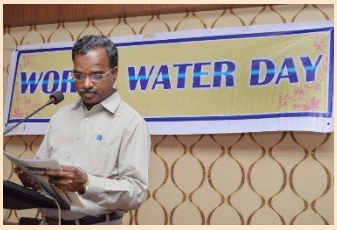
Revised membership tariff

	For FIE Membership Grade			Amount	
For Direct Enrolment (paying in single remittance)				6450	
For transfer (those who paid Composite Subscription in existing grade)		AMIE to FIE		3710	
		MIE to FIE		3610	
For transfer (those who paid Life Compounding Subscription in existing grade)		AMIE to FIE		4470	
		MIE to FIE		3870	
For transfer (those who are in the Annual Subscription Block)		AMIE/MIE to FIE		3080	
	Member of IEI - MIE				
				Amount	
For Direct Enrolment (paying in single remittance)				4100	
For transfer					
AMIE to MIE	For those who paid Composite Subscription in existing grade			1650	
	For those who paid Life Compounding Subscription in existing grade			2150	
	For transfer (those who are in the Annual Subscription Block)			1840	
	Associate Member of IEI - AMIE				
	Membership Grade			Amount	
For Direct Enrolment (paying in single remittance)				3500	
	Chartered Engineer Certificate				
	Membership Grade			Amount	
Fees for Chartered Engineer Certificate (after AMIE Membership)				7500	
	Student Membership of IEI - SMIE				
	Membership Grade			Amount	
SMIE				1500	

TIRUCHIRAPPALLI LOCAL CENTRE CELEBRATED

The Tiruchirappalli Local Centre celebrated the World Water Day 2017 at the premises of IEI, TLC on 21st March 2017. Dr R Ilangovan, ME, PhD., Former Chief Engineer, PWD Water Resources Department, Pollachi, Coimbatore, delivered the keynote address on the theme "Waste Water".





Er. R. Selvaraj, Chairman of the centre briefed the audience about this year's theme and read the message. Er. S. Samidas, past chairman welcomed the gathering and introduced the speaker to the gathering. Dr. Ilangovan made an interesting presentation on the theme and highlighted the ways and means to preserve water and the issues in waste water treatment. He stressed that a holistic approach is needed to check water pollution. The salient features of the talk are presented in the technical pages of the issue.

Er. R Selvaraj, Chairman of the centre presented a memento and Dr S T Ramesh, Committee member of the centre felicitated the speaker. Er. N Rajasekaran, committee member of the centre proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

RECENT Lectures

An Over View of Aircraft- Engine Operations

Division: ***Aerospace Engineering***

On 7th March 2017, Er. G. Arumugam, Assistant Engineer, BHEL, Tiruchy delivered a lecture on "An Over view of Aircraft- Engine Operations" at the institution premises. Er. S Lakshmanan, welcomed the gathering. Er. Raja presented a memento the speaker and Er. Murugadas proposed the vote of thanks. The lecture was well received by the participants.

Wireless Sensor Networks

Division: ***Computer Engineering***

Computer Society of India, Tiruchirappalli chapter joined hands with the local centre in organising the lecture programme on "Wireless Sensor Networks". Dr. K. Muthuramalingam, Asst. Professor, Dept. of Computer Science and Engineering, Bharathidasan University, Tiruchirappalli delivered the lecture on the theme on 14th March 2017 at the institute premises.

In his lecture he said, "A wireless sensor network is a collection of nodes organized into a cooperative network. This network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants, at different locations. They merge a broad range of information technology; hardware, software, networking and programming methodologies. The hardware components need to be programmed using software tools to work cooperatively toward accomplishing a user-defined task. In terms of software, the operating system for programming this particular sensor network is called TINYOS. TinyOS is an event-driven operating system designed for sensor network nodes that have very limited resources". Earlier, Er. D Senthil Kumar, Hon. Treasurer, CSI Tiruchirappalli chapter welcomed the gathering. Er. S Dharmalingam, Past Chairman of IEI TLC presented a memento to the

speaker. Mr. R Selvaraj offered his felicitations. Er G Arumugam, committee member proposed the vote of thanks. Mr. S Lakshmanan, Hon. Secretary conducted the proceedings.

