Issue No. 2017/09-10

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

IEI – TLC – NEWS

Congratulates

Er. R RAJA MANOHAR

Executive Director, BHEL

RECIPIENT OF

Best Engineer Award 2017

CHAIRMAN SPEAKS.....

Dear Engineers,

Warm & Best Greetings to all.

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 eighth issue by taking lot of initiatives

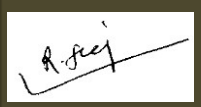
From April 2017 upto Nov 2017, so far we have conducted & covered the following 14 engineering disciplines technical programmes. (I.e.) Chemical Engineering, Computer Engineering, Electrical Engineering, Electronics & tele. comm. engg, Mechanical Engineering, Marine Engineering, Production Engineering and also about Goods & Services Act in General & Inter Disciplinary area. Architectural Engineering, Aerospace Engineering, Environmental Engineering, Metallurgical & Materials Engg, Textile Engineering. So far we have covered about 36 Technical programs from April 2017. We are yet to cover the Mining Engineering, which we are planning in December. I request all the members to attend the forth coming technical programs & get benefitted.

33rd National convention of Electrical Engineers in the emerging topic “" Hybrid AC/DC Power System for effective Utilization of Renewable Energy" from 24 & 25th Nov 2017 at NIT-T in association with BHEL-Tiruchirappalli & National Institute of Technology, Tiruchirappalli was conducted in a grand manner. We have received appreciations from ELDB members, Director - Technical-IEI-HQ & his team, all delegates. It was a great success in the annals of IEI-TLC.

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

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'S DESK……

Dear Member,

Warmest Greetings to you and your family.

This is the most important part of Social Interactions and this leads to respecting the Nature also in advanced state. One individual respects another individual based on his own internal representation of the second individual and this internal representation changes over time and get advanced as the advancement of learning, experience and conceptualization by the individual. For better understanding of this article please refer the article published in the previous Newsletter.

1. **Materialistic**: Respecting an Individual based on his materialistic holding leads to giving more respect to those who are having more wealth. If the wealth is obtained through inheritance, then the concept of value of the individual gets diluted because the individual would not have the quality of possessing or sharing the resources. This is materialistic respect.

2. **Position:** Respecting the same individual based on his position in the society or in an organization is more meaningful in the context of getting higher position in the Society and this leads to personal excellence. This is intellectual respect. In monarchy this concept is completely not there and the position in the society is inherited from their ancestors. This was the case in ancient days.

3. **Emotional**: Respecting the same individual based on his feelings leads to close interaction with the individual. Mutual trust and comfortable feelings are enhanced. This interaction leads to better living state compared to above materialistic and position based respect. Understanding others feelings better leads to be a better leader. As the feelings and emotions are there for living beings the suffering of one individual also makes another to suffer leads to have link only with fewer individuals as one cannot suffer for sufferings of many individuals in a larger society. This is emotional respect. This is evident between people brought-up in similar environments.

4. **Elevated Emotional:** Respecting an individual based on his feelings and also with intellect leads to better emotional relations. This leads to stronger bonding at the same time avoids spread of sufferings. In the emotional state intellectual will not work and hence this relationship is to be practiced to get advancement.

5. **Spiritual:** As the level of Emotional understanding improves hand-in-hand with intellectual understanding leads to Spiritual understanding. In this, every member of a society is respected and importance given to their feelings also. This understanding leads to know the reason for the sufferings of others, finding ways and teaching them to come out of their sufferings. This leads to development of Spiritual gurus. For better understanding, internally represent every individual as a part of nature who also having feelings and emotions. Spiritually there is no difference between self and others and a guru guides others to follow his own path. Like this there are several gurus each telling their way is the best not because of their self-interest but for the social wellbeing. If this is viewed from the materialistic state or from the intellectual state that leads to the problems of the present society over spirituality.

All these things are development of internal representation of other individual/society as a whole over time and experiences in life and finding the reason for their sufferings and changing themselves to have better experience and to have common platform to cover all living being without distress and to avoid over consumption of natural resources.

