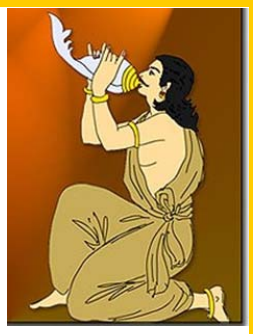
SOUND BYTES



Decibel 22
Frequency 4
March 2022 issue
Email ID: soundbytesisnt@gmail.com

Official Newsletter of ISNT Chennai Chapter

Caring is sharing!

EC of ISNT Chennai Chapter sincerely thanks the sponsor, cosponsor and the authors of the articles without whose contribution Sound Bytes 4 would not have seen the light. We are evolving. The grapevine says that the Head Office is embarking upon a grandiose plan in the near future to indulge in creating a highway to effectively communicate with members, non members at an increased frequency to create an awareness about our profession. NDT cannot remain the domain of a few individuals. Where there is a demand for Quality, Reliability & Sustainability this Science & Technology is second to the need.

This issue is special for few of us since in the Case Study we have stumbled upon a solution for a vexing problem, thanks to Sri.SGN. Murthy. Machine foundation, this was raised by a civil engineering participant of a Thermal Power plant during UT Level-II course VA provides a probable solution. We sincerely hope that this case study will offer a solution to probe the foundation design and be a direction indicator.

Foundation means a strong base. Hence it was felt that we shall visit the basics of the NDT methods and recollect the important steps. So this issue contains a few of basics.

Wish you all a happy Reading.
Ram

SPONSOR

Sponsorship for September 2022 issue is open. We request NDT organizations to avail this opportunity

Indian Society for Non-Destructive Testing , Chennai Chapter
Module 59, 3rd floor, Readymade Garment Complex. SIDCO Industrial Estate, Guindy, Chennai 600 032. Phone 044-45532115, 7200086075.
Email: isntchennaichapter@gmail.com; Website: www.isnt.in

ISNT Chennai Chapter News

Addition of Members – **Nil**
Total Members - 695
Courses Conducted
UT Level-II 08.12.2021 to 18.12.2021
Course Director: Mr.E.Sathya Srinivasan
Examiner: Mr.R.Chandran / Mr.S.R.Ravindran
MT & PT Level-II 13.12.2021 to 23.12.2021
Course Director: Mr. R.Balakrishnan
Examiner: Mr.E.Sathya Srinivasan
Phase-1 Awareness program on PT, MT and ET held on 3-15 December 2021 for Veltech, Avadi faculties.
Phase-2 Awareness program on RTFI and UT held on 7-13 January 2022 for Veltech, Avadi faculties.
Course Director: Mr.R.Balakrishnan.
VT Level-II theory portion by online from 17.01.2022 to 20.01.2022.
Course Director: Mr.R.Balakrishnan
UT Level-II 07.02.2022 to 18.02.2022
Course Director: Mr.P.Anandan
Examiner: Mr.E.Sathya Srinivasan
Courses Planned
RT Level-II from 23rd Feb 2022 to 6th March 2022
Course Director: Mr.E.Sathya Srinivasan
EC meeting
The fourth EC meeting was held on 19th December 2021 both physical and virtual formats. Out of 19 attendees, 10 were physically present and 9 attended through video conferencing.






COURSES IN PROGRESS

ISNT Head Office News

ISNT HO—Annual General Body Meeting
ISNT Head Office Annual General Body Meeting (AGM) was held on Saturday 24th December 2021 at 6.30 PM at Hotel GRT, Mahabaliburam. 11 EC Members of our chapter has attended the AGM.
HO, NCB & other chapters news
For ISNT Head office announcements and Webinars of other chapters please refer to the Website of HO of ISNT (www.isnt.in).



