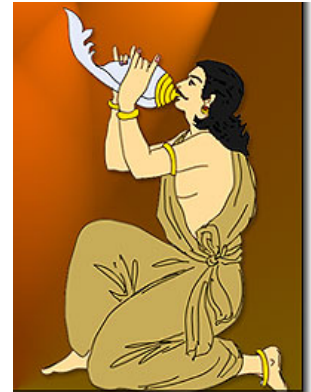


SOUND BYTES



Official newsletter of the ISNT Chennai Chapter



GENISIS

Man is a social animal by nature as Aristotle said. All his human qualities such as to think to enquire to learn language, to play and work only developed in human society. All this developed through interaction with others. He cannot survive in isolation. So the world shrank. And then the Pandemic struck. Several theories are floating around about its origin.

The result is an infodemic - an overabundance of information, both online and offline. It includes deliberate attempts to disseminate wrong information to undermine the public health response and advance alternative agendas of groups or individuals. Ultimately it is agreed that it is due to the greed of the human race.

Is it the end of the human race? Or will the ingenuity of the race overcome it? More and more the gap between Science and Philosophy is narrowing. The recent interest in Bounce theory and Point of singularity is a pointer. As per the Adwaita philosophy Point of singularity is Brahman and the cycle of Creation and Destruction is bounce.

It had been the philosophy of our chapter to be a forerunner in several aspects as for as NDT activities are concerned. The executive council of the chapter in its EC meeting on 28th February 2021, decided to bring out a News Letter from June onwards and entrusted the job to me. On my behalf I constituted a committee consisting of Dr. Prabhu Rajagopal, Brahma, Subburatnam, Chitathoor Srinivasan, Mani Mohan, Vivek Rajamani and Rabin to bring out the newsletter. Our main aim is to disseminate the knowledge stored in the minds of the NDT practitioners regarding "Problem Solving" - Challenges and solutions. This in our opinion will assist the present day practitioners in overcoming difficult situations. This is a step towards creating a ready reckoner. All these episodes will be categorized and stored by the chapter and will be made available to the members through the net for them to refer. It will also contain news about our chapter and other NDT news. We welcome inputs from all of you in our endeavor. It was a challenging task to bring out the first issue of the newsletter due to prevailing conditions as meetings could not take place. A meeting among the members would have been more helpful. Our sincere thanks to Avehi Vivek for helping us to design this newsletter. Hoping that this issue virtually brings us closer and bridge the information gap.

Ram Prakash

Indian Society for



Non-Destructive Testing
Chennai Chapter

EC MEMBERS FOR THE YEAR

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Shri. RG.Ganesan	Chairman Elect
Shri. R.Balakrishnan	Vice Chairman
Shri.S.R.Ravindran	Vice Chairman
Dr.Prabhu Rajagopal	Vice Chairman
Shri. V.Thangamani	Honorary Secretary
Shri. P.Anandan	Hon. Joint Secretary
Shri. E.Sathya Srinivasan	Honorary Treasurer
Shri. A.R.Parthasarathy	Hon. Co. Treasurer

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3. Shri. R.Jayagovindan	14. Shri. P.N.Udayasankar
4. Dr. L.Karunamoorthy	15. Shri. V.Vibooshnan
5. Shri. N.Karunanidhi	16. Shri. A.Vimal Raj
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9. Dr. S.Rajendra Boopathy	20. Shri. Kasi Viswanathan
10. Shri. C.Srinivasan	21. Shri. C.P.Madhusudan
11. Shri. R.Subbaratnam	22. Shri. S. Subramanian (BGR)

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Dr.O.Prabhakar	Advisor
Shri. K.Viswanathan	Advisor
Shri.V.Pari	Advisor
Dr.Krishnan Balasubramaniam	Advisor
Shri.B.Ram Prakash	Advisor



"Teamwork is the ability to work together toward a common vision."

AGM @GRT: JANUARY 31, 2021

The Annual General Body Meeting (AGM) was held on Sunday 31st January 2021 at 10.30 hrs. at Hotel GRT Grand, T.Nagar, Chennai- 600 017. 37 members attended the meeting. Returning Officer Mr.Gopal Kidao announced the New Executive Committee Members for the year 2020-2021. Chairman Shri.S.Subramanian, Secretary Shri.V.Thangamani and Treasurer Shri.E.Sathya Srinivasan.