Solid State Welding (Resistance Welding)

Division: Mechanical Engineering

On 28th March 2017, Er. V R Samuel, Dy. GM, BHEL delivered a lecture on Solid State Welding (Resistance Welding) at the institution premises. The programme was organised in association with IIW and IIIE. In his lecture, Mr. Samuel briefed about various types of solid stare welding processes and elaborately covered the resistance welding processes, the working principles, applications and effect of parameters on weld quality.

Earlier Er D Varatharajalu, Immediate Past Secretary, IEI TLC welcomed the gathering an introduced the speaker. Er. R. Selvaraj, Chairman presented a memento to the speaker. Er. S Dharmalingam, past president offered his felicitations. Er. S. Samidas, past chairman proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

Control of Induction Generators

Division: Electrical Engineering

The institute conducted a lecture programme on "Control of Induction Generators" on 4th April 2017. Dr. S. Senthil Kumar, Asst. Professor. Dept. of EEE, NIT, Tiruchy delivered the lecture at the institute premises. The programme was organised in association with IIW and IIIE. In his lecture he covered various methods of controlling the induction generators viz. Voltage frequency control, closed loop control, constant frequency and constant voltage controls, etc.

Earlier Er. S. Samidas, past chairman, welcomed the gathering. Er. R. Selvaraj, Chairman presented a memento to the speaker. Er. S Ramadas, former GM, BHEL offered his felicitations. Er. G Arumugam, committee member, proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

Goods and Services Tax

Division: General & Inter Disciplinary

Mr. T V Sundaram, Sr. Manager (ERP) enlightened the audience on the contemporary topic "Goods & Services Tax" on 11th April 2017 at the institute premises. The programme was organised in association with CSI, Tiruchy chapter. Following are few of the highlights of his lecture.

- GST – Good Service Tax Act passed in the Parliament in both the Houses and made.
- Effective from 01.07.2017.
- This is a major Tax Reform in this country ever since Independence.
- The idea behind introducing GST is to bring One Tax One Nation
- And Uniform Taxation throughout the country.
- GST will subsume all more Indirect Taxes and State Levies.
- There is a Paradigm shift from Origin Based Taxation to Destination Based Taxation

- Even though GST council proposed singe rate of Tax for all commodities, the present proposed rate structure is 0%, 5%, 12%, 18% & 28% thus one tax one nation purpose is defeated.
- However, the uniformity in rates among various states and taxable events, place supply makes the system more transparent.
- In order to bring GST in force, GSTN should be in place, which is the back bone for the entire tax administration and tax collection and tax distribution.
- The IT infrastructure and IT system has to be upgraded and seamless integration with GSTN has be to be established at Department level
- The Dealers have also to upgrade their IT system to make it compatible to GST.
- All the Dealers have to get new Registration under GST and align their business process to comply with GST.
- Key Challenges in Implementing GST are cut over issues, clear understanding of GST rules and provisions, place of supply and time of supply, taxable event, taxable services, abatements and Reverse charge rules.
- HSN Classification for goods and SAN (Service Account Number) for services is to be clarified for different kinds of commodities and host of services.
- As the definition of service is so wide unless specifically exempted by notifications, the umbrella of services in the service tax net will be huge.

Earlier Er. D. Senthil Kumar, Hon. Treasurer of CSI, welcomed the gathering and introduced the speaker. Dr. T A Daniel Sahayraj, Dy. Director of Boilers graced the occasion with his august presence and presented a memento to the speaker. Er. D Harsha, past chairman offered his felicitations. Er. S. Samidas, past chairman, proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

Advances in Gas Shielded Welding Processes

Division: ***Production Engineering***

The Indian Institute of Metals, The Indian Institute of Welding, The Indian Society for Non Destrucitve Testing and Indian Welding Society joined hands with the Institution of Engineers in organising the lecture programme on "Advances in Gas Shielded Welding Processes" by Mrs. A Santha Kumari, SDGM (WRI), BHEL, Tiruchy at the instituion building on 18th April 2017.

