



From Chairman's Desk ...

Dear Members of ISNT Thiruvananthapuram Chapter,

At this juncture of our Chapter stepping into the fourth decade of activities, on behalf of the new Executive Committee, I would like to inform you that a good number of NDT programmes are on the anvil for a very effective and technically active year ahead. I hope that with your full support and cooperation the new team of office bearers will be able to perform effectively to achieve new heights in the activities of the Chapter. It is also inspiring to recollect the major achievements we had in the past, such as, the two very successful national Seminars NDE1998 at Technopark and NDE2003 at Kovalam, best Chapter award for the year 2002, the formation of national level Digital Radiography Working Group (DRWGI) under the leadership of our Chapter, National NDT Award (R&D) to our Chapter in 2003, etc. There are still more to achieve...

The new EC has already scheduled some programmes for this year, such as, Refresher Course in NDT in August 2009, Seminar on Digital Technologies in NDT during November 2009, Workshop on Developments in DR technology under DRWGI at an earliest occasion, Monthly Technical Lectures, etc. The programmes for University and Colleges are also in the pipeline. The Chapter website www.isnttvm.org has been updated and the incoming programme is being flashed in the news line on the home page. The updated membership list has also to be uploaded. Members may kindly intimate the correct address if there is any change. Kindly note that the details of programmes and activities of the Chapter will be intimated through e-mail and website as it is the way of life now.

The National Seminar NDE 2009 will be held at Trichy in December 2009 and our Chapter has to participate in a big way this time by submitting a good number of papers and sending a team of delegates. You can have the up-to-date details from the web site nde2009.in, and online submission of abstract is also possible.

This issue of Image is coming to you as the first release from the new executive committee. Sri. V K Ravindran, Ms. S. Vaishnavi and Sri. S. Remakanthan in the new team of Editorial Committee are carrying out this task very efficiently.

Thank you.

❖ MR Kurup Memorial Lecture 2009

The chapter conducted the MR Kurup Memorial Lecture in the fond of memory of Padmashree M. R. Kurup, who was the spirit behind every activity of the chapter. MR Kurup Memorial Lecture 2009 was delivered by Shri PS Sastri, Director, ISRO Safety Office, ISRO Head Quarters, Bangalore.



Shri PS Sastri, delivering the Lecture

Sri PS Sastri spoke on the safety aspects in a space programme in general and presented a detailed account on the safety aspects envisaged in the Indian Human Space Programme.

❖ Annual Technical Meet 2009

Smt. Novma Money, Human Relations & Mental Health Professional gave an eloquent lecture on Adolescent Management, with many case studies, theory and humour. It was well received by all the members and their families present. Smt. Novma Money brought out the problems faced by teenagers and the parents role in the making of good children.

❖ Annual General body Meeting

AGM- 2009 was held at Hotel Residency Towers, Thiruvananthapuram. on 25th April. Chairman Sri.



Sri. R. Sivaramkrishnan, Chairman delivering the welcome address

Sivaramakrishnan presided over the meeting. Shri S Sridhar, Hon. Secretary presented the annual report of the Chapter and Shri Binu P Thomas, Hon. Treasurer presented the audited statement of accounts of the year 2008 - 2009. The new Executive Committee for 2009 – 2011 was also nominated by the AGM. On behalf of the newly elected office bearers, Dr. V R Ravindran, Chairman delivered the acceptance speech



Dr. V R. Ravindran, the Incoming Chairman delivering the acceptance speech in AGM-2009.

Secretary's Report

The new Executive Committee had its first meeting on May 15, 2009. The meeting was jointly chaired by the outgoing Chairman Sri. R Sivaramakrishnan and incoming Chairman Dr. V R Ravindran. After elaborate discussion, EC decided the schedule of Chapter activities for the year ahead.

- One day Seminar on Trends in Digital Technology in NDE- Nov 2009.
- Two day Refresher Course on Non Destructive testing on Aug 22 & 23, 2009 at Hotel Horizon, Thiruvananthapuram.

• Bi- Monthly Lecture program :

Organised First lecture on 2nd July 2009 on Fracture of Composites by Dr. R Ramesh Kumar, VSSC.

The second Lecture was held on 20th July 2009 on DICONDE and DigitalRadiography by Sri. R Sainik, GE Inspection Technologies.

Both the lectures were well attended and appreciated by the members.