With Warm Regards

(S. Lakshmanan)

CONTENTS

"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

BEST ENGINEER AWARD 2017 TO THE EXECUTIVE DIRECTOR OF BHEL

As part of Engineer's day celebrations, The Institution of Engineers, Tiruchirappalli Local Centre honours the Best Engineer in this part of country every year. For the year 2017, Er. R. Rajamanohar Executive Director, BHEL, Tiruchy complex has been chosen and conferred with the coveted award in a colourful function on 23rd Oct. 17.

In his presidential address, Er. N. Gopalaswamy, Director, Dalmia Cements (Bharat) Ltd and the past chairman of The Institution of Engineers, Tiruchirappalli Local Centre complimented the recipient of the award and highlighted on the parallels between him and Er. R. Rajamanohar. He nicely narrated the interactions between BHEL, Tiruchy and Dalmia Cements (Bharat) Ltd for more than four decades.

Dr. S Dharmalingam, past chairman of The Institution of Engineers, Tiruchirappalli Local Centre read out the scroll of honour and citation and presented the same to Er. R. Rajamanohar. Then Er. R. Selvarai, Chairman presented the Best Engineer Award 2017 to Er. R. Rajamanohar in the presence of senior officials of BHEL and members of IEI.

Addressing the gathering, Er Rajamanohar said, “I owe a lot to my parents, RSK School and BHEL for making me eligible to get this coveted award. The great teachers of then REC made my life meaningful. The knowledge imparted by the selfless teachers made me to reach the heights in my life”. He further said, “People matters for every individual to achieve success. The Secret of Success is nothing but the desire to question. Questions like why? How? When? Where? What? Will bring right answers to the issues to take right decisions”.

Er. Samidas, Er. P. Nagamanickam, Er. K Ramadas and Dr. Anantharaman offered their felicitations. Earlier Er. R Selvaraj, Chairman welcomed the gathering. Er. Lakshmanan, Honorary Secretary proposed the vote of thanks. Er. N Rajasekaran committee member conducted the proceedings.

WORLD HABITAT DAY

World Habitat Day was celebrated with great vigour at the centre on 03rd October 2017 on the theme "Housing Policies: Affordable Homes". Dr. K Baskar, Associate Professor, Department of Civil Engineering, National Institute of Technology, Tiruchirappalli delivered the theme talk. The following are the excerpts of his talk.

"More than 30 years ago, the United Nations General Assembly took an important step in promoting the idea that everyone deserves a decent place to live by declaring that the first Monday in October would be World Habitat Day. The first Monday of October throughout the world. It was officially designated by the United Nations and first celebrated in 1986. The purpose of the day is to reflect on the state of our cities and towns and the basic human right to remind the world of its collective responsibility for the habitat of future generations.

Affordable home refers to housing units that are affordable by that section of society whose income is below the media different definitions for affordable housing, but it is largely the same, i.e. affordable housing should address the housing needs of the lower or middle income households. Affordable housing becomes a key factor and majority of the population can't afford. Disposable income of the people remains the primary factor in determining the affordability. As a result, it becomes the increased responsibility of the government to cater to the rising demand for affordable housing.

Affordable housing is gaining its pickup of developing countries. With housing level are discussing ways and means to provide citizen.

To form a housing policy for affordable homes this problem by defining the term "affordable housing". Defining also important to create targeted providing interest rate subsidies, etc."

Earlier, Er. K. Ramadas, Sr. member welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman presented the memento to the speaker. Er. N Rajasekaran, Committee member proposed the vote of thanks.

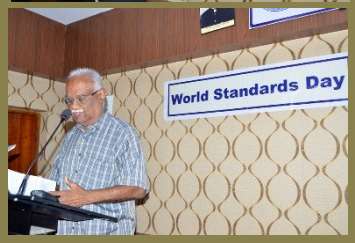
The Institution of Engineers (India)

World Standards Day

Each year on 14 Oct. the members of the IEC, ISO and ITU celebrate World Standards Day - a means of paying tribute to the collaborative efforts of the thousands of experts worldwide who develop the voluntary technical agreements that are published as international standards.