In her lecture she said, "The competitive scenario in the manufacturing sector demands for increased productivity, better quality with cycle time reduction. Many of these requirements are being addressed by the development of advanced variants on existing arc welding processes and several such have been developed in the recent times. These new variants are mostly developed in Gas shielded welding processes. Significantly the developments taken place in Gas

Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW) as these offer great potential for automation. Some of the advanced variants developed around the GTAW process include TIPTIG / TOPTIG, K-TIG, ATIG, Inter Pulse, Pulsed GTAW, Hot Wire GTAW etc. In GMAW process, there are developments like the Double Pulsed GMAW, Tandem GMAW, Deep penetration mode GMA welding and Waveform controlled short circuiting transfer GMA welding. The development of these advanced processes has been made possible by the advancements in electronics, computer technology and modern welding power source design. Most of the advanced arc welding processes are intended for use in mechanized welding mode employing robot or SPMs, as manual handling of these processes is difficult due to high amperages and welding speeds involved". She also highlighted the advances in Plasma Arc Welding process.

Earlier Er. N. Rajasekaran, National Council Member, IIW welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman presented a memento to the speaker. Er. S. Samidas, past chairman offered his felicitations. Er. N Parameswaran, Hon. Secretary, IIM, Tiruchy chapter, proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

Optimisation of Milling Parameters for Aluminium Silicon Carbide Composite

Division: production Engineering

Dr. M Ganesan, Asst. professor, Saranathan College of Engg. Delivered the lecture on, "Optimisation of Milling Parameters for Aluminium Silicon Carbide Composite" on 25th April 2017 at the institute. The programme was organised in association with IIE, Tiruchy chapter.

In his lecture Dr. Ganesan Said, "In this work, the optimization parameter of Aluminium Silicon Carbide Composite is to be investigated which finds its application in electrical and automobile industries. The basic milling parameters such as spindle speed, feed rate and depth of cut are selected and examined at three levels to study the effect of milling parameters on Surface Roughness, Material Removal Rate, Temperature and Machining Time. Temperature plays a vital role in milling operation and the temperature raised in milling operation affects the properties of the material, so control of temperature during the process is very essential. The aluminium based material is soft material and it having high metal removal rate. The objectives are to maximize the Material Removal Rate, to minimize the Surface Roughness, to minimize the Temperature and to minimize the Machining Time. There are experiments are to be conducted by the recommendation of Design of Experiments. Based on the experimental results, the empirical equations are to be formulated and it is optimized by using the Taguchi Approach and Grey Relational Analysis. The

outcome result of the optimization parameters is compared with empirical model and validated to predict the variations. Present work is focused on the optimization of milling parameters is found by using the design of experiments and optimum level of milling parameters is recommended for the future investigation".

Earlier Er. G Arumugam, past committee member welcomed the gathering and introduced the speaker. Er. S. Dharmalingam, past Chairman presented a memento to the speaker. Er. S. Samidas, Past Chairman offered his felicitations. Er. Selvarajan form OFT, proposed the vote of thanks.

New members

✓ The following members were enrolled / upgraded as Fellow of IE.

- Er. RAGURAMAN P
- Er. RATCHANNIYA SAMUEL V
- Prof. SELVAKUMAR S

✓ The following members were enrolled / upgraded as Member of IE.

- Er SRINIVASAN N
- Er BALACHANDAR P
- Er SANKARASUBRAMANIYAN V
- Er EDWIN K
- Dr (Ms) SARANYA R

✓ The following members were enrolled / upgraded as Associate Member of IE.

- Er PRIYADHARSINI R
- Er SAYA NANDINI DEVI M
- Er AARTHI R
- Er SUGANYA S
- Er ARAVIND RAM K R
- Er SANJEEVI R
- Er MATHUDEVAN V
- Er S RAJESWARI N

Electrical Engineering Division Board of IEI, in the recent meeting held at Aurangabad has approved the proposal OUR LOCAL CENTRE to host the 33rd National Convention of Electrical Engineers 2017. The Convention will be held in November 2017 at Tiruchirappalli. Additional details will be shared in the next Newsletter.