Challenges & Solutions

RADIOGRAPHIC EXAMINATION OF ENVELOP
PIPES –
A CASE STUDY- BY SHRI R. SUBBARATNAM
(RETD. IGCAR SCIENTIST)

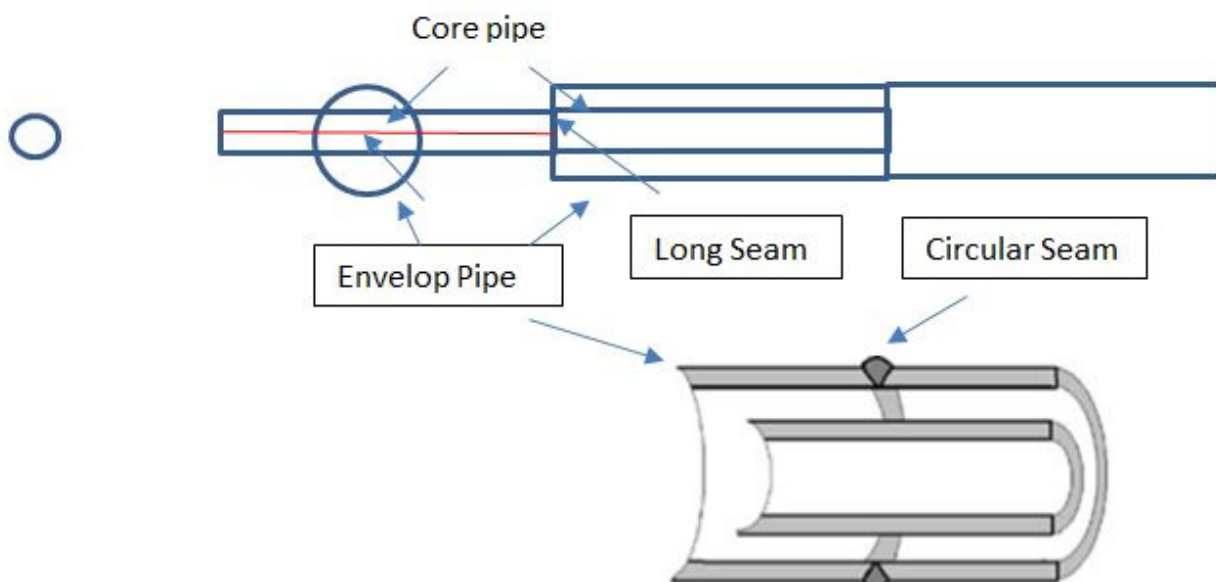


INTRODUCTION:

Envelop pipes (Double Envelop) are used in many industries like Nuclear, Petrochemical etc. In Nuclear industry particularly sodium cooled fast breeder reactors, these envelop pipes are used for safety (Liquid sodium reacts violently with air / water - sodium in core pipe should not face atmosphere – fire hazard) and heating or cooling (by gas), the core pipe constituents mostly liquid sodium.

Major problem with respect to radiography is, envelop pipe weld examination, in achieving the required sensitivity and ascertaining the minimum gap between the core pipe and envelop pipe, which is critical. Normally envelop pipe is constructed by two half segmental pipes welded using longitudinal and circular welds for required length of pipe.

Construction: The Core pipe (25 mm Dia to 63 mm Dia) (AISI 316L) is encircled by Envelop pipe (63 mm Dia to 114 / 122 mm Dia) (AISI 316L). Envelop pipes are constructed by two half pipes welded by two long seams and circular seams to the required lengths and shapes (serpentine), as per the requirements and as shown below. Some areas will have multiple core pipes (up to 7 nos.) (Pic at bottom) in a common envelop. Construction details are as given in below drawing and picture.



THE REQUIREMENTS AND PROBLEM/S:

Radiographic Examination Requirements: As the welds are in critical areas, all the welds are to be radiographed to the stringent sensitivity requirements. Also the minimum gap between the core and envelop pipes are to be maintained and has to be ascertained by radiography as other NDE are not providing the details and hence not suited.