The aim of World Standards Day is to raise awareness among regulators, industry and consumers as to the importance of standardization to the global economy. 14 Oct. was specifically chosen to mark the date, in 1946, when delegates from 25 countries first gathered in London and decided to create an international organization focused on facilitating standardization. Even though ISO was formed one year later, it wasn't until 1970 that the first World Standards Day was celebrated.

Dr. Dharmalingam, past chairman of The Institution of Engineers, Tiruchirappalli Local Centre delivered a talk on the Theme for this year: Standards make cities smarter at the institute building on 16th October 2017. Initially, he traced the history of International Standards Organization. In his lecture he said, "Some of the benefits to the Society from Standards are:



For customers

- worldwide compatibility of technology
- wide choice of offers & competitive prices

For governments

- health, safety and environmental legislation

For trade officials

- level playing field for all competitors
- technical barriers to trade

For consumers

- provides assurance about their quality, safety and reliability

For everyone

- quality of life in general

For the planet

- International Standards on air, water and soil quality, and on emissions of gases and radiation

People in cities expect at least the following: Sufficient fresh water; universal access to cleaner energy; the ability to travel efficiently from one point to another; a sense of safety and security.

Though different agencies provide different definitions, ISO provides the following definition for a Smart City:

"Smart City" should be described as a city that dramatically increases the pace at which it improves its sustainability and resilience, by fundamentally improving how it engages society, how it applies collaborative leadership methods, how it works across disciplines and city systems, and how it uses data and integrated technologies in order to transform services and quality of life to those in and involved with the city (residents, businesses, visitors).

How Standards make city smarter

Building a Smart City is highly complex. Every city faces its own challenges and requires its own mix of solutions. However, there is one common denominator that greatly simplifies this task.

International Standards support the development of tailor-made solutions that can be adapted to the particular circumstances of a given city. Standards contain expert knowledge and best practices, and are essential enablers in ensuring quality and performance of products and services. In addition, they drive compatibility between technologies and help users to compare and choose the best solution available.

Standards also open the door to a larger choice of products and services. They help increase competition and foster innovation. In a systems approach, standards enable the integration of structures or solutions from different suppliers."

Earlier Dr. S. Kumaresan, welcomed the gathering. Er. S. Lakshmanan, Honorary Secretary conducted the proceedings. Er. R. Selvarai, Chairman read out the details of the theme. Er. E. S. Salai Kuberan proposed the vote of thanks. Er. S. Samidas read out the message on smart cities. Er. K. Ramadas, presented the memento to the speaker.

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The Institution of Engineers (India)

45TH AGM

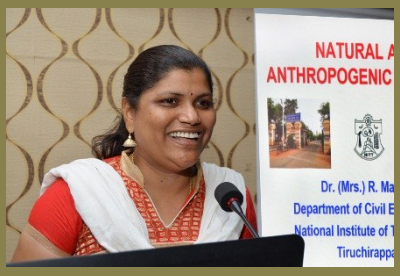
ANNUAL GENERAL MEETING

30-10-2017

RECENT LECTURES

Natural & Anthropogenic disasters

Division: Civil Engineering



Dr. R Manjula, Assistant Professor of NIT, Tiruchy delivered a lecture on "Natural and Anthropogenic disasters at the Institute Premises on 5th September 2017. In her lecture, she said, "The major challenges of the 21st century faced by human beings are how to achieve water security, food security, energy security and environmental security. Owing to enhanced natural/anthropogenic disasters worldwide, these challenges become much more complicated and daunting especially for developing countries. Therefore, it is important to highlight the risk of different disasters as well as the modern tools and techniques for minimizing disaster incidence and losses."

Er. S Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings. Er. C Sivan, FIE introduced the speaker. Er. S Ramadas, Former General Manager, BHEL & Sr. Member of IEI offered his felicitations. Er R Selvaraj, Chairman IEI TLC presented a memento. Er S Samidas, Past Chairman, IEI TLC proposed the vote of thanks.

