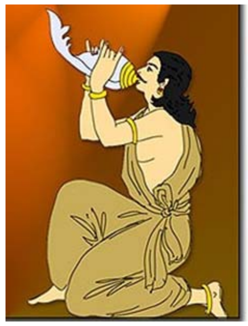
SOUND BYTES

Decibel 21
Frequency 3

Official Newsletter of ISNT Chennai Chapter



Climate change & NDT.

Dear members,

Season's greetings to you all.

Steam car is the dream car, often repeated sentence by my Mechanical Engineering Professor in the early 1960s. It is becoming true. Vehicles running with electricity as the energy source, soon will be the order of the day and the electricity will be generated with Hydrogen as the fuel. The state of the fuel has changed from Solid to liquid and then is proceeding to gas – Carbon, Hydro carbon to Hydrogen. This change in my opinion, will usher in new frontiers of testing, especially in the area of Leak Testing, to be invented and practiced. Already the introduction of Alloy wheels & Tubeless tires is throwing new challenges in this area. I envisage newer materials & shapes for storage of Hydrogen, hence their characterization. With the advent of replacing Coal by Hydrogen in producing Green Steel entirely by early 2030s, the challenge is obvious.

Space for "Sound Bites" is increasing, motivating the team and forcing us to publish more innovative public interest articles. A BIG THANK YOU. One request please. Can you mention your membership number for us to identify, while posting your feedback.

Thank you all for authorizing the same team to continue till the next AGM. The team, with the debilitating effort of pandemic behind, will work with more vigour and come out with stellar performance.

Ram

Indian Society for Non-Destructive Testing , Chennai Chapter
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Email: isntchennaichapter@gmail.com; Website: www.isnt.in

ISNT CHENNAI CHAPTER NEWS

1. Addition of Members – Nil : Total Members - 695

2. Courses Conducted

i) **MT & PT Level-II 26.08.2021 to 05.09.2021 Course Director: Mr.R.Vivek**
Examiner: Mr.E.Sathya Srinivasan / Mr.S.R.Ravindran

ii) **UT Level-II 15.09.2021 to 26.09.2021 Course Director: Mr. B.Ram Prakash**
Examiner: Mr.D.Venkataramanan / Mr.Nickolas

iii) **RT Level-II 20.10.2021 to 31.10.2021 Course Director: Mr.P.Anandan**
Examiner: Mr.E.Sathya Srinivasan / Mr.S.R.Ravindran

A) Course planned

S.No	course	From	To
01.	UT Level-II	08.12.2021	19.12.2021
02.	MT & PT Level-II	13.12.2021	23.12.2021
03.	VT Level-II	17.01.2022	22.01.2022
04.	UT Level-II	02.02.2022	13.02.2022
05.	RT Level-II	23.02.2022	06.03.2022

B) In-house Training

Conventional NDT Training Program to Faculties of M/s. Veltech Rengarajan Dr. Sagundala Institute of Science & Technology, Avadi – Chennai during December 2021.

3. Technical talks

S.No	Date	Topic	Speaker	Venue	No. of participants
01.	03.09.2021	Recent Trends in Infrared Imaging for Non-destructive Testing and Evaluation of Solids"	Dr Ravibabu Mulaveesula, Associate Professor, IIT Delhi	Video Conferencing – MS Teams	64
02.	01.10.2021	"Quality Consciousness & It's Manifestations In Industry"	Dr. Deepesh Vimalan, Senior Manager-QC, BHEL, Trichy	Video Conferencing – Zoom	48

4. EC meeting

The Third EC meeting was held on 17th October 2021 both physical and virtual formats. Out of 13 attendees, 6 were physically present and 7 attended through video conferencing.