• Academic Programme:

The first programme a One day workshop is proposed to be held at Kariavattom Campus, University of Kerala in October 2009.

• DRWGI Activity:

One Day Workshop on Digital Radiography is proposed for the 1st week of October 2009 in collaboration with M/s. GE Inspection Technologies & other institutions.

• Joint Seminar with MRSI:

Chapter will associate with MRSI to organize a seminar in September 2009 at Trivandrum.

• National seminar NDE 2009:

EC decided to encourage Chapter members for maximum participation and Paper presentation.

• IMAGE:

EC decided to release the July Edition of IMAGE by last week of July 2009.

Executive Committee 2009 - 2011

The new Executive Committee for the year 2009 – 2011 has been elected with Dr. V R Ravindran as Chairman and Sri. Imtiaz Ali Khan as secretary. The new team of office bearers is as given below.

Chairman	: Dr. V. R. Ravindran	Sri. S. Adalarasu
Vice –Chairmen	: Sri. K R. MohanAnanthanarayanan Dr. Ramesh Kumar. R	Sri. K. V. Hariharan Nair
Secretary	: Sri. Imtiaz Ali Khan	Sri. R. Sivaramakrishnan (Immediate Past Chairman)
Joint Secretary	: Sri. Ratheesh S.	Sri. S. Sridhar (Immediate Past Secretary)
Treasurer	: Sri. Sekhar Natraj	Co-opted Members : Sri. S. Saratchandran
EC Members	: Dr. M R. Suresh Sri. Roykuttan Sri. N. Narayanankutty Sri. B. Vijayamohanan Nair	Sri. Manoj Kumar Dr. Mahadevan Pillai Sri. S Remakanthan Sri. M Nalla Perumal

Know about Imaging Plates

Vaishnavi S, RPP, VSSC

Introduction

The conventional film radiography is being replaced with the latest Digital X-ray Imaging techniques such as the Imaging plates [IP] and Flat panel detectors [FPD]. Both these techniques are film less, fast and economical for NDT Facilities carrying out huge amount of radiography work. Even though FPD based system is superior to imaging plates in respect of sensitivity, resolution and real time imaging capability, their performance is limited by X-ray energy in the lower range, normally below 300kV. For higher energies of the order of 450kV or MeV range, imaging plate is a better option. DR systems are being successfully used in VSSC for the last several years but the feasibility of Imaging plate based Computerized Radiography [CR] has not yet been started. This is mainly due to its limitation in real time imaging as the image has to be retrieved from the exposed plate through laser scanning. The technology of imaging plates based Computerized Radiography is briefly explored here.

Basic principle of Imaging Plate

Imaging Plates are flexible image sensors used for Radiography Imaging. Tiny crystals of Barium Fluorobromide of grain size of about $5\ \mu\text{m}$ are embedded with traces of Europium. This formulation of BaFBr:Eu^{2+} is uniformly coated on a polyester support film.

Mechanical stability to this active layer is provided by a thin metal base and a top polymer layer. BaFBr crystals are photo stimuable phosphors that act as local storage of high energy radiation and Eu^{2+} ions act as luminescence centres. Construction layout of an Imaging Plate is shown in Fig 1.

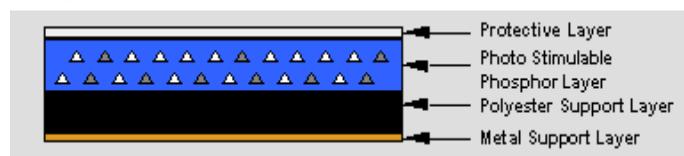


Fig 1: Imaging plage Layout

The phosphor used for the Imaging Plate uses the phenomenon of Photo-Stimulated Luminescence [PSL]. In PSL, a substance re-emits light upon a second stimulation of light that has a longer wavelength than the luminescence wavelength of the first stimulation. This phenomenon satisfies the basic concept of the Imaging Plate as an X-ray image sensor, which stores the first radiation information and releases that information as light. In other words, the electron irradiation excites the crystals in their luminescence center to a semi-stable state. The image thus formed by this excitation is stable for many

hours and decays within days. By an illumination with red laser light, the crystals are excited again and stimulated to release the stored information as blue luminescence signal.