DIGITAL SIGNATURE

Division: Computer Engineering

In the lecture programme organised on 12th September 2017 along with the Computer Society of India, Tiruchirappalli chapter, Er. D. Senthil Kumar, Sr. Manager, ITS & S, BHEL delivered the lecture on Digital Signature. In his lecture, delivered at the premises of the local centre, the speaker briefed about digital signature and its aspects in a lucid manner. The brief write up about the lecture is presented under Technical Pages.

Earlier, Er. M Chockalingam, Retired Chief Engineer (TNEB) welcomed the gathering. Er. R Selvaraj, chairman of the centre presented a memento the speaker. Er. M S Ramesh, AGM (ITS & S), BHEL offered his felicitations. Er. S Samidas, Past Chairman, IEI TLC proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

CONVERTING AGRICULTURAL WASTES INTO USEFUL PRODUCTS

Division: Agricultural Engineering

"Converting agricultural wastes into useful products" was the theme of the lecture delivered by Er. H. Mohit from NIT, Tiruchy on 19th September 2017.

In his lecture he said, "The reuse and recovery of secondary or tertiary fiber resources will proves that there is a good supply of raw materials, promotes the development of products and also improves the efficiency of logistics. These types of wastes are managed into biomass feedstock, landfilling, aerobic or anaerobic digestion, etc. which creates damage to environment by means of soil degradation, communicable diseases like dengue, malaria etc. to living beings and air pollution (due to burning). The plant waste fiber based polymer composites occurs consequential advantages over the traditional materials like metals or non-metals. Furthermore, the utilization of recycled raw materials mainly plastics are challenging tasks which consists of many grades, contaminants, colors and different performances. The plant fibers are obtained directly from agricultural wastes or production residues during the processing of crops for their primary uses. These type of plant based fibers are extensively available and shows that it can be used as a reinforcement material to polymer matrices. However, plant fibers has lower density, inexpensive and biodegradable in nature. There are various plant fibers incorporated in polymer matrix composites are jute, wood, sisal, coir, kenaf, bamboo, fruit, flax, silk fibers etc. The polymer materials of composites can be used in pipe fittings for various operations like fire-fighting, transportation of water, irrigation and disposal of chemical and industrial wastes.

Earlier Er G Arumugam welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman presented a memento to the speaker. Er. K Ramadas, Sr. Member offered his felicitations. Er. S. Samidas, past chairman proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

GREEN BUILDING ARCHITECTURE

Division: Architectural Engineering

On 26th Sep 2017, the centre has organised a lecture programme on "Green Building Architecture" in association with the Institution of Industrial Engineers at the institute premises. Ar. S Senthil Kumar, from Square Grid, Tiruchirappalli, delivered the talk on the theme in the well-attended programme.

Earlier Er G Arumugam welcomed the gathering and introduced the speaker. Er. K Ramadas, Sr. Member presented a memento to the speaker. Er. C Sivan, offered his felicitations. Er. G. Balakrishnan, Committee member proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

NETWORK ADDRESS TRANSLATION

Division: ***Computer Engineering***

IEI, TLC has joined hands with the Computer Society of India, Tiruchirappalli chapter to organise a lecture on "Network Address Translation" on 10th October 2017. Dr. M. J. Jeyasheela Rakkini from SASTRA University delivered the lecture at the institute premises. In her lecture she said, "Network address translation (NAT) is a method of remapping one IP address space into another by modifying network address information in IP header of packets while they are in transit across a traffic routing device. [1] The technique was originally used as a shortcut to avoid the need to readdress every host when a network was moved. It has become a popular and essential tool in conserving global address space in the face of IPv4 address exhaustion. One Internet-routable IP address of a NAT gateway can be used for an entire private network."