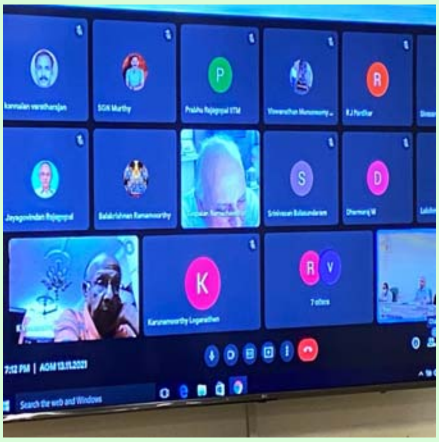
5. Meeting with VC of Anna University

17.09.21 was a golden day for your chapter as a few prominent members could meet the new VC of Anna University to felicitate him on his appointment and chalk out a new path for the benefit of the student community.

ISNT CHENNAI CHAPTER NEWS

Annual General Body Meeting

The Annual General Body Meeting (AGM) was held on Saturday 13th November 2021 at 6.30 PM at ISNT VA Chandramouli Hall, Guindy, Chennai by hybrid manner as informed through circular sent to all members along with MOM of previous AGM, Secretary's Report and Audited Financial Report for the year 2020-2021. Total number of attendees was 50, by Physical presence – 24 and by virtual presence– 26. The present team of office bearers & EC members were elected for 1 more term till July 2022.



HO news & other chapter news

For ISNT Head office announcements and Webinars of other chapters please refer to the Website of HO of ISNT (www.isnt.in).

INVITED ARTICLE

Industry 4.0 solutions for ultrasonic testing

Dr.Maria Felice, Product Marketing Manager, Asiaregion,
Screening Eagle Technologies, Switzerland

Ultrasonic Testing (UT) is a popular NDT method for thickness gauging and flaw detection, this is because of several reasons. It is sensitive to both surface and subsurface defects, including defects well below the surface. A result is obtained instantly with the option of doing post-processing for more thorough analysis. Required material preparation is minimal and only access to one side is needed. Importantly, ultrasonic waves are non-hazardous.

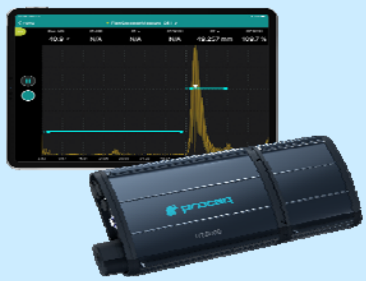
However, UT does pose several challenges. A high degree of operator skill and integrity is required to set up the inspection, conduct it and report results. After most UT inspections, there is no automatic permanent record of the inspection – it is the responsibility of the operator to record the necessary information. Some materials can be difficult to inspect with ultrasound, for example if they are coarse-grained. Defects can be missed in such cases and conversely, spurious indications can be misread as defects.

A big change for ultrasonic testing occurred approximately 30 years ago when flaw detectors switched from analogue to digital. However, this did not solve most of the challenges associated with UT. Recently reported pain points include: complex user interfaces, inefficient workflows, complicated data interpretation, incomplete traceability, obstructed data sharing and difficulties getting personnel onsite (because of skill shortages and pandemic-related restrictions). Various readily available technologies can be used to combat these pain points. They are mostly technologies that we use in our daily lives inside mobile devices such as handphones and tablets. So why not use them for flaw detection?

Mobile devices are typically lightweight and can connect wirelessly (through Bluetooth or WiFi) to other hardware. Therefore, the proposed setup is to separate the flaw detector into two components: (1) the pulser/receiver which connects to the ultrasonic probes and (2) a mobile device which connects to (1) wirelessly and is used to set up the inspection and to receive, process and store inspection data.

Mobile devices are typically connected to the internet so data can be stored securely on the cloud and shared instantaneously. Furthermore, the inspector can communicate remotely with an expert and get assistance while still out on the field. Due to the touch screen nature, the software (or 'apps') on mobile devices usually have a 'tile' design with a few options that are easy to view and select, instead of multiple drop-down menus.

The latest mobile devices have very powerful processors and large storage capacities. This means the processing that previously could only be done on a PC can now be done on the field. Furthermore, there are rarely issues with running out of storage space, and high volumes of data can be saved. For example, instead of recording a single A-scan of a suspected indication, the A-scans collected in the few seconds before hitting 'save' can also be recorded. This increases traceability and reduces the likelihood of having to repeat an inspection. Mobile devices often can capture a multitude of data formats such as photo, video, audio and text. Therefore, such data can be stored alongside inspection data to highlight important points such as ambient temperature, surface condition of the component and so on.



