



**Sri Venkateswara College of Engineering,  
Pennalur, Sriperumbudur - 602117**

(An Autonomous Institution – Affiliated to Anna  
University, Chennai)

**Dept. of Civil Engineering**



**REPORT OF THE WEBINAR ON “FLUID MECHANICS OF HUMAN  
CIRCULATORY SYSTEM”**

**Date, Time & Meeting URL link**

Date : Thursday, 11 June 2020

Time : 10:30 am - 11:30 am

Mode : Online through Cisco Webex

Meeting Link: Meeting URL: <https://meetingsapac10.webex.com/meet/pvenkat>

Meeting number: 583 304 861

**Speaker**

Dr. B.S.V.Prasad Patnaik  
Professor, Dept. of Applied Mechanics,  
Indian Institute of Technology Madras

**Convener**

Dr.R.Kumutha, Professor & Head / Dept. of Civil Engg.

**Coordinator**

Dr. P.Venkateswara rao, Professor, Dept. of Civil Engg.

**Target Audience**

Students, Faculty members and Industry Personnel

**Participation:**

Number of Participants benefited: 42 (11 internal and 31 external)

Faculty : 19

Research Scholars : 02

UG Students : 18

Industry Persons : 02

Others : 01

## BROCHURE



**Sri Venkateswara College of Engineering**  
Sriperumbudur, Tamilnadu



**Dept. of Civil Engineering cordially invites you for a**

# webinar on **Fluid Mechanics of Human Circulatory System**



**Dr. B.S.V. Prasad Patnaik,**  
Professor, Applied Mechanics,  
IIT Madras

Date: 11/06/2020

Time: 10.30 AM to 11.30 AM

Register @

<https://forms.gle/kJBk9E9nK2RCJfWS9>



Join us  
Cisco  
**webex**

**Who Can attend:**  
Faculty / Industry Personnel /  
students of Civil /  
Mechanical / Biotech

**Dr. R. Kumutha**  
Professor & HoD / Civil  
Convener

**Dr. P. Venkateswara Rao**  
Professor  
Coordinator

## **BRIEF PROFILE OF PROF. B.S.V.PRASAD PATNAIK**

Prof. Prasad Patnaik received his PhD from the Indian Institute of Technology Madras in 1998. During 1998 – 99, he was a post –doctoral fellow at UBC, Canada. He taught at the National University of Singapore (NUS) during 1999-2006, before moving back to IIT Madras in 2006.

He is currently working as Professor in the department of Applied Mechanics at IIT Madras, Chennai. He specializes in computational Fluid Dynamics (CFD). His research interests include Fluid Structure Interaction (FSI), Nuclear Thermal System, and Bio – Fluid Mechanics etc.

He has published in close to 60 international journals of repute.

So far, he has graduated 8 Ph.D.'s.

## **BRIEF REPORT OF THE WEBINAR**

The objective of the webinar is to understand the application of fluid mechanics concepts in human blood circulatory system and thereby in future to develop devices for the mechanical circulatory support. So that the webinar is aimed at focusing the audience from various programs of engineering who studied the Fluid mechanics course already i.e., people from civil engineering / mechanical engineering / automobile engineering / Biotechnology / Biomedical background from academic institutions ( faculty & students) and industry.

**Prof. R. Kumutha**, Convener & HoD of dept. of Civil Engineering, delivered the welcome address and **Prof. P. Venkateswara rao**, coordinator, introduced the speaker to the audience.

The speaker **Prof. B.S.V. Prasad Patnaik** explained initially about the basic concepts of major circulation loops in human body. The deoxygenated blood in the body gets collected in the right atrium of human heart, through the superior and inferior Vena cava. The deoxygenated blood in the right atrium goes to the right ventricle and from there it moves to the lungs, through the pulmonary artery. In the lungs, the blood gets oxygenated and it flows to the left atrium through the pulmonary vein. The Oxygenated blood flows from left atrium to the left ventricle and from there it flows into the aortic valve. Through the aortic valve, it flows to the Aorta and then, the oxygenated blood gets distributed to the entire body through respective arteries.

He explained about the velocity of blood flow while it is flowing from Aorta to Capillaries as high to low due to flow of blood from low cross sectional area at Aorta to high cross sectional area at Capillaries. Similarly the velocity of blood flow is low to high whenever it is flowing from Capillaries to Vena cava due to decreased cross sectional area from Capillaries to Vena cava.

Further the speaker explained concepts with following basic fluid mechanics questions.

- (i) Is blood Newtonian or non-Newtonian fluid
- (ii) Is the flow through the arteries laminar or turbulent

(iii) Fluid mechanics behind blood pressure measurement etc.