ISNT Chennai Chapter - Course Calendar for 2022-2023

S.No	Month	Course Code	Courses	Training Period		Examination Date	**Course Fees Rs.	Last date of receipt of application form
				From	To			
1.	April	ST-2201	Surface NDT Level-II (MT & PT)	21.04.22	27.04.22	29.04.22 & 30.04.22	10,500/-	15.04.2022
2.	May	RI-2202	RT Film Interpretation Level-II	09.05.22	12.05.22	14.05.22	7,500/-	05.05.2022
3.	May	UT-2203	Ultrasonic Testing Level-II	24.05.22	01.06.22	03.06.22 & 04.06.22	13,500/-	20.05.2022
4.	June	RT-2204	Radiographic Testing Level-II	15.06.22	22.06.22	24.06.22 & 25.06.22	12,000/-	10.06.2022
5.	July	VT-2205	Visual Testing Level-II	04.07.22	07.07.22	09.07.22	6,000/-	30.06.2022
6.	July	ET-2206	Eddy Current Testing Level-II	20.07.22	27.07.22	29.07.22 & 30.07.22	20,000/-	15.07.2022
7.	August	ST-2207	Surface NDT Level-II (MT & PT)	18.08.22	24.08.22	26.08.22 & 27.08.22	10,500/-	13.08.2022
8.	September	UT-2208	Ultrasonic Testing Level-II	13.09.22	21.09.22	23.09.22 & 24.09.22	13,500/-	09.09.2022
9.	October	RT-2209	Radiographic Testing Level-II	12.10.22	19.10.22	21.10.22 & 22.10.22	12,000/-	06.10.2022
10.	November	ST-2210	Surface NDT Level-II (MT & PT)	03.11.22	09.11.22	11.11.22 & 12.11.22	10,500/-	28.10.2022
11.	November	UT-2211	Ultrasonic Testing Level-II	22.11.22	30.11.22	02.12.22 & 03.12.22	13,500/-	18.11.2022
12.	December	RT-2212	Radiographic Testing Level-II	14.12.22	21.12.22	23.12.22 & 24.12.22	12,000/-	08.12.2022
13.	January	ST-2213	Surface NDT Level-II (MT & PT)	19.01.23	25.01.23	27.01.23 & 28.01.23	10,500/-	13.01.2023
14.	February	UT-2214	Ultrasonic Testing Level-II	31.01.23	08.02.23	10.02.23 & 11.02.23	13,500/-	25.01.2023
15.	March	RT-2115	Radiographic Testing Level-II	22.02.23	01.03.23	03.03.23 & 04.03.23	12,000/-	17.02.2023

Important Note:

All courses, examinations and Certifications are based on IS 13805. If any one wishes to write Examination as per SNT TC 1A,The Employer shall have / develop a written Practice based on "SNT-TC-1A - 2016".

COURSE FEEDBACK

Dear ISNT Chennai Chapter and team,

The programme was conducted for 14 days and it was really good and it had enhance the skills in utilizing the NDT equipment to its potential for academic and research activities. Resource persons were very knowledgeable and were able to tailor the whole training program to our individual needs. It was a very informative and eye-opening programme. I thought ISNT covered all the areas brilliantly. Having the opportunity to discuss issues openly and honestly really appreciated the flexibility.

We enjoyed the practical elements the best. Excellent trainer, obviously an expert in the field; practical sessions really helped."

I have recommended the course to academic institutes.

Dr.Joseph J Kakkassery
Assistant Professor & Coordinator NDT Training Program
Department of Mechanical Engineering
Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology Avadi, Chennai- 600062

Vibration Diagnostics – A Case study

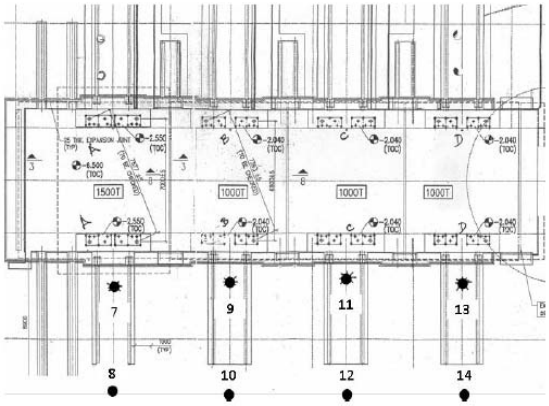
Dr.K.Muthumani, Managing Director,
Structflix Structural Concepts Private Limited, Chennai
Email: md@structflix.com

INTRODUCTION

Dynamic loading in civil engineering structures could be harmonic as in the case of machine foundations, impulsive as in the case of blast loading, random as in the cases of wind, seismic and wave loading. Measurement of amplitudes of vibration and the frequency content using various transducers constitutes a form of dynamic testing. Dynamic tests conducted on elements and assemblages to determine natural frequencies and mode shapes can lead to structural health assessment. This article gives a brief note on one such case study carried out for a car manufacturing company.

Description of the Structures

Vibration Measurements are carried out on the press foundation pedestal, press yard bay and press panel stock area of the car factory. The press yard mainly consists of four press units D, with a pressing force capacity of 1500,1000,1000,1000 T respectively. Each press unit is supported on two pedestals on the two sides. On either side of the press unit, rails are provided for facilitating movement of press jig.



Measurement location in Press Yard Bay of the factory

Measurement Locations and Instrumentation

The vibration measured at 23 locations in press foundation pedestal, press yard bay and press panel stock area. Figure shows the typical instrumentation station. Response acceleration of the various structures in the press yard is measured with tri-axial accelerometer and seismic sensor. These sensors are such that they will function well up to low frequencies. The sampling rate for recording the sensor is kept as 250 samples per second. The trigger level for the sensor is kept below 1e-4 g such that it is always kept logging the data as the back-ground noise itself shall be more than the trigger threshold value. Conditioned outputs of the accelerometers are collected and analysed using Fast Fourier Transform (FFT) analysis to get the frequency-amplitude quantification.

