India Welds

Making Technology Adoption Easy!

Knowledge is of No Value unless you put it into Practice.
-Anton Chekhov

Vol 3:1 Jan-Apr 2020

From the Editor's Desk!

Dear Welding Enthusiast!

The preceding year has been a one off journey for SMICPL which saw us achieving a milestone in our efforts towards uplifting the welding sector.

For the first time there was an exclusive workshop/ event organised to get the industry, academia, skill foundations, the welding solution manufacturers together on the same platform.

IndiaWelds Synergy 2019 was just the beginning of the long road that we have set out on. The many deliberations, the interactions have helped us better understand what needs to be done.

Hence we were there as an invited speaker as part of a ***CII (Confederation of Indian Industries)*** *event, to speak on what needs to be done on modernisation of welding technology in the railway sector.*

IndiaWelds (SMICPL) was also selected to be a part of the ***DPIIT-CII National Consultation Forum For Make In India 2.0*** *(Towards $1 Trillion Manufacturing Economy by Stimulating Growth & Investments).*

There have been much deliberations and also much on the ground work.

As in the previous year, we are continuing the theme this year too as ***'Making Ideas Happen!'*** *Hence at IndiaWelds, we are here to turn your and our ideas into reality.*

Welding sector at many places remain in the previous generation while the other manufacturing processes race ahead.

So, we are identifying those areas and fine tuning it with the management of forward looking firms and devising methods to modernise the sector. And from this year, this newsletter will be published once in 4 months as we concentrate more on customised training.

There is a long way to go. The journey has just begun. If you also want to be a part of this dynamism, please write to us at info@indiawelds.com and join us to make technology adoption easy!

Ajay

Happy Reading!
Editor
IndiaWelds

WHAT'S INSIDE

Join the biggest group of welding professionals. Write to us at info@indiawelds.com with your name and email address.

Who can join:
Any individual who is qualified in terms of education qualification or experience ***in the field of welding can join us.***

Weld Joint Inspection: Part I

Starting this edition, we are going to focus on one of the most important aspects of welding: Inspection. While in this part we will look at the basics, we will qualify as we gradually get into the details subsequently.

To define, in welding, inspection refers to an examination of a welding structure. Inspection may be qualitative and may involve only visual observation of correctness of functioning/dimensions.

Inspection before Welding

This is the first stage of inspection and involves the following:

(a) Check out the welding joint drawing such as dimensions, tolerances, process specification, etc.

(b) Chose the suitable welding process by easy method.

(c) Set the welding parameters such as current, voltage, frequency, polarity, etc.

(d) Select the defect free material as per specification.

(e) Selection of proper size, proper flux coated electrode as per specification (BIS specification).

(f) Select the Jig and fixture of proper size as per welding joint complexity.

(g) Proper arrange of welding joint cooling and ventilation as well as smoke.

Inspection in between the Welding Process

The second stage of inspection involves:
(a) Welding groove (Edge preparation) should as per specification.

(b) Tack welds should be of adequate size, length and pitch,

(c) Method of welding such type that minimum distortion should be in welding joint.

(d) Welding position, fill up gap should be as per welding procedure.

(e) Slag on the welding joint should be properly removed from each pass in multipass arc welds.

Inspection after or Completing the Weld

Once the welding is done, tests are carried out to

(a) Determine properties and weld quality of a weld object.

(b) Find out suitability of weldment

This is done with the help of

1. Destructive testing.
2. Non-destructive testing.

Destructive Testing

In destructive testing load is applied on the welding joint/welding specimen.

Deformation take places on removing the load permanent deformation take place inside the weld specimen, means specimen is no longer to use.

Several methods are available for destructive testing such as:

(a) Tensile test
(b) Compression test
(c) Bend test
(d) Impact test
(e) Hardness test
(f) Etch test
(g) Nick-break test.

Advantage of Destructive Testing

(i) These tests give the actual data of tensile strength, impact strength, hardness, and bend test, etc.

(ii) These type of test can be used on all metals.

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There is another method to find out defects, if any, in the weldment. A testing load is applied on welding specimen. No permanent deformation upon removing the load indicates that weld object can be further used.

Non-Destructive Testing

With the help of NDT we can find out the several invisible subsurface defects. NDT makes weld component more reliable and safe as NDT does not provide direct measurement of mechanical properties but they are extremely useful in revealing defects in components that could hamper their performance when they are in Testing and Inspection of Welding Joint under load.