Earlier Er. N Rajasekaran, Hon. Secretary of CSI, Tiruchy chapter welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman of IEI, TLC presented a memento to the speaker. Er. K. Ramadas, offered his felicitations. Er. D Senthil kumar, Former Treasurer of CSI Tiruchy chapter proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

TERMITE CONTROL AND OTHER GENERAL PEST MANAGEMENT

Division: ***Chemical Engineering***

Mr. A. Anandha baskaran, Branch Manager, PEST Control (India) Limited, Tiruchy dleivered the lectrue on BHEL delivered a lectrue on "Termite Control and Other General Pest Management " at our premsies on 24th October 2017.

Earlier Er D Senthil Kumar, welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman presented a memento to the speaker. Er. Venkateshvaralu, AGM, Dalmia Cements offered his felicitations. Er R Sivaramakrishnan, Committee member proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

HIGH FREQUENCY GAS TUNGSTEN ARC WELDING PROCESSES

Division: ***Production Engineering***

High Frequency GTAW process was deliberated in the lecture programme conducted on 31st November 2017, by Dr. K Devakumaran, Dy. Manager (WRI), BHEL. In the lecture programme, organised in association with IWS, IIIE, IIW, ISNT and IIM, he said, "High frequency gas tungsten arc welding (HF-GTAW) process is an advanced modification of conventional gas tungsten arc welding (GTAW) process [1, 2]. Super imposition of high frequency current of the order of 20,000Hz on the arc gives a constricted arc which, greatly reduces the overall heat input of the process during welding".

Talking about the application of the process he further added, "The use of this technique allows thin sheet (up to the level of 0.3 mm) welding application and titanium and its alloys to be successfully welded outside of a vacuum chamber, without a trailing gas shield, and thus with far greater versatility and precision than conventional processes".

Earlier Er G Balakrishnan, Committee Member, welcomed the gathering and introduced the speaker. Er. R Selvaraj, Chairman presented a memento to the speaker. Er. S Samidas past chairman of the centre offered his felicitations. Er. M L Mohammed Ismail, past Committee member, IEI TLC proposed the vote of thanks. Er. S Lakshmanan conducted the proceedings.

Readers are requested to note that UPCOMING EVENTS is not included in this issue. The inconvenience caused is very much regretted.

The Institution of Engineers (India)

TECHNICAL PAGES

DIGITAL SIGNATURES

Er. D Senthilkuamr, BHEL

Digital Signature is an electronic signature

- Duly issued by listed 3rd Parties (CA-Certification Authority)
- Establishes Your Online Identity - doing business or Other transactions –Web

Purpose: To use Internet as safe and secure medium for e-Governance and e-Commerce Applications

- e-Filing of Income Tax Returns
- e-Tendering in India on Government Websites (such as Indian Railway Catering and Tourism Corporation)
- In BHEL, used - e-Procurement and Online IBR Doc. Approval

What is Digital Signature?

- Asymmetric cryptography used to simulate the security of a signature in digital, rather than written, form.
- Digital signature schemes give two algorithms which one which involves the user's private key for signing and user's public key for verifying signatures.
- Output of the signature process is called the "digital signature."
- Digital Signatures are computer generated codes
- Signature is not only tied to signer but also to the message that is being signed (i.e. They are document content dependent)

What is a Digital Signature Certificates (DSC)?

It is the electronic format of physical or paper certificate like a driving License, passport etc. Certificates serve as proof of identity of an individual for a certain purpose; for example, a Passport identifies someone as a citizen of that country; who can legally travel to any country. Likewise, a Digital Signature Certificate can be presented electronically to prove your identity, to access information or services on the Internet or to sign certain documents digitally.

Why do I need a Digital Signature Certificate (DSC)?

It authenticates your identity electronically. DSC also provides you with a high level of security for your online transactions by ensuring absolute privacy of the information exchanged using a Digital Signature Certificate (DSC). You can use certificates to sign / encrypt information such that only the intended recipient can read it. You can digitally sign information to assure the recipient that it has not been changed in transit, and also verify your identity as the sender of the message.

How does a Digital Signature Certificate work?