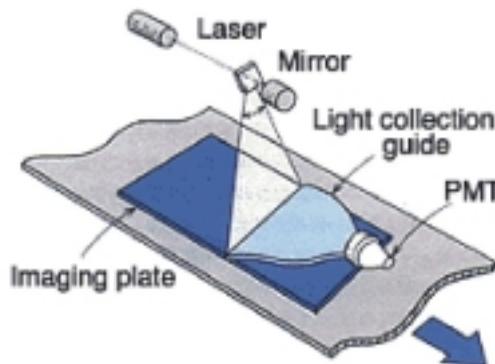


Fig 2: Reading the image information from the Imaging Plate

The amount of blue light released depends on the first excitation with electrons and is a direct measure of the electron dose. As this is a physical process it is fully reversible without degradation, and so imaging plates can be reused many times. By exposing to white light for a period of 10 to 15 minutes, gradually all excitation is released and the plate is ready to be exposed again. As the excitation is stored within the crystal luminescence centers the number of available storage cells is virtually unlimited. For this reason the plate is not saturated. Only the readout device limits the dynamic range. The PSL released upon the laser is collected into the photomultiplier tube (PMT) through the light collection guide and is converted to electric signals. Depending on the purpose, the reading density may be selected from 5 to 40 pixels/mm. The reading sensitivity and sensitivity range can also be selected accordingly. Subsequently, the analog electrical signals are converted to digital signals of 8 to 16 bits followed by Image analysis and data processing. niformly irradiated visible light.

The Imaging Plate is reusable after erasing the residual latent image with uniformly irradiated visible light. Refer to Fig 3 for CR Scanner for maging plates



Fig 3: Computed Radiography scanner from GE Sensing & Inspection Technologies

Advantages of Imaging Plates

Sensitivity : Imaging Plate is 10 times more sensitive than film and so it's an ideal detector for low dose imaging.

Dynamic range : Its dynamic range is linear over 6 orders of magnitude and more.

Pixel size : Pixel size from 15 μ m to 50 μ m is possible and so high resolution images with spectral resolution can be achieved.

Digital image data availability : Digital data is available

on laser scanning. Image processing is possible and under or over exposure images can be visualized.

Fast scanning: No wet processing is involved and is faster. The data is digitized while reading and is available directly after readout.

Reusability : About 1000 times reusable. Besides reusability, Image content remains for 2 or 3 days after the exposure.

Reference : Websites related to Fujifilm, GE Inspections & Ditabis Technologies

BACK TO BASICS !!!!

X-rays vs Gamma rays

X-RAYS	GAMMA RAYS
X-rays originate from Electrical excitation	Gamma rays are of radioactive origin
X-rays are emitted by electrons outside the nucleus	Gamma rays are emitted by the nucleus
X-ray machines emit broad band of wavelengths. [polychromatic]	Gamma ray sources emit one or few wavelengths [narrow band]
Quality of X-radiation can be controlled at the will of the operator	Quality of Gamma rays cannot be controlled at the will of the operator

5th Refresher Course on Non-Destructive Testing

August 22& 23 [Sat & Sun] 2009 at Hotel Horizon Thiruvananthapuram

TECHNIQUES / TOPICS COVERED

- ❖ Significance of NDE
- ❖ Processes and sources of defects
- ❖ Radiography Techniques
- ❖ Ultrasonic Technique
- ❖ Visual Inspection
- ❖ Penetrant Testing
- ❖ Magnetic Particle Testing
- ❖ Eddy Current Testing
- ❖ Infrared Thermography
- ❖ Accoustic Emission Technique
- ❖ Advanced Optical Techniques
- ❖ NDT standards and certification

Practical demonstration on selected general techniques will be conducted

Course fee:

ISNT members	- Rs. 2000/-
Non- ISNT members	- Rs. 2250/-
Students	- Rs. 1500/-

CONTACT ADDRESS

Dr. R. Ramesh Kumar

Course Director

Head, HPDD, INSTEF Area, VSSC, Thiruvananthapuram – 22
Ph: 2562447(O); Email Id: r_ramesh@vssc.gov.in

Sri. Ratheesh S

Course Coordinator

Engineer, PED, VSSC, Thiruvananthapuram – 22
Ph: 2564252(O); Email Id: s_ratheesh@vssc.gov.in

Application with the following details, is to be sent to the contact address on or before 5th August, 2009

Editorial Committee

Editor : V.K.Ravindran
Members : Vaishnavi S & Remakanthan S

Address for Correspondence

V.K.Ravindran
QDPC, VSSC.. Ph. 2563680
E-mail: ppec_qrpg@vssc.gov.in