Vibration Severity

The vibration severity is computed in terms of Zellar's power of vibration and Vibrar unit. The possibility of damage to buildings can be assessed based on the Vibrar units. Table 2 gives the strength of vibration and the possible damage based on the Vibrar unit. Koch has compiled the amplitude of vibration for different frequencies, and classified them under different categories that will indicate the intensity of possible damage. Fig. 5 shows the chart giving different vibration intensities and possible damage on structures developed by Koch. In the present study the results of entire investigation will be discussed with reference to the criteria described above.

Summary and Recommendations

The vibrations are transient and impulsive type representing the impact type of pulses from all the four press machines. Maximum acceleration of 3.2 g is seen in Y direction of at one point at base plate. The Zellar and vibrar values are such that the category of vibration as per Vibrar is "Strong vibration" (concrete surface vibration). The bottom level of pedestals shows reduced acceleration levels with an order of magnitude less than the top value.

Vibration at press feeder bay over the concrete slab in which the rails are embedded are found to be "strong" as per Vibrar scale. Suitable suggestion to improve the foundation were suggested and the factory is running smoothly thereafter.

View of Vibration Measurement

Bureau of Indian Standards
The National Standards Body of India

Mr.M.Manimohan
Compiler

Bureau of Indian Standards(BIS) is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected therewith or incidental there to BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing

Origin of BIS

In the twilight years of British rule in India, when the country was faced with the gigantic task of building up the industrial infrastructure, it was the Institution of Engineers (India), which prepared the first draft of the Constitution of an Institution which could take up the task of formulation of National Standards. This led to the Department of Industries and Supplies issuing a memorandum on 03 September 1946, formally announcing the setting of an organization called the "Indian Standards Institution". The Indian Standards Institution (ISI) came into being on the 06 January 1947

In the initial years, the organization concentrated on standardization activity. To provide the advantages of standardization to common consumers, the Indian Standards Institution started operating the Certification Marks Scheme under the Indian Standards Institution (Certification Marks) Act, 1952. The Scheme, which was formally launched by ISI in 1955-56, enabled it to grant licenses to manufacturers producing goods in conformity with Indian Standards and to apply ISI Mark on their products. To meet the requirements of the Certification Marks Scheme, the nucleus of a laboratory was started in 1963. While the product certification wasbeing operated under the Indian Standards Institution (Certification Marks) Act, 1952, the formulation of standards and other related work were not governed by any legislation. A Bill with this objective was therefore introduced in the Parliament of 26 Nov 1986.

Bureau of Indian standards (BIS) came into existence, through an act of parliament dated 26 November 1986, on 1 April 1987, with a broadened scope and more powers taking over the staff, assets, liabilities and functions of erstwhile ISI. Through this change over, the government envisaged building a climate for quality culture and consciousness and greater participation of consumers in formulation and implementation of national standards.

The Bureau is a Body Corporate consisting of 25 members representing both Central and State governments, Members of Parliament, industry, scientific and research institutions, consumer organizations and professional bodies; with

Union Minister of Consumer Affairs, Food and Public Distribution as its President

and with Minister of State for Consumer Affairs, Food and Public Distribution as its Vice-President.

BIS HEADQUARTER

9,Bahadur Shah Zafar Marg, New Delhi-110002, India
Tel : +91 11 23230131, 23233375, 23239402 (10 lines)

5 Regional offices in Central, East, West, North and South regions with Regional Head Quarters at Delhi, Kolkatta, Mumbai, Chandigarh and Chennai
29 Branch offices

Total Published Standards	**20954**
Total Standards revised	**7668**

Totally 16 Departments are covered by BIS
Chemical Department (CHD)
Civil Engineering Department (CED)
Electronics and Information Technology Department (LITD)
Electro technical Department (ETD)
Food and Agriculture Department (FAD)
Management and Systems Department (MSD)
Mechanical Engineering Department (MED)
Medical Equipment and Hospital Planning Department (MHD)
Metallurgical Engineering Department (MTD)
Petroleum, Coal and Related Products Department (PCD)
Production and General Engineering Department (PGD)
Service Sector Department-I (SSD-I)
Service Sector Department-II (SSD-II)
Textile Department (TXD)
Transport Engineering Department (TED)
Water Resources Department (WRD)

All standards related to NDT are covered under Metallurgical Engineering Department (MTD).

Totally 65 Standards are in force for various NDT Methods

Visual	**01**
Training & Certification	**01**
Penetrant Testing	**02**
Magnetic Testing	**09**
Eddy current Testing	**07**
Leak Testing	**02**
Radiography Testing	**12**
Neutron Radiography	**01**
Ultrasonic Testing	**17**
Acoustic Emission	**02**
Composite	**01**
Concrete	**01**
Thermography	**03**
NDT General	**02**
Metallography-Replica	**01**
Residual Stress Measurement	**01**
Signal Analysis	**01**
Stray Flux	**01**

At present ISNT is being represented in the MTD21-Non-Destructive Testing Sectional Committee under Functional Category as Technologist by Sri R.J.Pardikar (Principal Member) and Sri Diwakar D.Joshi(Alternate Member) .