A Digital Signature Certificate explicitly associates the identity of an individual/device with a pair of electronic keys - public and private keys - and this association is endorsed by the CA. The certificate contains information about a user's identity (for example, their name, pin code, country, email address, the date the

certificate was issued and the name of the Certifying Authority that issued it).These keys complement each other in that one does not function in the absence of the other. They are used by browsers and servers to encrypt and decrypt information regarding the identity of the certificate user during information exchange processes. The private key is stored on the user's computer hard disk or on an external device such as a token. The user retains control of the private key; it can only be used with the issued password. The public key is disseminated with the encrypted information. The authentication process fails if either one of these keys in not available or do not match. This means that the encrypted data cannot be decrypted and therefore, is inaccessible to unauthorized parties.

CAs: Controlling Authority

- They are licensed to issue Digital Signature Certificates (DSC)
- Listing of certain CAs (Safescrypt, National Informatics Center [NIC], TCS, eMudhra etc.)

CCAs (Controller of Certifying Authorities) is the "Root" Authority who certifies the Technologies, Infrastructure and practices of all CAs

Private Key Protection

- The Private key generated is to be protected and kept secret. The responsibility of the secrecy of the key lies with the owner.
- The key is secured using
    - PIN Protected soft token
    - Crypto -Smart Cards
    - Hardware Tokens

General Features

- Key is generated inside the token.
- Key is highly secured as it doesn't leave the token.
- Highly portable.
- Machine Independent

Various Classes of Digital Certificates: [Generally Validity – 1 to 2 yrs]

- Class 0: Demo/Test purpose
- Class 1: Digital Signing of e-Mails
- Class 2: Income Tax e Filing, EPFO, Registration for New Telephone, etc.
- Class 3: e-Procurement, e-Tendering, Patent Filing etc.
- Class 3: DGFT - Export / Import purpose

Summary - Digital Signature

- It is an electronic signature
- Issued by listed 3rd parties called CA.
- Authenticates - Identity of the Message Sender
- Ensures - Original content of the message or Doc. sent is NOT Altered.
- DS - Cannot be imitated by someone else.
- Can be automatically time-stamped.
- The sender too cannot deny sending the message
- Digital Signature Certificates are legally valid in India.
- Commonly used for Business Applications, Banking transactions & Online Approvals, etc.

HIGH FREQUENCY GAS TUNGSTEN ARC WELDING PROCESSES

Dr. K. Devakumaran, Dy. Manager, WRI

High frequency gas tungsten arc welding (HF-GTAW) process is an advanced modification of conventional gas tungsten arc welding (GTAW) process [1, 2]. Super imposition of high frequency current of the order of 20,000Hz on the arc gives a constricted arc which, greatly reduces the overall heat input of the process during welding [1, 3]. The basic operating principle of arc constriction mechanism in the HF-GTAW process is shown schematically in Fig. 1(a-c). Fig. 1(a) shows the constriction of the arc in conventional GTAW process due to the magnetic field around the arc [2, 3]. In case of HF-GTAW process, in addition to above, super imposition of frequency modulation/pulses and its current referred as high frequency (F) and high frequency current (I_F) respectively also introduced on the main welding current (I) (Fig. 1(b)), which, results in further constriction of arc (Fig. 1(c)) [3, 4]. Due to arc constriction, the energy is localized or concentrated and accordingly reduces the overall heat input of the process. Photograph of conventional and high frequency GTAW arcs have been shown in Fig. 2 (a) and (b) respectively. This technology commercially branded as InterPulse™ GTAW process [4]. The various forms of high frequency pulses are possible for superimposition in HF-GTAW process is shown schematically in Figs. 3 (a) and (b) [3, 4]. The Fig. 3(a) is continuous and Fig. 3(b) is pulsed forms. Both the forms were used for superimposition of high frequency current on the welding current in HF-GTAW process and accordingly the arc gets constricted. Depending on the applications, the superimposition of high frequency current can be also introduced either above or below the current in the main welding circuit as shown schematically in Fig. 4. This means that, the welding current can be altered during welding due to superimposition of high frequency current. Each modes of operations in HF-GTAW process have unique weld deposit characteristics in reference to the appearance, geometry and microstructure. This is primarily happened because, it has the ability to combine a comparatively low work-piece heating along with high arc stiffness. In general, current decreases during welding, when the high frequency current is super imposed below the main current (Fig. 4). Thus, the arc constriction and reduction of heat input are primarily depends on the magnitude of high frequency parameters 'I_F' and 'F'. Due to the superimposition of 'I_F' and 'F' in HF-GTAW, it may give superior weld joint characteristics in comparison to that of the conventional GTAW technique. The use of this techniques allows thin sheet (up to the level of 0.3mm) welding application and titanium and its alloys to be successfully welded outside of a vacuum chamber, without a trailing gas shield, and thus with far greater versatility and precision than conventional processes [2, 3].