Let's take a look at ultrasonic testing at high temperatures which is a particularly challenging application. Screening Eagle Technologies' Proceq UT8000 is an ultra-portable flaw detector that can be used with commercially available ultrasonic probes and couplant, including ones designed for high temperature. It has several software features which make high temperature inspection much easier and more reliable.

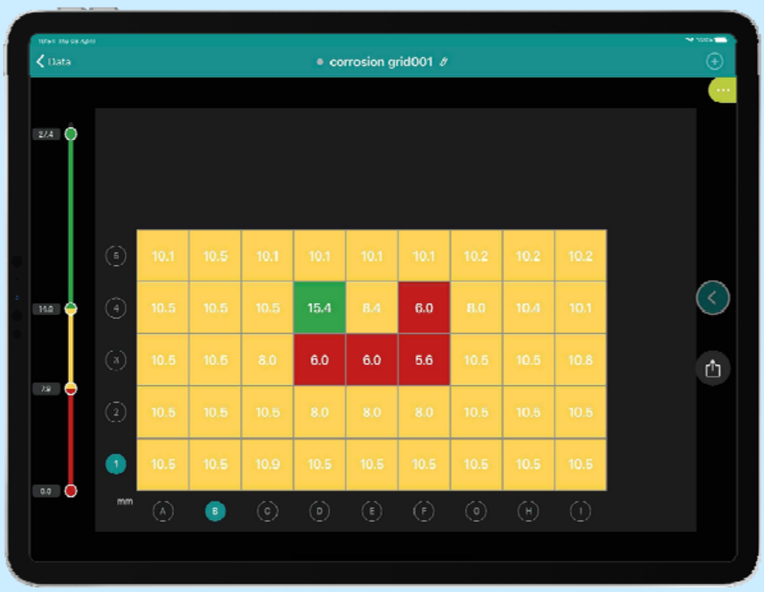
Ultrasonic testing at high temperature is required in process industries, with temperatures often above 300°C and sometimes even 500°C. In particular, thickness measurement is often required since pipes and tanks often corrode in these environments. Further to the above-mentioned pain points, there are ones particular to this application. Working conditions are dangerous and uncomfortable. There is a limited time window available for inspection because the ultrasonic probes can only be used for a limited time at such high temperatures. Ultrasonic velocity is dependent on mechanical properties which in turn are dependent on temperature. This velocity change is non-negligible at high temperatures so must be accounted for.

A range of specialist hardware exists for high temperature measurement including probes and couplant. This hardware meets the physical requirements for the harsh environment. However, the inspection workflow itself remains very challenging because time for collecting data is very limited. Probes can typically be used for 5-10 seconds at a time at high temperature, before a 1-minute cooling-down period (this is referred to as ‘duty cycling’).

If errors such as bad positioning of gates are made, the entire inspection often needs to be repeated. Furthermore, it is difficult to record exact inspection locations and take notes in this unpleasant environment. It is recommended that the zero and velocity calibration be undertaken at the exact temperature of the part to be inspected, due to the temperature-dependent ultrasonic velocity. These calibration procedures can be cumbersome. With Proceq UT8000, calibration of velocity and zero offset only requires a couple of seconds of contact with the part. The A-scan peaks are saved, and the user can calibrate comfortably off these with the probe removed from the hot part.

With Proceq UT8000, when the user is scanning a surface and presses save because they think they have found an indication of interest, the A-scan data collected a few seconds before the save operation is also saved. This is known as ‘time rewind’. It enables the users to scroll through the data and ensure that they report the A-scan directly over the defect. This ensures that results are reliable and reduces the amount of inspection rework.

When doing thickness gauging with Proceq UT8000, the entire A-scan is recorded at each measurement location. By a simple swipe, the user is taken from the thickness reading on the grid to the full A-scan at that location. Settings such as gain and gate location can be adjusted. Again, this increases reliability and reduces rework.