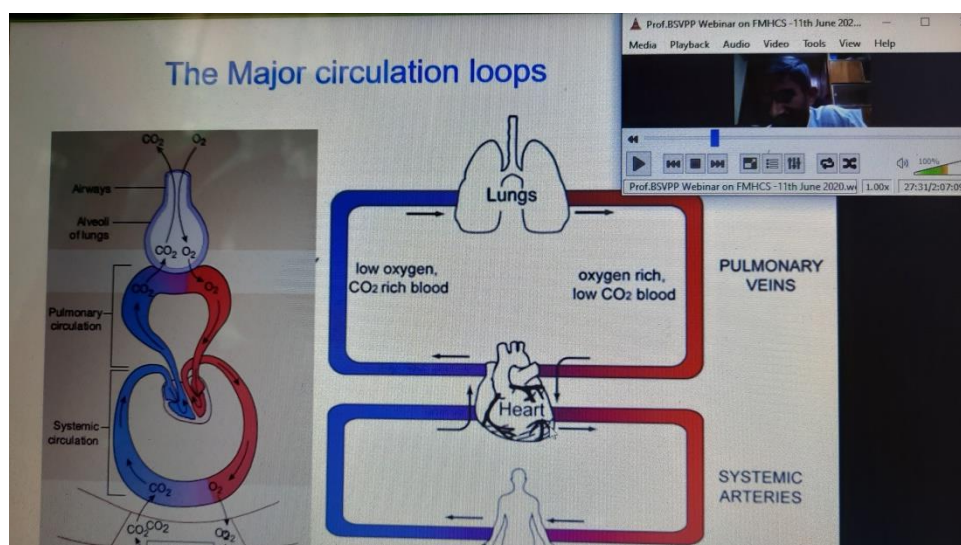
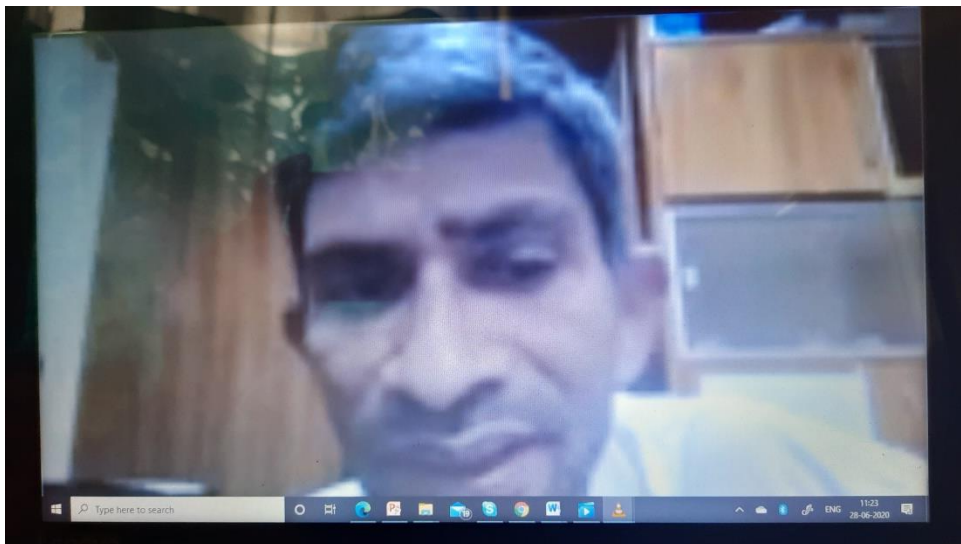
The speaker concluded that understanding of Fluid Mechanics has a vital role to play in understanding the human circulatory system in particular, the valve dynamics, the  $Q-\delta P$  relation, aneurysms, stenosis etc. which will determine the future development of devices for the Mechanical circulatory support.

The questions raised by the participants were answered by the speaker.

The session ended with vote of thanks delivered by **Dr. P. Venkateswara Rao**, Professor, Dept. of Civil Engineering. The participants appreciated the webinar.

**Note:** In the beginning of the webinar when the speaker started the presentation there was audio disturbance due to some signal problem.