Sensitivity Requirements:

The sensitivity requirements for all critical pipe welds are ASTM 5-1T up to 6 mm thick and ASTM 5 -2T for more than 6mm (6-10 MM)thick.

No problem in radiographic examination of Core pipe in achieving sensitivity, ASTM 5 – 1T according to the core pipe thickness, using X ray with smaller focus.

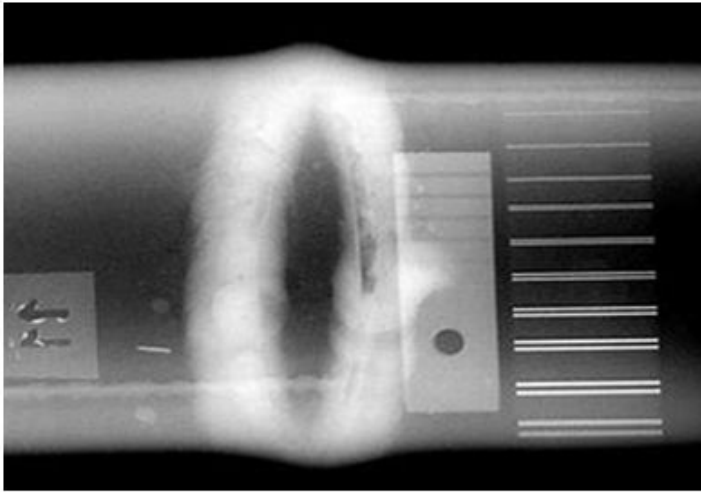
But in the case of envelop it has two problem. First is achieving sensitivity the other is gap measurement.

The total penetration thickness in case of envelop is minimum of four wall thickness, two walls of core pipe and two of envelop. But the sensitivity requirement is same as ASTM 5 – 1T / 2T (according to the pipe single wall thickness). This was found very difficult with respect to achieving the sensitivity.

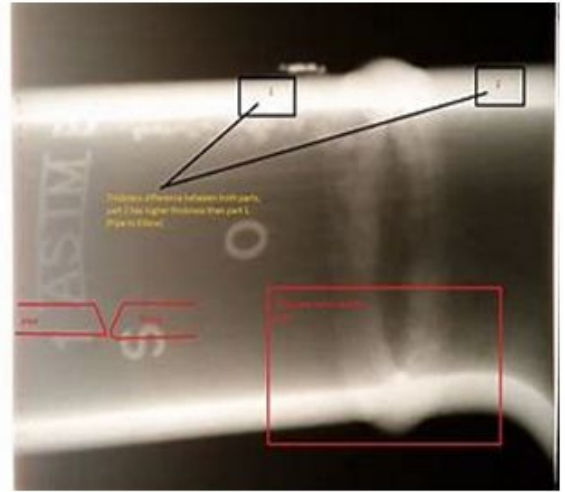
Solution: Sensitivity requirements is very high, tight and hence, it was decided to use x–ray with lower focal spot size, with in limited SFD space for exposure (~500mm in most cases), to meet the sensitivity requirements and has been achieved in all the cases. It was noted that the area coverage also becomes less in certain cases (core pipe thickness is more), it will cover only core pipe area. As the coverage is less it requires more exposure in certain areas / conditions according to core pipe thickness.

Gap Measurement: It is necessary to measure the minimum gap between the core and envelop pipes as this will lead to differential flow of envelop gas for cooling or heating the core pipe liquid leading to thermal instability. Also the welding distortion (AISI 316L) will change the gap, which is maintained properly during fit up. Out of other NDE's radiographic examination was found best suited in this case.

Problem: Radiographic examination with x ray as stated above to meet the sensitivity requirement, will not provide the results of gap measurement. This radiograph will not provide the clear cut edges of core and envelop pipes to measure the gap. This is due to the variable energy of x ray beam, for the set energy level to penetrate required total wall thickness, leading differential radiographic density across thickness, making the selection of points for gap measurement difficult, please refer picture below.