MAY 2017			
Date	**Division**	**Topic**	**Speaker**
02-05-2017	Mechanical Engineering	Optimization of Drilling parameters using Particle Swarm Optimization Technique	Dr N Baskar, Professor, Mechanical Engineering, Saranathan College of Engineering, Tiruchirappalli - 620012
09-05-2017	Electronics & Communication Engineering	Robotics - Future World	Er Joshua Arul Kumar, Associate Professor, MAM College of Engineering, Siruganur, Tiruchirappalli - 621105
16-05-2017	Electronics & Communication Engineering	World Telecommunication and Information Society Day (17-05-2017) - Theme: BIG DATA FOR BIG IMPACT	Dr Maluk Mohammed, Director & Correspondent, - MASTeR Group of Institutions, Siruganur, Tiruchirappalli – 621105
23-05-2017	Chemical Engineering	Energy Conservation Opportunities in Industries and Households	Dr N Stalin, Assistant Professor, Department of Petrochemical Technology, Anna University, Tiruchirappalli - 620024
30-05-2017	Marine Engineering	Fabrication Practices and Integrity Evaluation of Large Welded Ship Structures.	Dr Ravichandran G General Manager, Welding Research Institute, Bharat Heavy Electricals Limited, Tiruchirappalli - 620014
JUNE 2017			
Date	**Division**	**Topic**	**Speaker**
06-06-2017	Civil Engineering	World Environment Day (05-06-2017)	Dr G Swaminathan, Professor, Department of Civil Engineering, National Institute of Technology, Tiruchirappalli-620 015
13-06-2017	Computer Engineering	Automated Learning & Intelligence	Dr Raghunathan A, Additional General Manager, Human Resource Development Centre, Bharat Heavy Electricals Limited, Tiruchirappalli - 620014
20-06-2017	General & Inter-Disciplinary	Innovation by Instinct	Er M Jeyakumar, Wing Commander, Indian Air Force

27-06-2017	Textile Engineering	Comfort Properties of Textile Materials	Er G Suganth, Head of the Department, Department of Textile Technology, Pavendar Bhrathidasan College of Engineering and Technology, Mathur, Tiruchirappalli - 620024
JULY 2017			
Date	Division	Topic	Speaker
04-07-2017	General & Inter-Disciplinary	Problems in Kidneys & its remedies	Dr Rajesh, MS, MCh,FICS (Urology)
11-07-2017		Lecture with CSI	
18-07-2017	General & Inter-Disciplinary	An Insight on Project Management	Er Mohamed Imran A H, Manager, Business Development, Synergy School of Business Skills, TABS Complex, Cantonment, Tiruchy - 620 001
25-07-2017		Introduction to CALPHAD	Dr. K. Santhy, Lecturer, Dept. Materials Science Engg., CARE College, Tiruchirappalli

For Details Please see Engagement Column of Leading Newspapers of Tiruchirappalli

33rd National Convention of Electrical Engineers 2017

Tiruchirappalli Local Centre of The Institution of Engineers (India) is organizing the Thirty third National Convention of Electrical Engineers 2017 and National Seminar on "Hybrid AC/DC Power Systems for Effective Utilization of Renewable Energy" during 24-25 Nov. 2017 at Tiruchirappalli. As you are aware, National convention is a major event of IE (I) and is conducted once in a year, in a particular division of Engineering. More than three hundred practicing Engineers, Academicians, Consultants, Scientists, Industrialists, Students from all over the country are expected to participate in this seminar. Memorial lecture, State of the art lecture, Invited lectures, technical presentations, case studies etc. will be presented during this seminar by leading organizations/personalities. For additional details please see the brochure at www.ieitiruchi.org

Salient Points from the Theme Talk on WORLD WATER DAY

TECHNICAL PAGES

World Water Day is held annually on 22 March as a means of focusing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources.

An international day to celebrate freshwater was recommended at the 1992 United Nations Conference on Environment and Development (UNCED). The United Nations General Assembly responded by designating 22 March 1993 as the first World Water Day.

Each year, World Water Day highlights a specific aspect of freshwater. In 2017, the theme is "Wastewater."

INTRODUCTION

World Water Day, on 22nd March every year, is about taking action on water issues. In 2017, the theme is wastewater and the campaign, 'Why waste water?', is about reducing and reusing wastewater.

Sustainable Development Goal (SDG) target 6.3 requires us by 2030 to "improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally."

Progress towards target 6.3 will also help achieve the SDGs on health and well-being (SDG 3), safe water and sanitation (SDG 6), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), life below water (SDG 14), and life on land (SDG 15), among others.