ISNT, Chennai Chapter members, Sri Dr.Prabhu Rajagopal,(Principal Member) and Sri Dr .Krishnan Balasubramanian,(Alternate Member), from IIT, Madras, are representing Under Academic Institution category.

Source : https://bis.gov.in

TECHNICAL TALK ABSTRACTS

03.09.2021 - Recent Trends in Infrared Imaging for Non-destructive Testing and Evaluation of Solids by Dr. Ravibabu Mulaveesala, Associate Professor, IIT Delhi.

ABSTRACT

InfraRed Thermography (IRT) is one of the widely used Non-destructive Testing and Evaluation (NDT&E) method for characterization of variety of materials irrespective of their electrical and magnetic properties. Among different testing modalities and associated post processing schemes recently proposed infrared image correlation based thermal wave imaging schemes gained their importance due to their inherent merits. This present talk highlights highly depth resolved infrared imaging modalities based on infrared image correlation approach for identification of subsurface defects in metals and composites.

Keywords: Infrared Thermography, Phase Images, Time Domain Analysis, Frequency Domain Analysis.

Biography

Dr. Ravibabu Mulaveesala received M.Tech from National Institute of Technology (NIT), Tiruchirapalli in 2000 and PhD from Centre for Applied Research in Electronics, Indian Institute of Technology Delhi (IITD), India in 2007. Presently he is working as an Associate Professor in the Centre for Sensors, iNstrumentation and cyber physical System Engineering (SeNSE), Indian Institute of Technology Delhi. His research interests include development of novel instrumentation for thermal, acoustical and optical non-destructive testing and evaluation technologies. He serves as editorial or advisory boards of the several refereed journals of Institute of Physics, Institute of Electrical and Electronics Engineers (IEEE), Institution of Engineering and Technology (IET), Elsevier etc. and also to several peer reviewed conferences.

01.10.2021 - "QUALITY CONSCIOUSNESS & IT'S MANIFESTATIONS IN INDUSTRY" by Dr. Deepesh Vimalan, Senior Manager-Quality Control, High Pressure Boiler Plant, Bharat Heavy Electricals Limited, Trichy

ABSTRACT

The term Quality, even though it's scope & definition has undergone continuous evolution with changing times, is still the defining parameter of success in any industry. It is essential not only to understand this fact, but also to imbibe a quality culture across the organisation, in order to ensure the survival of business through quality. Here comes the importance of inculcating quality consciousness in every employee, through the establishment of policies, systems, documents and role clarity in every organisation. The objective of this talk is to present some of the prominent practices followed in industries in order to achieve this goal. This talk will give a rudimentary coverage of various facets of Quality viz., evolution of quality, roles of quality control & assurance, quality management concepts, six sigma, quality circles and quality case studies.

Biography

Deepesh Vimalan is currently working as Senior Manager, quality control in the High Pressure Boiler Plant, Bharat Heavy Electricals Limited, Trichy. He has obtained M.S from IIT Madras & Ph. D from NIT Trichy. He has 17 years of experience in NDE & Quality in the manufacturing of thermal and nuclear power plant equipments, and holds ASNT Level-III in UT & MT. He is an ISO 9001:2015 Quality Management system lead assessor, and has also completed the Harvard Manage Mentor Leadership Program by HBS. He has won several awards including the ISNT National NDE award for significant contributions in industrial applications 2019. So far he has over 20 publications to his credit and his areas of interests include conventional & advanced NDE imaging, welding, FEM etc.

ECHO BITES

Dear Sir,

Today I read the sound bytes. Happy to see the 11 pages of pearls joined as a garland. Information and photos are very clear to understand the technical information, meetings had with the V.C of Anna university, and practical problems shared by the experienced manager.
Thankful to Mr.Ramprakash and other members of the team for taking the pain to release the Newsletter "Decibel 21 and frequency 3" to preserve forever to review repeatedly.
I am forwarding the "Sound Bytes" to other societies and known Ex.colleagues for their information and spreading our chapter activities with your permission.
Congratulation to everyone involved in releasing the E.Newsletter in time.

Kind Regards,
R.Jaygovindan

Sir,
Thanks for the Newsletter. It is really a good initiative and of great use.
Regards,
V.SHRIDHAR

Dear Sir,

Excellent is the only word come to my memory ! A very great news letter, full of useful information. Please go ahead with your innovative ideas with latest developments and improvements.
Best Regards,
V.Raghunathan.

Dear Readers,
Your response & comments are highly appreciated

NEW PRODUCT

NEW! DXB:1 Digital X-ray Buggy

The DXB:1 Digital X-ray Buggy performs high-quality panoramic digital radiographs of circumferential welds on new pipelines without using traditional film. No more chemical processing, dark rooms, or flaws associated with conventional radiography.