### SNAPSHOTS OF THE WEBINAR





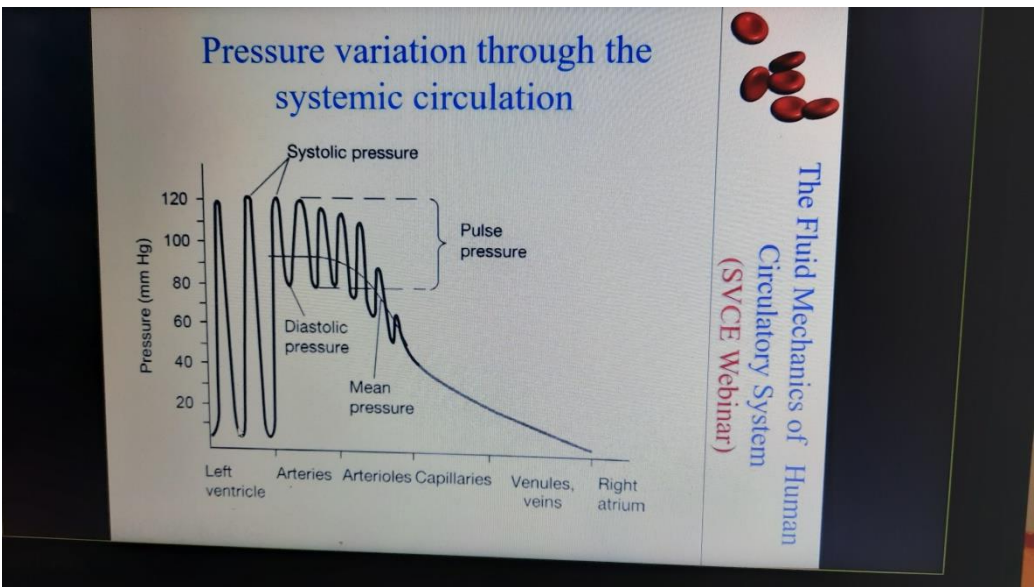
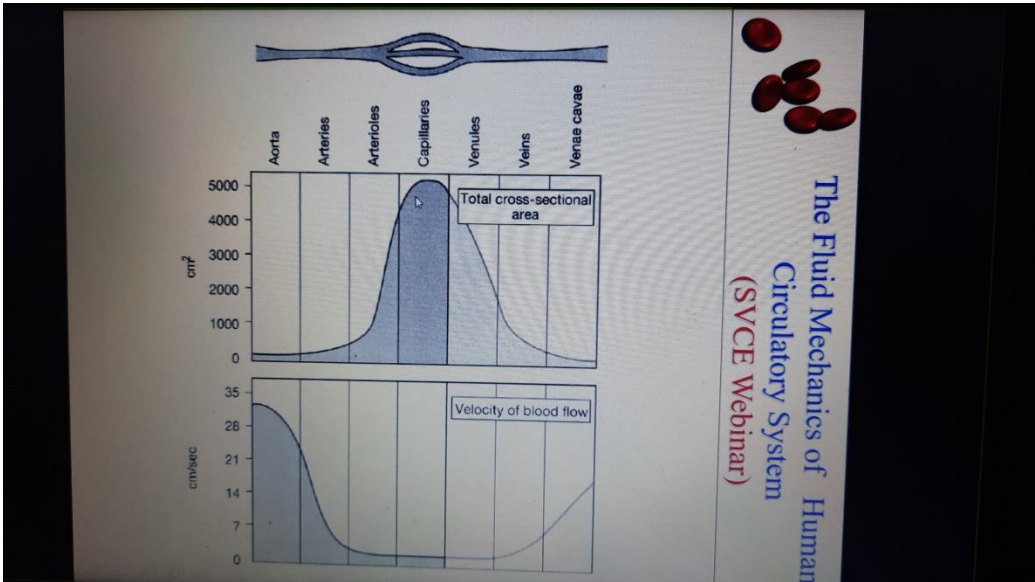
### Some cardiovascular devices

The Fluid Mechanics of Human Circulatory System (SVCE Webinar)

Prof BSVPP Webinar on FMHCS - 11th June 2020...