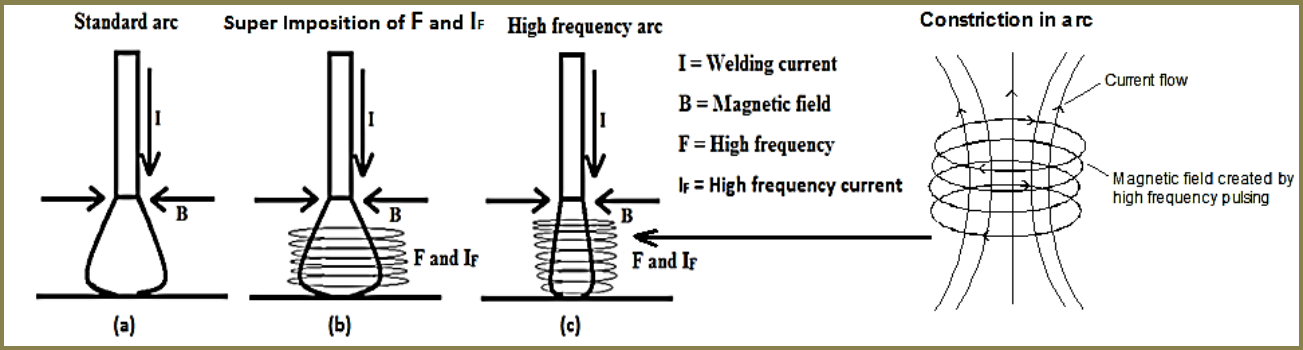
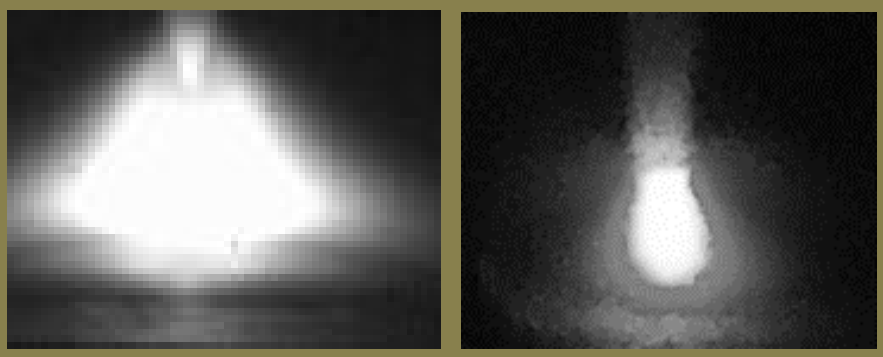
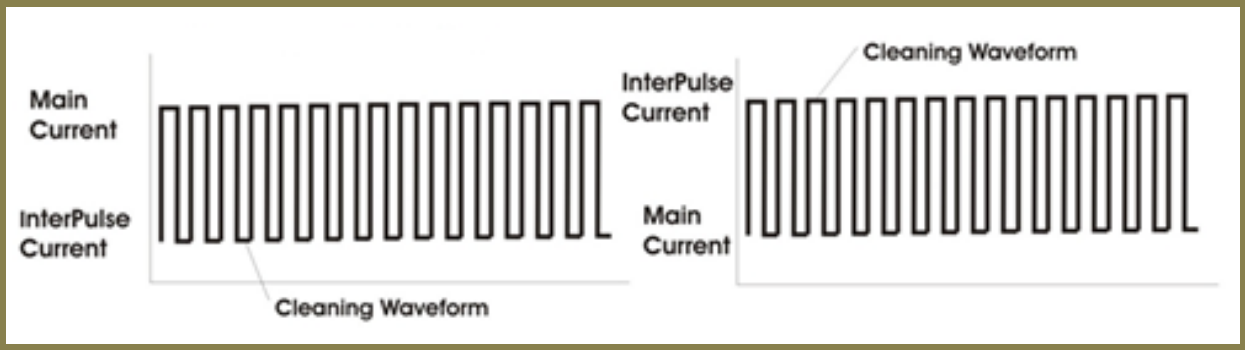