JME's DXB:1 system communicates and integrates with the entire CR2 Pipeline Crawler Range. This allows 2-way communication between the Pipeline Crawler and DXB, giving configuration of key crawler parameters from the DXB control tablet. This integration also enables the commencement of inspection with the push of a single button. The DXB operator can control, adjust and view the status of the CR2 crawler at all times during an inspection task.

CHAT ROOM

Dr. Ravibabu Mulaveesala

Dr. Prabhu Rajagopal

1. Please tell us about your role as the Professor steering the SenSE Lab at IIT Delhi? How is your Group driving change in the field of Cyber Physical System Engineering?

As a faculty member at SeNSE, the main focus is to develop major academic & research activities in the field of sensing and imaging systems, advanced information processing (data analytics and machine learning) approaches and controls aspects of Cyber-Physical Systems which helps to fulfil the essential needs of the country mainly for defence, space and industrial sectors.

Well...with the fourth industrial revolution, physical systems are being designed to have a cyber component, that enables remote inspection, condition monitoring and easy of communication with physical systems for necessary action. In these systems, ubiquitous sensing and advanced data analytics features are taking us from automation to autonomy via a deep interconnection between the cyber and physical entities. Cyber-physical systems are becoming abundant in many sectors including manufacturing, testing & evaluation, health care, energy, infrastructure, transportation, defence & security and agriculture. As far as the safety, time and life of critical systems are relying on cyber-physical system concepts to become more efficient, fast, robust, resilient, flexible and scalable. As cyber-physical system applications become more pervasive, students with a background in sensing, imaging, instrumentation and cyber-physical systems will be in demand to design, produce, inspect and maintain the systems.

2. What prospects do you find for InfraRed sensing technologies in the NDT industry?

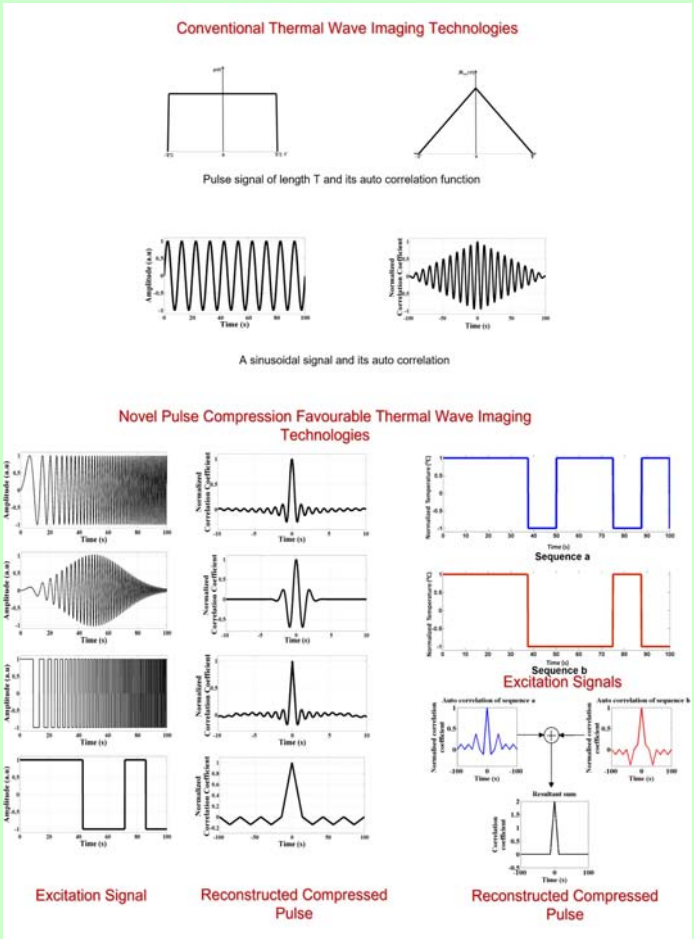
With the recent advancements in wide area monitoring remote infrared sensing and imaging NDT methods in combination with present day cyber physical system technologies, I am sure infrared/thermal non-destructive testing techniques will provide solutions to the NDT industries.

3. What are the core technologies being developed at your Group that you are excited about?

Researchers in my group extensively worked and developed pulse compression favorable thermal wave imaging technologies for non-destructive testing and evaluation application. I am so excited to share these technologies are well accepted and implemented globally by the thermal NDT&E R&D community as well as the industries.

4. What are the major obstacles to wider industry acceptance for these technologies?

In fact, these technologies are relatively new for the NDT&E community over the conventional techniques and will take some time to get wider acceptance. I am sure within few years as I mentioned above due to their remote wide area quantitative and safe inspection capabilities in combination with recent development in cyber-physical system technologies, infrared/thermal NDT&E will emerge as one of the most promising NDT methods.