A digital logbook is automatically appended to each data set collected with Proceq UT8000. This can include photos of the test site, text comments and even audio clips. Notes can be added at any time, during the inspection or even several weeks afterwards. This ensures that all necessary information is stored with the ultrasonic data.

Ultrasonic / Radiography Practical Problems

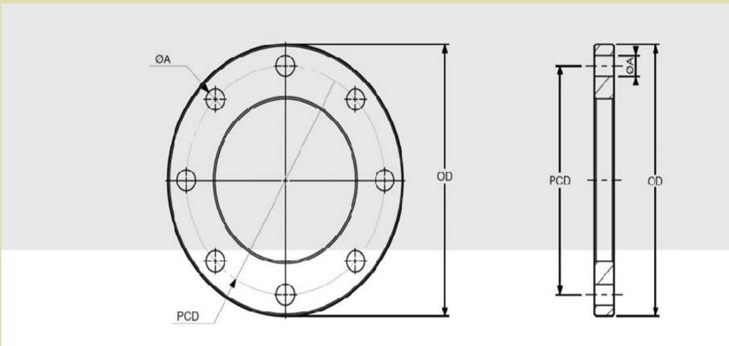
R Balakrishnan, Manager-CQ-BHEL (retd)

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 high-pressure 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?

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?

3. In Globe valve Bonnet steel castings, the flange sides are to be evaluated by both RT & UT.

Figure –1



Figure—2

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

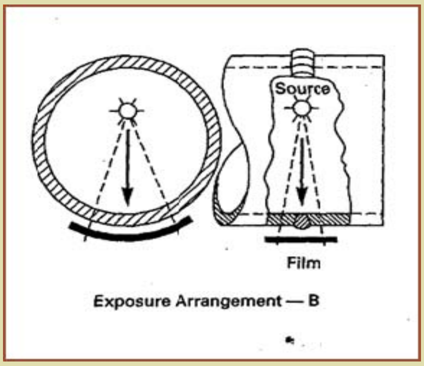


Figure –3

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 ?

Answers for the questions published under Do you know in the September Issue.			
1	b	6	b
2	c	7	c
3	b	8	a
4	c	9	b
5	b	10	b

TECHNICAL TALK ABSTRACTS

23.05.2021 – 1. Industry 4.0 solutions for metal testing in Harsh Environment covering Hardness and flaw detection and 2. Flaw detection at high temperature using specialized piezoelectric crystals & monitoring systems by Dr.Maria Felice, Product Marketing Manager, Asiaregion, Screening Eagle Technologies, Switzerland and Dr.William Vickers, Product Manager, Sensors and Systems Solutions, Ionix Advanced Technologies Ltd., UK.

Abstract

The latest hardware and software for metal testing in harsh environments.
The webinar will demonstrate how inspectors can collect more accurate and reliable measurements even in harsh environments, in less time and with reduced health and safety risks compared to standard ultrasonic systems. Both speakers will talk about the latest trends in inspection data logging and sharing.

Biography

Dr.William Vickers is the Product Manager for sensors and systems solutions at Ionix Advanced Technologies Ltd., UK. Having completed a PhD in advanced ceramics, William started at Ionix working on the piezo ceramics which would become the technology at the core of the company's products. William is experienced in the planning, implementation and operation of ultrasonic inspection & monitoring systems for data digitalization and an expert in data management and integration in particular within the oil and gas industry.

Dr.Maria Felice is the Product Marketing Manager for the Asia region at Screening Eagle Technologies, a company headquartered in Switzerland. Maria completed an Engineering Docotrate (EngD) in ultrasonic array testing and then worked in NDT research for 3 years in UK and Singapore. In 2018 she joined Screening Eagle Technologies (Proceq) in Singapore, initially as a technical sales engineer, focusing on flaw detectors. Maria is experienced in quantitative NDT, multi-technology NDT and digitalization.