TOP LINE MESSAGES

- **Globally, over 80% of the wastewater generated by society flows back into the ecosystem without being treated or reused.**
- **1.8 billion people use a source of drinking water contaminated with faeces, putting them at risk of contracting cholera, dysentery, typhoid and polio. Unsafe water, poor sanitation and hygiene cause around 842,000 deaths each year.**
- **663 million people still lack improved drinking water sources.**
- **By 2050, close to 70% of the world's population will live in cities, compared to 50% today. Currently, most cities in developing countries do not have adequate infrastructure and resources to address wastewater management in an efficient and sustainable way.**
- **The opportunities from exploiting wastewater as a resource are enormous. Safely managed wastewater is an affordable and sustainable source of water, energy, nutrients and other recoverable materials.**

- The costs of wastewater management are greatly outweighed by the benefits to human health, economic development and environmental sustainability – providing new business opportunities and creating more 'green' jobs.

WASTEWATER AND THE WATER CYCLE

Water has to be carefully managed during every part of the water cycle: from fresh water abstraction, pre-treatment, distribution, use, collection and post-treatment, to the use of treated wastewater and its ultimate return to the environment, ready to be abstracted to start the cycle again.

Due to population growth, accelerated urbanisation and economic development, the quantity of wastewater generated and its overall pollution load are increasing globally. However, wastewater management is being seriously neglected, and wastewater is grossly undervalued as a potentially affordable and sustainable source of water, energy, nutrients and other recoverable materials. It therefore needs to be seen as a resource, rather than a burden to be disposed of.

There are many treatment processes and operational systems that will allow us to use wastewater to meet the growing water demand in growing cities, support sustainable agriculture, and enhance energy production and industrial development.

WASTEWATER AND CITIES

By 2030, global demand for water is expected to grow by 50%. Most of this demand will be in cities and will require new approaches to wastewater collection and management. Indeed, reused wastewater may help address other challenges including food production and industrial development.

Mainly in low-income areas of cities and towns within developing countries, a large proportion of wastewater is discharged directly into the closest surface water drain or informal drainage channel, sometime without or with very little treatment. In addition to household effluent and human waste, urban-based hospitals and industries such as small-scale mining and motor garages, often dump highly toxic chemicals and medical waste into the wastewater system. Even in cities where wastewater is collected and treated, the efficiency of treatment may vary according to the system used. Traditional wastewater treatment plants may not remove certain pollutants, such as endocrine disruptors, which can negatively affect people and the ecosystem.

Examples:

- Dual distribution systems delivering reclaimed water. Since 1977 in St Petersburg, Florida, USA, a parallel network of pipes, separate from potable water mains, has served a mix of residential properties, and commercial and industrial parks, enabling them to use recycled water for irrigation, laundry, vehicle and building washing, and ornamental water features.
- Biologically purifying wastewater before discharging. The effluent volume from Schiphol Airport, Am-sterdam, is comparable to that of a small city with a population of 45,000. About half of the wastewater originates from passengers and businesses at the airport, 25% is discharged by aircraft and catering, and the remaining volume is produced by other aviation-related businesses. The on-site wastewater treatment plant biologically purifies water to a quality fit for discharge into local waterways.

WASTEWATER AND INDUSTRY

Societal and environmental pressures over recent years have led to a growing movement for industry to reduce its wastewater and to treat it before discharge. Wastewater is now seen as a potential resource and its use, or recycling after suitable treatment, can provide economic and financial benefits.

Wastewater can be used within the business itself or between several businesses through 'industrial symbiosis'. Industrial water consumption is responsible for 22% of global water use (UN-Water, 2012). In 2009 in Europe and North America, water consumption by industries was 50% as compared to 4-12% in developing countries (WWAP, 2009). It is expected that in rapidly industrialising countries, this proportion could increase by a factor of five in the next 10-20 years. Therefore, there is a strong incentive to use wastewater in-house and locally, based on cost savings alone.

Businesses can directly use some wastewater, providing it is fit for purpose. For instance, using process water for cooling or heating, or rainwater from roof collection or concrete aprons for toilet flushing, irrigation or vehicle washing.

Examples:

- An industrial ecosystem. In Kalundborg, Denmark, the by-products of one enterprise are used as a resource by other enterprises, in a closed cycle. The Asnæs Power Station receives 700,000 m^3 of cooling water from Statoil each year, which it treats and then uses as boiler feed water. It also uses about 200,000 m^3 of Statoil's treated wastewater for cleaning each year. The savings to local water resources are considerable: nearly 3,000,000 m^3 of groundwater and 1,000,000 m^3 of surface water per year.
- Reclaiming water from mining. The Witbank coalfields are located around Emalahleni, a small city in South Africa dealing with worsening water scarcity. The Anglo American mining company built a water treatment plant that uses desalination technology to convert water from the mine into drinking water, and treat industrial water so it can be safely released into the environment. As an added benefit, in the treatment process, gypsum is separated from the water and used as a construction material. The plant provides a safe and secure water source to the city, meeting 12% of Emalahleni's daily water needs.