Several methods are available to find out the internal surface defects. They are:

(i) Florescent test
(ii) Dye-penetration test
(iii) Visual inspection test
(iv) Ultrasonic test
(v) Cycle test
(vi) X-ray test/γ-ray test (Radiography test)
(vii) Magnetic particle test

(viii) Eddy current test

Advantage of NDT

(i) This type of test requires low initial cost.

(ii) These tests give the correct microscopic structure of object without destroying the object.

(iii) These tests are fast and easy to handle.

Prior to welding a joint it is incumbent on the fabricator to establish a number of factors to ensure he is familiar with all parameters and requirements relating to the joint.

- What is the required quality level to be achieved?
- What are the acceptance criteria?
- Does the weld need to comply with the PED (pressure equipment directive) or CE marking.
- Is there a suitably approved weld procedure for the joint?
- Is the welder qualified within the terms of the approved procedure?
- Have the parameters of the procedure been adhered to.
- Control and certification of consumables.
- Control and certification for parent material.
- Amperage and polarity.

By: Dr.S.A Rizvi, Ph.D.-Welding (IIT-BHU), Workshop Superintendent, University Polytechnic, JMI,New Delhi
Image Courtesy: Internet

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IndiaWelds SYNERGY 2019 : A Retrospection

IndiaWelds Synergy 2019, a flagship event of SMICPL (IndiaWelds) was held on 21st of November, 2019 at Le Meridien Gurgaon, Delhi-NCR. The theme of the event was "Creating Sustainable Welding Excellence through Industry- Academia Synergy".

It was a 1 day workshop that focussed on various methods of enhancing the welding sector. This event brought together experts and novice alike from the fabrication industry, academia, skill development institutions and other welding solution providers to discuss the many aspects of welding that needs focus.

The daylong event had Indian Welding Society as the Technical Partner, Panasonic as the Technology Partner and AKG Skill Foundation as the Skilling Partner. It had a number of technical sessions and brainstorming session on various technical subjects related to welding sector.

The event was graced by Mr.A.K.Tiwari, Principal Executive Director, Railway Board, Ministry of Railways

as the Chief Guest. He, in his keynote address stated the importance of achieving sustainable welding excellence.

There were other members from the Railway Board, IWS Executive Governing Council, NRDC who voiced their opinion on welding excellence during the inaugural session.

The technical sessions had topics ranging from 'zero defects' in welding, Development of Sound Weld Joints, Welding with Responsibility, Lean in Welding and Industry 4.0.

These talks were delivered by industry and academic experts giving a fresh

together to uplift the welding sector.

This had panellists from Ministry of Railways, PSU, Academic Institution, Skill

With an audience of more than 120 delegates from more than 50 organisations like NTPC, MECON, Railway Workshops, RDSO, RITES, IIT D, IIT R, DTU, AKG Skill Foundation, Escorts, Plasser India etc., the sessions saw an active participation from all quarters.

perspective on solutions.

Speakers included experts from IIT Delhi, IIT Roorkee, RDSO, NTPC, MECON, Lincoln Electric, Panasonic, TATA Technologies to name a few.

Development Institute dwelling on discussion on

The day ended with a panel discussion on Identifying Specific Interventions needed by both Academia and Industry

to boost Synergy between them!

The panel discussion formed the ethos of the whole theme.

It was for the first time that the welding sector had such open house discussion on how to bring academia and industry

getting the academia industry connect.

Our sponsors who made this event possible included Panasonic, NTPC, Braithwaite & Co., Kemper, Kemppi, Skillveri, RITES among others.

The workshop also had in display some of the unique technologies like Virtual Welding Machines (by Lincoln and Fronius) for training, welding exhaust system (Kemper), Welding Machines (Panasonic), Welding Robot (KUKA) and Welding Defect Solution (Spatter Cure Enterprises).

The huge success and the outcome of the various brainstorming sessions and feedback from the attendees has given a new perspective, idea and also direction to SMICPL in continuing its work to uplift the welding sector and to make technology adoption easy. This definitely marked the beginning of a new chapter in the growth of IndiaWelds.