30.07.2021 "In-situ testing of wire ropes used in suspension bridges and other installations" By Dr. Alexander Shalashilin, INTRON

Dr.Alexander Shalashilin is a Export specialist. He did MSc in Physics at University College London and 2009 and PhD in Machine Dynamics at Moscow Institute of Aviation in 2019. Dr. Alexander Shalashilin has been working for almost 10 years in the field of non-destructive testing and industrial safety expertise. At INTRON since 2017, he caters for foreign sales, consultating major customers as well as those based in the Middle East & North Africa region, Norway and the United States.

TECHNICAL TALK ABSTRACT

13.06.2021 Fiber Optic Technologies for NDE & SHM by Prof. Balaji Srinivasan, Head Fiber Lasers and Sensors Laboratory, Department of Electrical Engineering, IIT Madras, Chennai.

Abstract

Over the past decade, optical fiber sensors are gaining popularity as a viable alternative to the conventional transducers for a wide variety of applications, including NDE & SHM. Characterized by their light weight and a broadband response, optical fiber based sensors are inherently immune to electromagnetic interference (EMI) issues and can be suitably deployed in harsh conditions. Among the various optical fiber sensors, fiber Bragg grating (FBG) sensors are a preferred choice for several applications due to their compact size and high-sensitivity to strain and temperature variations.

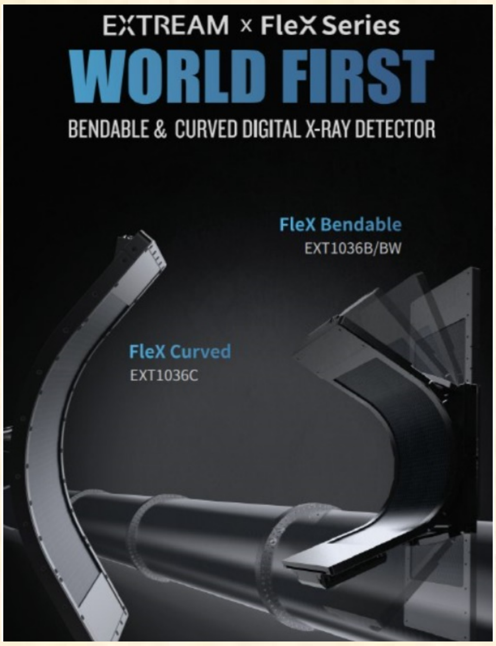
In this talk, we will provide an overview of the optical fiber sensor technologies that are used for the above applications, with a specific focus on the use of fiber Bragg grating sensors for elastic wave sensing in metallic as well as composite structures. A few case studies will be discussed including the identification of elastic modes in metallic plates, and defect identification in bent metallic/composite plates using feature-guided waves. Finally, the latest research work on the identification of delamination in composite plates through sparsely populated samples will also be briefly discussed.

Biography

Balaji Srinivasan obtained his Ph.D. in 2000 from the University of New Mexico, USA. He subsequently worked as a Senior Development Scientist at Corning Incorporated, USA, where he led technology development efforts related to 3D Optical Cross-connects and Channel Selectable Tunable Filters. Since 2004 he has been with the Indian Institute of Technology Madras as a faculty in the Department of Electrical Engineering, presently as Professor.

Balaji's research interests span the development of active and passive optical components / subsystems for distributed fiber optic sensors and fiber lasers. Balaji has co-authored more than 150 journal and international conference publications, as well as 3 book chapters. He also has 7 patents to his credit (6 more pending). He has successfully executed or currently investigating 24 research projects worth over INR 17 Crores (USD 2.6M) of funding, resulting in the development of 6 technologies, 3 of which have been transferred to industry for commercialization.

New Product



DRTECH, a digital diagnostic imaging system company, will present the EXTREAM FleX series, an industrial detector (NDT) capable of inspecting curved surfaces, at the 2021 Electronic Production Technology Exhibition in Munich (Productronica, 11/16 ~ 11/19) and the 2021 American Society of Non-Destructive Exhibitions (ASNT) (11/15). ~11/18) announced on the 16th that it was released for the first time in the world.