DO'S AND DON'TS IN INDUSTRIAL RADIOGRAPHY PRACTICE

S.Chockalingam
Scientific Officer 'F'
AERB

DO'S

1. extend the drive cable and the guide tube of the gamma exposure device and the electric cable of the x-ray machine completely.
2. always carry out field radiography work where it is of low occupancy
3. carry out field radiography with correct collimator.
4. always ensure that the cordoned area is under observation through out the exposure.
5. always ensure audible alarm and warning lights are placed at the immediate vicinity
6. always ensure that the gamma exposure devices are stored in a pit and adequate security measures are provided
7. always maintain a log book with up-to-date entries in standard format
8. always wear a tld/drd badge during exposure
9. always maintain correct work procedures
10. always ensure that the source control or shutter mechanism is locked, all port plugs are firmly secured and survey meter used to verify the source in the fully shielded position.

DON'TS

1. never allow a trainee to operate the exposure device without supervision.
2. never allow the adjacent radiography sites to overlap.
3. never transport gamma exposure devices in public transport
4. never use some one else's tld. Tlds are not transferable
5. never transfer/ dispose the gamma cameras without permission from aerb
6. never carry out radiography activities when rso leaves the institution
7. never share, loan or borrow from another radiography agency, any of the radiography facilities, e.g. radiography enclosure, storage room, radiography equipment, radiation monitors and radiography personnel, except when permitted to do so by the competent authority.
8. never leave the gamma camera unattended in the vehicle while transporting it to different sites for radiography.
9. never enter areas of potentially high, but unknown, dose rates unless carrying a functional survey meter and, preferably, wearing a personal alarm monitor and/ or direct reading dosimeter
10. never touch a radioactive source or allow hands to come close to it.

Mr.M.Manimohan, Manager (Retired),
NDTL, BHEL, Trichy

CHECK LIST FOR RADIOGRAPHY

1. The joint number has to be painted / engraved before taking Radiography.
2. Check for Work order / Sale order, PGMA, DU No, Joint No and date in the Radiograph.
3. IQI and arrow to indicate the direction of gamma ray source should be kept
4. After taking RT, the arrow direction and Joint No are to be painted
5. If repaired locally, letter R1 / R2 etc to be kept with RT number depending upon the number of times the repair has been undertaken.
6. If any retake due to Process mark and other problems is given, while retaking, letters "RT" should be kept and while submitting for evaluation the original film also should be offered.
7. If merging / grinding has to be done and retaken, the letter "MRT" should be kept.
8. In the report against the procedure and acceptance the procedures reference is to be written according to the product
9. The reports should be signed by Level II from NDT Agency.

VERIFICATION IN THE RT REPORT

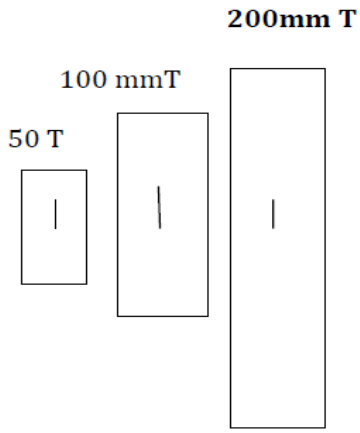
1. Job details and dimension
2. Drawing number
3. Welder number
4. Type of weld
5. Material
6. Source used
7. Source size and strength
8. SFD
9. Film brand and speed
10. Screens used
11. IQI Designation
12. IQI Placement-Source / Film side
13. Exposure time
14. Manual / Auto processing
15. Technique used
16. Film viewing-Single wall or double wall viewing
17. Procedure and acceptance reference
18. Result
19. Radiographer's Name and Level
20. Name and Level of the person doing

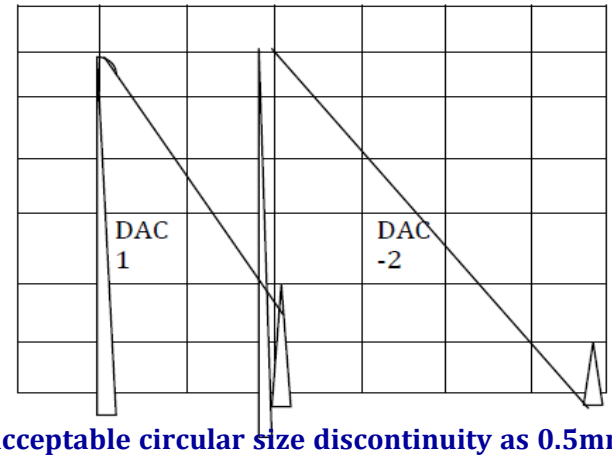
CHECK LIST FOR DARK ROOM

1. The following should be checked in Dark room periodically
2. Storage of film and the expiry date verification
3. Chemicals expiry date
4. Developer, Fixer preparation date
5. Area of film processed
6. Replenisher addition details
7. Safe light intensity measurement at periodical interval
8. Cleanliness of Lead screens, hangers, clips and cassettes.
9. Availability of thermometer and Developer Temperature measurement
10. Safe disposal of dark room chemicals (as per EMS Norms)

Questions ? Answers ?