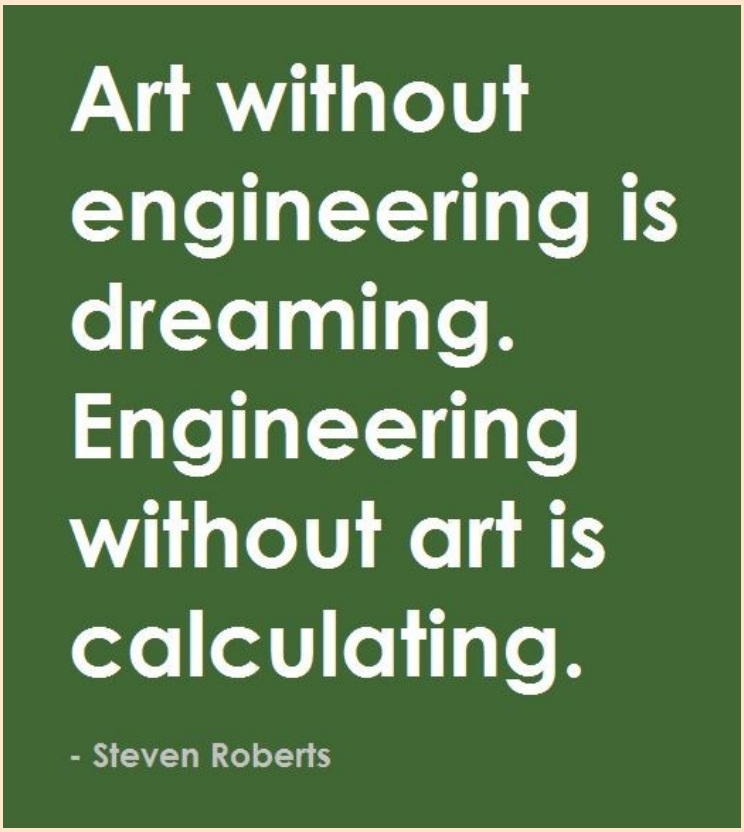
WASTEWATER IN AGRICULTURE

- Partly to help maximise yields to meet demand, usage of chemical fertilizers and pesticides has increased in recent years, both in industrial and small farming, making agriculture a potential source of environmental pollution.
- Pollution of groundwater and surface water by agricultural use of untreated or inadequately treated wastewater is a major issue in many developing countries where such irrigation is practised.
- Farmers are increasingly looking into non-conventional water resources, mainly wastewater, whether due to its high nutrient content or lack of conventional water resources. If applied safely, wastewater is a valuable source of both water and nutrients, contributing to water and food security and livelihood improvements.

- **Improved wastewater management can improve the health of workers, especially in agriculture, by reducing the risk of pathogen exposure. It can also create direct and indirect jobs in water-dependent sectors and beyond.**

Example:

Use of wastewater in farming. It is estimated that more than 40,000-60,000 km^2 of land is irrigated with wastewater or polluted water (Jimenez and Asano, 2008), posing health risks to farmers and to eventual consumers of the agricultural products. Available technologies allow removal of almost all contaminants from wastewater, making them suitable for every use. The WHO Guidelines on Safe Use of Wastewater in Agriculture and Aquaculture and the Sanitation Safety Planning (SSP) approach provides a comprehensive framework to ensure that health risks are managed to protect public health. Israel paves the way, where treated wastewater accounts for 50% of irrigation water (OECD, 2011).



IEI – TLC – NEWS solicits technical articles from members on various topics for publication.

On behalf of the Institution of Engineers (India), Tiruchirappalli Local Centre, published by Er. S. Lakshmanan, Hon. Secretary, IEI, TLC

Edited by: Er. S. Dharmalingam FIE, Er. N Rajasekaran FIE & Er. A. Anand MIE. Feedback & Suggestions are welcome through E mail to: ieitlc1973@gmail.com