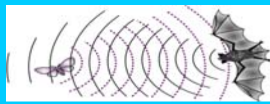
The industrial (X-ray) detector is a key component that acquires images in industrial digital X-ray inspection equipment and is used for NDT (Non-Destructive Testing). NDT is an inspection that checks the internal defects, structure, and condition of the product without destroying the product. Therefore, it is applied to various industrial fields such as buildings, water and sewage, gas or petroleum pipelines.

EXTREAM FleX (Extreme Flex), first developed by DRTECH , is a product for RT (Radiographic Test) in the field of non-destructive testing. possible product.

Currently, in the case of pipe inspection, a flat-panel digital detector (DR) uses a film due to the limitation that it cannot be bent. However, many films are used for one inspection, and a long inspection time is required due to the process of film installation before filming and film removal after filming. In addition, immediate inspection is not possible due to additional reading time due to film development after inspection, and there are difficulties in data storage such as long-term storage of films.

EXTEAM FleX is a crystal that combines the advantages of analog film and flat digital detector (DR) into one.

ECHO BITES



Thanks for the Newsletter. It is very useful and enhances knowledge. I hope this is monthly.
Regards,
V.Shridhar

Congrats
and
best wishes
K.V.Vannan

Glad to received the Newsletter and my sincere best wishes & Congratulation to the Team and especially the Chief Mr.Ram Prakash.
Thanks and Regards,
RG. Ganesan

Top-notch work by the team. Well developed theme and contents. Especially kudo's to the Quiz developers. All the best and expecting more from sound bytes.

C. Jaiganesh

Two days ago i read your News Letter in Your website, which is very useful for me and also i am awaiting for next publish.

Jayakumar

We appreciate the efforts being put by ISNT Chennai to update members through sound bytes. Sections and articles are interesting and informative. Courses planned in news chapter contains completed courses which shall be addressed. The Q&A chapter in Readers did not digest will be helpful to clear doubts. Best wishes to the team.
Sankaranarayananan
AD NPCIL

Today I received the ISNT Chennai Chapter Newsletter. The content and format of Sound Bytes is really impressive and innovative..
I found this full of information. Thanks for the initiative and all the best.
Dr ALOK PANDEY
Scientific Officer, AERB, Mumbai

I saw your sound Bytes News letter over your website, which is Incredable.Also am waiting for Next News Letter on your website.
Regards
Dhinesh Suman Prasath.K
QA/QC Chennai Airport Project

My best wishes to the team ISNT Chennai chapter for this wonderful initiative.
First of all, the name chosen for the news letter is very much relatable to Ultrasonic testing where sound plays a major role.
The words (Decibell & frequency) used to mention the edition and frequency of the news letter is a proof for the creativity of the team.
I am so impressed from the very first page of this news letter.
I thoroughly enjoyed and learned a lot from each and every article of this news letter.
"Do you know" Portion is like Icing on the cake.
It will help to brush up the NDT knowledge of every NDTians......
Last but not least,
ISNT Chennai chapter produced n number of NDTians by their unique modelling in teaching NDT with the help of their proven teaching methodologies and experienced faculties...
My best wishes once again...
Ramasethu Iyer

Hearty Congratulation for all your efforts and involvement in bringing out a nice newsletter in the name of Sound Bytes

with high appreciation, I suggest kindly consider a column to discuss a few glimpses/Basis of the latest emerging techniques at least like a Sound bite in the upcoming Sound Byte.
All the best

with regards
Dr. M. Ashok
Professor, Department of Physics
National Institute of Technology - Tiruchirappalli

Prof. Balaji Srinivasan

Dr. Prabhu Rajagopal

2 line introduction to yourself (education, experience, current role) after the affiliation.

Balaji Srinivasan obtained his Ph.D. in 2000 from the University of New Mexico, USA. He subsequently worked as a Senior Development Scientist at Corning Incorporated, USA, where he led technology development efforts related to 3D Optical Cross-connects and Channel Selectable Tunable Filters. Since 2004 he has been with the Indian Institute of Technology Madras as a faculty in the Department of Electrical Engineering, presently as Professor. Balaji's research interests span the development of active and passive optical components / subsystems for distributed fiber optic sensors and fiber lasers.