Fig. 1. Basic operation principle of arc constriction in HF-GTAW process.



(a) (b)

Fig. 2. Photograph of arc (a) conventional GTAW and (b) HF-GTAW



(a)

(b)

Fig. 3. Super imposition of 'I_F' and 'F' in HF-GTAW (a) Continuous and (b) Pulsed [3, 4]

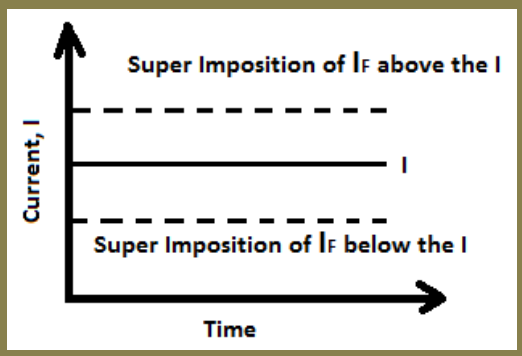


Fig. 4. Schematic diagram showing the different possibilities of super imposition of high frequency current and high frequency on main welding current in HF-GTAW.

In welding the acceptability of weld joint is primarily governed by required fusion of base metal through formation of arc crater of sufficient extent in it at an optimum thermal exposure primarily resulting in minimum heat affected zone (HAZ) of adverse microstructure and low residual stresses in weld joint. But, the critical control of above mentioned requirements becomes quite complicated during application of conventional GTAW due to wider arc characteristics [5, 6]. However, these difficulties of conventional GTAW can be more conveniently addressed by using HF-GTAW process.

References

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3) Rowan K. Leary, Eleanor Merson, Keith Birmingham, David Harvey and Rik Brydson., Microstructural and microtextural analysis of InterPulse GTCAW welds in Cp-Ti and Ti-6Al-4V, Materials Science and Engineering A, 2010, 527, pp 7694-7705.

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6) Yosuke Ogino, Yoshinori Hirata, Junichi Kawata and Kazufumi Nomura., Numerical analysis of arc plasma and weld pool formation by tandem TIG arc, Weld World (Doc. IIW-2357), 2013, 57, pp 411-423.

From: Jayabalan Rathinasabapathy [mailto:jayabalan48@gmail.com]
Sent: Thursday, November 02, 2017 11:39 AM
To: IEI, Tiruchirappalli Local Centre <ieitlc1973@gmail.com>
Subject: Re: IEI, Tiruchirappalli LC News Letter 2017/07-08

Dear Engineer/Sir,

Thank you very much for sending IEI, Trichy Local Centre News Letter. Really a Great Exercise done by your Panel Engineers. Excellent Sir.

Kind Regards,

Jayabalan.R

From: sk samy [mailto:sksamy.bhel@gmail.com]
Sent: Thursday, November 02, 2017 2:49 PM
To: Lakshmanan S <ieitlc2016@gmail.com>
Cc: laks@bheltry.co.in
Subject: Re: IEI, Tiruchirappalli LC News Letter 2017/07-08

Dear Sirs,

Once again a very good compilation and presentation of IEI TLC NEWS. Congratulation to all contributors.

With Kind Regards

S. Karuppasamy

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