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रेलवे पॉइंट्स क्रॉसिंग्स और उनकी वेल्डिंग- 1

रेलवे पॉइंट्स और क्रॉसिंग्स:

भारतीय रेलवे द्वारा प्रमुख तौर से दो प्रकार के पॉइंट्स और क्रॉसिंग्स का इस्तेमाल होता है –

- फैब्रिकेटेड या निर्माण किया हुआ कार्बन- मैंगनीज़ स्टील (याने रेल स्टील) के क्रॉसिंग्स और पॉइंट्स
- ढाले गए (कास्ट किए गए) मैंगनीज़ स्टील के क्रॉसिंग्स और पॉइंट्स

कार्बन- मैंगनीज़ स्टील में भी दो प्रकार के स्टील के क्रॉसिंग्स हो सकते हैं |

१। मीडियम मैंगनीज़ मीडियम कार्बन स्टील

इनमे ०.४५-०.६० % कार्बन तथा ०.९५-१.२५ % मैंगनीज़ होता है | इनकी हार्डनेस २८० BHN की होती है |

२। मीडियम मैंगनीज़ हाइ कार्बन स्टील

इनमे ०.६-०.८ % कार्बन तथा ०.८-१.३ % मैंगनीज़ होता है | इनकी हार्डनेस भी २८० BHN की होती है |

ढाले गए मैंगनीज़ स्टील के बने क्रॉसिंग्स में १.०-१.४ % कार्बन तथा १२-१४ % मैंगनीज़ होता है | इन्हे वर्क हार्डनिंग टाइप क्रॉसिंग कहते हैं | पिटाई करने के पहले इनकी हार्डनेस २५० BHN होती है किन्तु घन या हथौड़ी से पीटने के बाद इनकी हार्डनेस बढ़कर ४५०-५०० BHN हो जाती है |

क्यूंकी इन दो प्रकार के क्रोसिंग्स के स्टील पूरी तरह एक दूसरे से अलग हैं, इसलिए इनके वेल्डिंग का तरीका अलग है |

यह पॉइंट्स और क्रॉसिंग्स रेलों के लगातार आने जाने से घिसते हैं और उनकी ऊंचाई कम होती जाती है | भारतीय रेलों के नियमानुसार फैब्रिकेटेड क्रॉसिंग्स को ६ mm से अधिक घिसने नहीं देते | इस लिमिट के पहुँचते ही उनको रिकन्डीशनिंग के लिए भेज देते हैं|

इसी प्रकार मैंगनीज़ स्टील के क्रॉसिंग्स को ८ mm से ज़्यादा घिसने नहीं देते | उन्हें रिकन्डीशनिंग करने के लिए निकाल लेते हैं | ऊपर लिखे लिमिट्स राजधानी तथा शताब्दी ट्रेन जिन मार्गों पर चलती है उनके लिए है | अन्य मार्गों पर घिसाई की सीमा १० mm है |

क्रॉसिंग को रिकोनडीशनिंग के लिए चुनना तथा उनकी टेस्टिंग

जिन पॉइंट्स और क्रॉसिंग का रिकोनडीशनिंग करना है, वे अच्छी हालत में होने चाहिए | इस बात की पुष्टि इंस्पेक्टर द्वारा दिए गए सर्टिफिकेट के ज़रिए होनी चाहिए | वे सीमा से अधिक घिसे हुए (याने १० mm या ८ mm से ६ mm) नहीं होने चाहिए | घिसे हुए भाग में यदि क्रैक्स हो तो वे ३ mm से अधिक गहरे नहीं होने चाहिए | जिन क्रसिंग्स में ये क्रैक्स इससे अधिक गहरे हो उसे रिजेक्ट कर देना चाहिए और उनकी रिकोंडीशनिंग नहीं करनी चाहिए |

पॉइंट का नोज़ पोर्शन बहुत प्रभाव सहता है, इसलिए इस बात का ध्यान रखना ज़रूरी है की रिकोंडीशनिंग से पहले ये निश्चित हो जाए की इस भाग में कोई बाहरी या अंदरूनी क्रैक्स नहीं हैं | इसकिए घिसाई के बाद इस भाग का कोई पेनीट्रेशन या अल्ट्रासोनिक टेस्ट कर लेना चाहिए |

फैब्रिकेटेड या निर्माण किया हुआ मीडियम मैंगनीज़ स्टील के पॉइंट्स और क्रॉसिंग का रिकोनडीशनिंग का तरीका