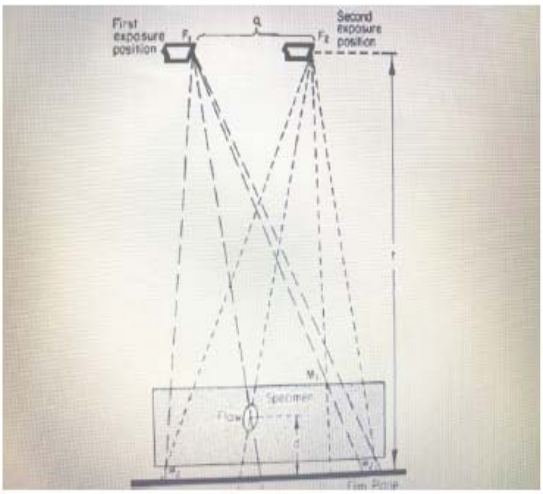
1.SG Iron Castings are widely used in Engineering Industries because of its "high strength,Toughness ,ductility,hot workability and hardenability . The valve blocks of SG Iron Castings are of Grade 400\15 of size 100x250x300 are used as highpressure boiler components under working pressure of 350 bar. The acceptance criteria as recommended by the user's specification is "No circular flaw size of more than 0.5 mm will be acceptable". The user recommended to use 4 MHz /2 Mhz Longitudinal wave Transducer. What is the exact Test Procedure required to test the valve blocks?.





Though User specification indicates the size of unacceptable circular size discontinuity as 0.5mm or more it is impracticable to deduct such smaller size discontinuity in SG Iron Castings .Also it is very difficult to prepare a flat bottom hole of such smaller size calibration block through machining.
It is to be noted that ASME code-Section V Article 5(Raw material UT) - SA609 refers size of FBH as 6.4 mm only for Straight beam technique and for angle beam technique hole dia starts from 2.4 mm and goes up to 12mm.
Anyhow, FB hole size of 1 mm of length 15 mm was made in 3 calibration blocks of SG Iron castings of width 25mm and length 50mm,100mm and 200mm as shown above which is as per the recommendations of ASNT Level III personnel .
Using the above blocks Two DAC curves would be made to scan the Valve block up to 400 mm T Valve blocks.
The double DAC curve as drawn would help to deduct the discontinuity by scanning the valve block on both side up to 400 mm .Thus, the discontinuities like non metallic inclusions and center shrinkage or corner shrinkages can be deducted through two DAC methods. This technique was successfully implemented and relevant defects were deducted in Valve blocks up to 400 mm T

2. In Austenitic Stainless steel Valve castings of 40 mm thickness UT cannot be performed. Only RT can be performed. How will you locate the depth of the defects present in it so that it would be feasible to rectify without wastage of material and time?



it is possible to locate the defect by two shots shift method in RT as detailed below.
To get more precise information of the depth, two shots RT are to be taken by keeping RT source at different location as shown in Figure .Then the depth can be calculated by measuring the size of images and using the triangulation technique.

In this technique, small lead markers, usually in the form of triangles, are attached to the two surfaces of the object, one set of three or four markers on the source side and one set on the film side. If two separate exposures are to be made, each film SHALL be carefully aligned with the object so both films occupy the same position. After the markers are positioned, one exposure is made with the normal source, object, and film position. A second exposure is made with all conditions the same between the object and film with the exception that the source is shifted 10° to 45° from the initial position. The greater this shift, the greater the accuracy of determining the position of a given discontinuity from one of the object's surfaces. If the discontinuity is sufficiently prominent, both exposures MAY be made on the same film. In either case, the distance of the discontinuity above the film is given by the following expression:

d= bxt/a+b
Where: d = distance of discontinuity above film plane
a = distance of the source shift
b = change in position of discontinuity image on radiographs
t = source film distance
It is good to know which of the two surfaces of the object is nearest to the discontinuity. In this case, the shift of the discontinuity and marker images is measured.
This technique is also known as Parallax Radiographic Technique..
But this technique is more effective for job thickness 50 mm and more only.

If the shift of the discontinuity image is less than one-half the shift of the markers on the source side of the object, then the discontinuity is nearer to the film side of the object. If the shift is greater than one-half, the discontinuity is nearer the markers on the source side of the object.
Thus the approximate location of the defect may be determined and the repair may be carried out accordingly by minimizing the wastage of material and the cost.

3. In Globe valve Bonnet steel castings, the flange sides are to be evaluated by both RT & UT Flange size: OD= 216mm, ID= 100mm, Thickness = 40mm The technique used is SWSI, by keeping the IR 192 source, at the inner side bottom of the flange as shown in Figure-3 RT Film evaluation confirms that the flange sides are free from any significant defects and the valve is acceptable. But relevant sub surface defects in the flange sides of the castings are detected in UT evaluation by using normal Probe of 2 Mhz. Why the defects that are noticed in UT are invisible in RT?