DWDI WELD RADIOGRAPH EXAMPLE – X RAY – VARIABLE ENERGY – SENSITIVITY HIGH BUT WILL NOT SHOW EDGE / THICKNESS -



DWDI WELD RADIOGRAPH EXAMPLE – GAMMA RAY – CONST & HIGH ENERGY – LOW SENSITIVITY BUT WILL SHOW EDGE / THICKNESS

Solution: Based on the above it was decided to use gamma ray (Ir 192) for gap measurement radiography, as the gamma energy is near constant. The radiography with gamma provided clear cut edges, refer DWDI on single pipe weld radiograph example picture above. The core and envelop pipes using gamma radiographs, provided details and the gap measurement was successfully done, after considering the enlargement factors $\{(SFD - OD/2)/SFD\}$. Exposure details and setup provided below for reference.

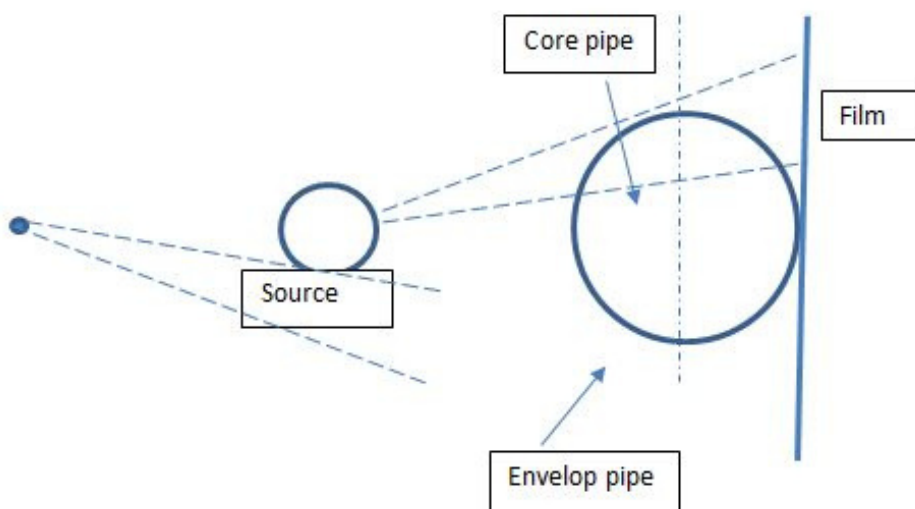
Radiographic examination - Sensitivity:

Source: MG 161 L – Philips 160 kV, 1.4/0.4 mm focal; 1.4 mm focal used; SFD: Multi Wall DI - 500 mm / Multi Wall SI - 175 mm (according to diameter); Film: Agfa D7; Technique: Multi Wall Double Image (MWDI) / MWSI (According to envelop pipe dia)

Radiographic examination - Gap measurement:

Source: Ir 192; Film: Agfa D7; SFD: 500 / 700 mm, No. of Exposure: Two at 90 Deg. Apart; No sensitivity requirements

Gap Measurement Exposure Setup:



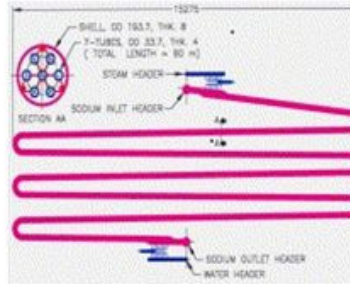
Actual gap can be calculated based on similar triangle method, considering enlargement, using following formula.

$$\text{Gap in the radiograph} / \text{Actual gap} = \text{SFD} / (\text{SFD} - \text{Envelop OD}/2)$$

Actual Gap = Gap value Measured in radiograph X $\{(SFD - OD/2) / SFD\}$.



Top View of one of the critical piping – serpentine bends with envelop – Restricted Space – for Radiography before thermal insulation



One System (Steam Generator) (2.25 Cr – 1 Mo) with seven core pipes with common envelop – see cross section (fabricated by M/s BHEL, Trichy)

Corrective Action: Envelop pipes where the minimum gap was not noted (sometimes touching) were corrected by proper heating and cooling.