१। सर्फेस की तैयारी

रिकोंडीशनिंग से पहले सर्फेस से चिपके हुए स्केल और वर्क हार्डन हुए हार्ड या सख्त परत को निकाल देना बहुत ज़रूरी है | यह काम ग्राइन्डिंग द्वारा किया जाता है | यदि क्रैक्स हो तो उन्हे घिसाई करके पूरी तरह निकाल देनी चाहिए | क्रैक का थोड़ा भी भाग बचा नहीं रहना चाहिए वरना रिकोंडीशनिंग के बाद क्रैक्स उभर सकते हैं | इससे रिकोंडीशनिंग किया गया क्रासिंग समय से पहले ही टूट सकता है और एक्सीडेंट हो सकता है | इसलिए घिसाई के बाद सर्फेस और पूरे क्रासिंग की डी.पी. टेस्ट या मेग्नाफ्लक्स द्वारा टेस्ट करना चाहिए |

By: Partho P. Banerjee, A Welding Enthusiast with 17 years experience
Image Courtesy: Internet

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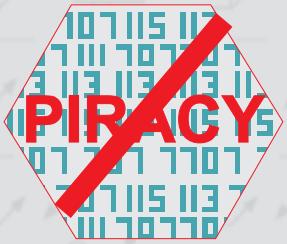
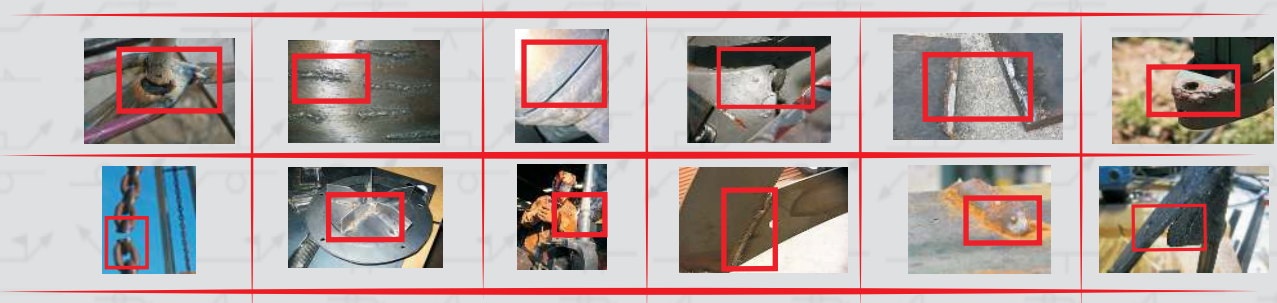


Do NOT encourage duplicates.
STOP compromising on welding safety, Today!



Probably success of an innovation can be measured by looking at the its many duplicates in the market!

But should you compromise quality over cost?

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The Curious Case of Industry - Academia Synergy

Excellence is the result of high intention, sincere effort, intelligent direction, skillful execution and the vision to see obstacles as opportunities.

Excellence also demands to look beyond the ordinary, to dwell into the most unthinkable. In the welding sector especially, looking at the ecosystem that exists, achieving perfection is the most daunting task. It is one thing to have an access to the best technologies. But to keep adapting to the new technologies for a constant and persistent growth demands more.

There are many pillars of excellence, skilling being one. But for rightful skilling, we must get the Industry Academia together to make welding excellence a sustainable one. Academia and Industry must work together in tandem. Or should they? What is this missing link that we are all addressing? And how do we solve this maze of missing links?

The Missing Link

As Jaspal Singh, a Quality Program Manager at Wellons Canada CORP, puts it, "the link is not only missing in India. Skilled welding professionals' availability is a global challenge". He further adds "Academia and Industry are two dissimilar base metals, they have their own unique properties and requirements."

Som Ashutosh, of AKGEC reiterates this when he states "the missing link in welding sector in India can only be minimized by facilitating effective connect between the two entities and building a notion of trust and dependence on each other which is missing today.". This is also emphasised when T. Mohapatra, Ex-GM, HAL opines that "link between Academia and Industry can be established by more involvement of Academia with Industries."