In RT, the minimum distance between source and Test specimen required to take quality radiograph is given as S= Txf/ µg; s= SFD- T where µg is un sharpness factor.
Minimum SFD = T+ fxT/µg
As per ASME Sec V µg=0.5 mm up to 50 mm Thickness of test specimen T=40 mm
Let us assume size of source f as 3 mm.
If we insert the values for f,T and µg on the above equation we obtain minimum SFD required to obtain quality radiograph is 280mm.

But, if RT is taken by Technique SWSI-RT1 by keeping the source inside diameter of flange side, the maximum SFD would be 140mm which is very much less than specification requirement of 280mm. . In usual practice, many Radiographers use Panoramic Technique –RT4 to take up RT of Valve flange side and not following minimum SFD rules .Hence RT thus taken is not a quality one and found to be missing of the required and relevant details of the test specimen on RT evaluation.

To obtain quality radiograph minimum SFD should be maintained as 280 mm and the possible technique may be RT2- DWSI by keeping the on the flange OD of the Valve and film on the opposite side. But, DWSI may have restriction because of the higher penetration thickness of 80 mm and Iridium 192 may not be a good radiographic source for the penetration of 80 mm steel thickness and the source of Co60 is required instead of Ir 192. The Co 60 could not be used for field radiography due to BARC restrictions.
Instead the source can be kept outside at a desired SFD and by keeping the film inside, multiple exposures can be taken as far as possible to cover the area. If so, the radiographic film would be quality one and the relevant details could be obtained.

R BALAKRISHNAN

Do You Know?

SS sheets of thickness 0.63 to 3mm are being used to manufacture SS bellows. The sheets are made tubular forms by folding the ends and joining by fusion welding as Butt Joints

As per the manufacturer and customer specifications ,quality of the weld joint is being radiographically tested .

1. Is there any International standard available to perform RT tests and also evaluate Radiographic Films of SS Butt joints ?

2. What kind of defects can be identified in RT evaluation?

TENSILE TEST

PROBLEM 1

A STEEL SPECIMEN is tested in a standard Tension Test to evaluate several mechanical properties .The dimension of the specimen and observations made during the test are given below

Determine :

1. The yield Strength
2. The ultimate Tensile Strength
3. The % of Elongation
4. Modulus of Elasticity
5. % of reduction in area
6. Fracture Stress
7. Modulus of Toughness

Dimension of the specimen	12.5 mm
Gauge Length	62.5 mm
Load at Yield Point	41kN
Maximum Load	72.5 kN
Fracture Load	51.25 kN
Gauge Length at Fracture	80.5 mm
Diameter of Fracture Section	9.5 mm
Starin at Load of 20 kN	7 , 7 6 4 x 1 0 - 4 mm/mm

PROBLEM II

The following data were obtained in a Tensile Test on a specimen of 15mm diameter with a 50mm Gauge Length

Load (kN)	70	120	150	160	170	200	220	233	235	220
Extension	0.25	0.40	0.50	0.60	0.75	1.75	3.00	5.00	6.50	8.00

The Specimen Diameter after fracture was 12.45mm

Determine

1. Tensile Strength
2. Young's Modulus
3. 0.2% Proof Stress
4. % Elongation
5. Reduction in area

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Ex-BHEL, Corporate surveillance

Answers in the next issue

Here are 20 fascinating facts about the eyes

1. Your eyes focus on 50 different objects every second.
2. The only organ more complex than the eye is the brain.
3. Your eyes can distinguish approximately 10 million different colors.
4. It is impossible to sneeze with your eyes open.
5. Ommatophobia is a fear of the eyes.
6. 80 percent of all learning comes through the eyes.
7. Your eyes can detect a candle flame 1.7 miles away.
8. Your iris (the colored part of your eye) has 256 unique characteristics; your fingerprint has just 40.
9. Heterochromia is the medical term for having two different colored eyes.
10. Only 1/6 of your eyeball is visible.
11. Your eyes are comprised of rods and cones. Rods allow you to see shapes, while cones are responsible for detecting and deciphering colors.
12. The average person blinks 12 times a minute (bet you just blinked!).
13. The shark cornea is nearly identical to the human cornea, and has even been used in human eye surgery!
14. Your eye is the fastest contracting muscle in the body, contracting in less than 1/100th of a second.
15. The optic nerve contains more than one million nerve cells.
16. The weight of the eye is only 28gms.
17. Compared with the Digital camera, eye got 576 Megapixel resolution system
18. Crystalline lens changes to thinner shape for far vision and thicker for Near vision.
19. Due to aging (above 40 years) lens loses its thickening ability resulting in loss of close focusing.
20. Eye is the only organ that does not grow as rest of the body grows with age. The size will be the same as when we were born.

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