For any further queries: Mail subbu_10@yahoo.com

New Products

Planys Technologies indigenously designed & manufactured EVITAR – A UV-C Germicidal Irradiation Robot for Disinfection. It is a smart robot devised to offer optimal indoor germ protection by the application of UV radiation emission. The radiations destroy the cellular structure of the micro-organism and prevent it from infecting or multiplying. Through an effective 360 degrees beam coverage, it secures a high disinfection rate. EVITAR UV-C Bot is one of the best solutions to effectively sanitize any public/private space compared to traditional liquid spray based disinfecting solutions. Applications include disinfecting enclosed common areas like airports, educational institutes, cinema halls, restaurants, libraries, airplanes, IT parks/offices etc. The technology developed has been tested, found effective against COVID-19 sample and approved by an ICMR approved lab in Chennai.

Contact: +91 8448188507; Write to us at info@planystech.com Planys Technologies, No.5 Jaya Nagar Extension, Balaji Nagar Main Road, Puzuthivakkam, Chennai 600091 India



ISNT H.O News

ISNT Head Office AGM was conducted on 20th March 2021 at Mahabalipuram on hybrid mode. From our Chapter Mr.S.Subramanian, Mr.V.Thangamani, Mr.P.Anandan and Mr.R.Vivek have attended the meeting. Course calendar for 2021-2022 was released during the AGM by Dr.B.Venkataraman, President ISNT.

Future events

ASNT Info: Don't miss our second largest conference this 27-29 July in Reno, Nevada: "Digital Imaging and Ultrasonics for NDT 2021." Connect with fellow NDT professionals and register now!

asnt.org/events.

ISNT CC News

EC meeting

- 1.The Sixth EC meeting was held on 28th February 2021 both physically and virtually (Google meet). A total of 11 members were present at the venue and another 9 attended the same virtually. In all, 20 members attended the meeting.
2. The First EC meeting for the financial year 2021-2022 was held on 25.04.2021 through video conferencing (Google meet). 19 members attended this meeting.

ISNT CC NEWS

Courses Conducted

S.No	Name of the course	From	To	Course Director S/Shri	No of participants		Examiner S/Shri
					Course	Exam	
01.	VT L-II	19.10.20 to 23.10.20	21.01.21 to 23.01.21	R.Balakrishnan	18	12	E.Sathya Srinivasan
02.	MT & PT L-II	28.01.21	06.02.21	M.Manimohan	17	19	E.Sathya Srinivasan
03.	UT L-II	17.02.21	27.02.21	P.Anandan	21	23	E.Sathya Srinivasan
04.	RT L-II	10.03.21	20.02.21	M.S.Viswanathan	11	11	C.Srinivasan

Technical talk

S.No	Date	Topic	Speaker			No. of Participants
1.	28.03.2021	"Probability of Detection and its relevance to practical NDT"	Dr. Phani Surya Mylavarapu, Defence Metallurgical Research Laboratory, Kanchanbagh P.O., Hyderabad-500058	ISNT Chennai Chapter	Video Conferencing - MS Teams	86
2.	07.04.2021	"Innovative investigation techniques and data processing for the assessment of bridges"	Dr.Guido Tronca of Italy,	ISNT Chennai Chapter in association with SRM Institute of Science & Technology (Ramapuram Campus) and Proceq of Singapore,	Video Conferencing - MS Teams	395
3.	18.04.2021	"Digital Radiography - Image Quality Metrics & Factors Affecting Image Quality"	Shri V. Manoharan, Senior Scientist (Retired), GE (Global Research) - John F Welch Technology, Bangalore	ISNT Chennai Chapter	Video Conferencing - MS Teams	58
4.	23.05.2021	"1. Industry 4.0 solutions for metal testing in Harsh Environment covering Hardness and flaw detection" 2. "Flaw detection at high temperature using specialised piezoelectric crystals & monitoring systems"	Dr Maria Felice, Product Marketing Manager, Asia region, Screening Eagle Technologies, Switzerland and Dr William Vickers, Product Manager, Sensors and Systems Solutions, Ionix Advanced Technologies Ltd., UK.	ISNT Chennai Chapter	Video Conferencing - MS Teams	

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**Non-Destructive Testing
Chennai Chapter**

Chief Compiler: B. Ramprakash
(pktprakash45@gmail.com)

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