1. Please tell us about your role as the Professor steering the Fiber Lasers and Sensors Group at IIT Madras? How is your Group driving change in this sector?

Optical fibers have revolutionized the way we communicate, and continue to create a strong impact in several other applications including healthcare, sensing, manufacturing, and defense. As a passionate researcher exploring the innumerable opportunities of optical fibers and optical fiber-based devices, my primary goal is to motivate and pass on my knowledge in this exciting area to the budding scientists and engineers. A couple of key areas where we are uniquely positioned to contribute to society is by developing next generation optical fiber-based laser sources and distributed sensors. By working with global industrial and technology partners, we are ensuring that these technologies reach the masses and also create job opportunities for fiber optic scientists and engineers.

2. What prospects do you find for Optical Sensing technologies such as Fiber lasers in the NDT industry?

One of the key attributes of optical fibers is its amenability to distributed sensing without suffering electromagnetic interference (EMI) issues that plague conventional electrical sensors. Due to their small size (comparable to human hair) and resilience to bending around corners, optical fibers are beginning to foray into spaces in complex structures that have hitherto not been explored. An added advantage of such optical fibers is their ability to be embedded in composite structures in a minimally invasive manner such that they could act as the "nerve" of the structure. Such attributes are being explored for practical solutions in the NDT industry, and are well poised to grow rapidly during this decade, especially from the SHM context.

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

As mentioned above, our group has been focused on several exciting opportunities for optical fibers, especially in developing fiber laser sources and distributed fiber sensors. On fiber laser sources, we have been leading efforts in developing kiloWatt-level coherent beam combined lasers which are critically needed to address growing security issues related to enemy drones. In distributed fiber sensors, we are working with commercial partners on developing key technologies including (1) fiber Bragg grating (FBG) sensors/interrogators for guided acoustic wave sensing, (2) Raman optical time domain reflectometers (R-OTDR) for fire monitoring in tunnels and real-time power monitoring, (3) Brillouin optical time domain analysis (B-OTDA) for pipeline monitoring, and (4) Rayleigh scattering-based phase OTDRs for perimeter sensing. Each of these technologies have excellent potential for commercialization, which we believe will be realized in the next 5-10 years.

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

The biggest obstacle for industry acceptance is the lack of awareness about fiber optics and photonics, in general. In India, we have reasonable exposure to optics/photonics at the higher secondary school level but it trails off rapidly when it comes to undergraduate education, especially in engineering curriculum. We have been trying to address this issue by offering introductory courses in photonics and optical fiber sensors through NPTEL. Recently, I got an opportunity to address a large number of industry professionals through the ISNT seminar platform. Over the past few years, I have also been invited and have provided similar seminars to technocrats in several industries. Such opportunities go a long way to get them exposed to this exciting field and get them to realize its true potential. With such industry support, I am quite optimistic for the future growth of optical fiber sensors.

NEW PRODUCT

CO-SPONSOR

PoRTS, the Portable Rheology and Temperature Sensor can measure multiple fluid properties like Viscosity, Density and Temperature simultaneously using a single waveguide sensor.It can work at higher temperatures up to 200°C and can also be used in corrosive environment as the sensor can be fabricated from a wide range of materials. The sensor is IoT-enabled and the portable nature of the system helps in obtaining real-time data which helps in catering insightful analytics to the user and brings data visualization to their fingertips. The sensor is adopted by Saint-Gobain and is currently under industrial evaluation. PoRTS has a resolution of 10 cP for the Viscosity, 0.001 kg/m^3 for the Density and 0.01°C for the temperature. It is also available as an in-line option which can be employed in industries that requires real-time data monitoring in their pipelines.

Xyma Analytics is a part of the prestigious Shell E4 Digital Track Cohort Programme in 2021 and also a finalist in the “Qualcomm Design in India Challenge - 2021”. We have been shortlisted as one of the top 50 Indian Startups in Vedanta Spark and one of the “Top 19 Promising Startups in Tamil Nadu”.

Indian Society for
ISNT
Non-Destructive Testing
Chennai Chapter

Chief Compiler:
Mr.B. Ram Prakash