Getting deeper in to the whole issue, Prof. D.Ganguly, Sr. Consultant, TATA Technologies explains that things need to be looked from another perspective. He says "It is well known that levels of engineering and technology achieved in today's industry are significantly higher that what is taught in academia. The gap keeps on expanding every year. Without placing the blame on any one entity, it has been seen that engineering education does not seem to be keeping pace with the advances in engineering in industry. Academics rarely have access to such advances as they have no exposure to the industry practices, nor do they have incentives to take internships in industry to re-learn engineering."

Similar thoughts have been resonated by Jaspal Singh as he states that "with economy growing at a rapid speed, we need trained, skilled welding professionals produced with efficiency. Also, we no longer have the time to train students in only a traditional setting.

The traditional classroom and lecture style will never produce the number of skilled professionals with the pace of today's Indian industry needs. Both need to work like a Current and Voltage in weld process, if V&I is not in tandem, quality weld cannot be produced."

Who will bear the onus?

Having established that, which section bears the onus of taking the initiative and how?

Interestingly, while majority feels that Industry must take the lead and do the handholding, Som Ashutosh feels that "Instead of hand-holding it is important to create a synergy between the two so that each can understand the need of the other and thereby create a win – win scenario for both. It is only possible by creating an interlink between the two either by an independent facilitator such as professional societies, associations or by the government."

A much different view is opinionated by Jaspal Singh when he states "it should be the industry that lead and collaborate with academia to provide academicians with the most up-to-date professional development education, so student career needs can be met. Dwelling further, he feels "the academia and workshops should develop a system based on consistent ability to move things around to accommodate immediate change."

An elaborate explanation is given by T. Mohapatra. He suggests, "Industries should do the hand holding of the Academia in terms of

knowledge and innovation as the Academia are the mines of knowledge and the platform for innovations.

Academia will provide technical support and support for technology adoption to Industries through research & development. However Industries may provide financial support to Academia. A part of the profit of the Industry may be earmarked for supporting Academia financially.

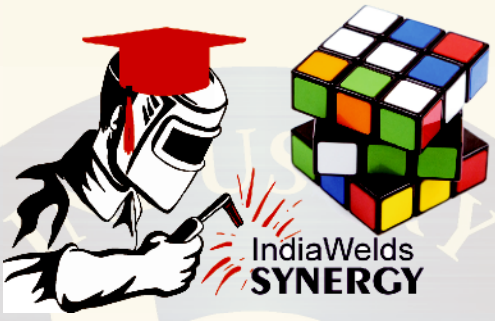
Each Academia as centre of excellence in a particular technical field can form a cell with the Industries of SME field. The "Industry - Academia" cell with Academia as CoE, will be the nucleus of the cell and the Industries of the same technical field will be surrounding the nucleus.

Prof. Ganguly, having seen the best of both academia and industry feels that "the syllabi used in colleges are outdated and are periodically reviewed and changed, but the pace is very slow.

Therefore, industry needs to take the lead in formulating the syllabi for engineering studies. The deliverance of education should be converted into a hands-on methodology with rigour so far not done in institutions."

The Initiatives

However, all these are not to state that nothing is actually happening on ground. As Jaspal Singh puts it, "Welding is unique sector and all the global organisations like CWB, AWS, TWI are putting lot of effort to attract the talent towards this sector. Welding is no longer a simple blue collar task, but involves much much more.



More than ever innovation, automation, IoT, Artificial Intelligence, Robotics. Lean Manufacturing, Additive Manufacturing, virtual/augmented reality and computer science have become a daily constant to our welding Industry. A decade ago , many of these influential factors were non-existent. So as the essential variables got increased in this sector, the welding procedure between Academia and Industry need to be re-qualified for consistent performance of weld (i.e. strong relationship)."

According to T. Mohapatra, welding sector can draw inspiration from Aerospace Sector like HAL which has been taking technical support from academic institutions like IISc and IITs. It is a very good example of Industry Academia interface. For Som Ashutosh, "some sort of cue can be taken from the service sector to achieve the same level of interdependency in the Manufacturing sector as a whole." Prof. Ganguly here concludes that "Engineers from industry with few years of experience should be enticed with incentives to take up academics."

The disruption has just begin. The thoughts provoked and small steps have been initiated.What do you feel about the whole issue? How can we really improve this gap? Have an idea? Feel free to share with us.

IndiaWelds has just begun this initiative to actively bridge the gap between the industry and academia. This presumably will open the road to achieve sustainable welding excellence. After all, it always seems impossible until it's done!