Media Playback Audio Video Tools View Help

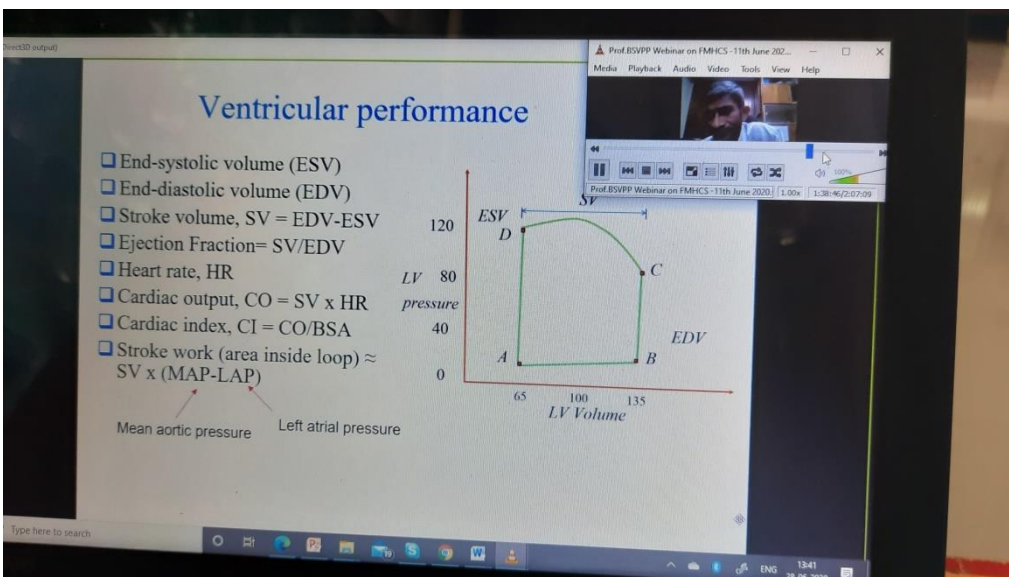
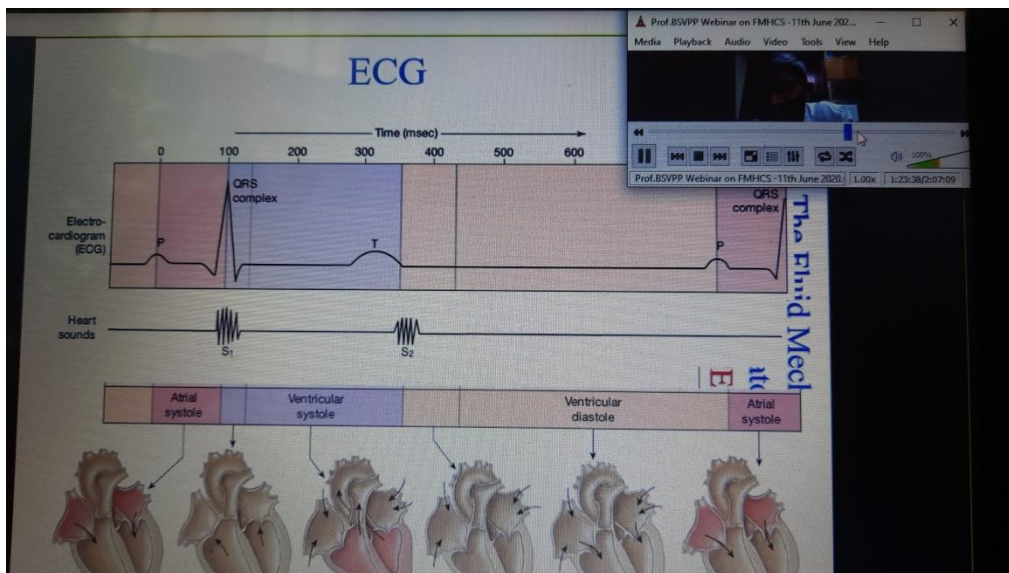
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## Some basic Fluid Mechanics Q's

- Is blood Newtonian or non-Newtonian ?
- How will the constitutive relation depend on ?
- Is the flow through the arteries laminar or Turbulent ?
- How will the  $Q$ -  $\Delta P$  relation vary for a (i) rigid tube (ii) flexible tube ?
- Fluid Mechanics behind blood pressure measurement.
- Pressure-volume relation for LV
- How to develop enough pressure drop and not encounter Hymolysis.

The Fluid Mechanics of Human Circulatory System (SVCE Webinar)



### LIST OF PARTICIPANTS

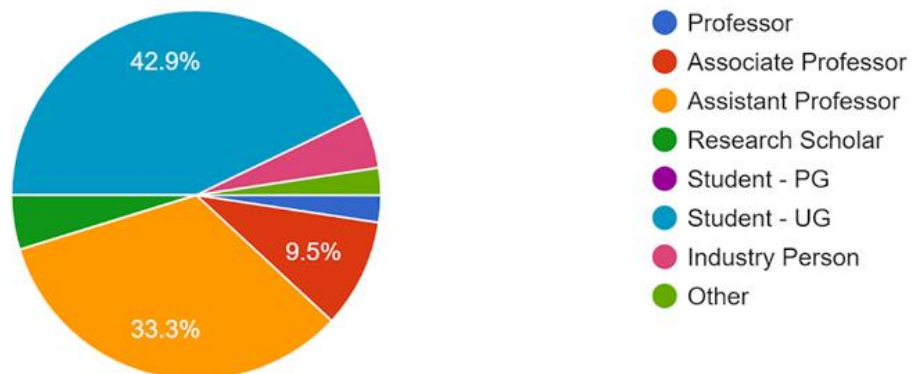
S.No.	Name of the Participant	Name of the Institution / Industry	Category
1	Mathiyazhagan R	Sri Venkateswara College of Engineering	Assistant Professor
2	Dr.C.Rajakumar	Dr.C.Rajakumar	Associate Professor
3	MONISHA G	Sri Venkateswara College of Engineering	Student - UG
4	K ANEES	Sri venkateshwara college engineering	Student - UG
5	Dr.C.Freeda Christy	Karunya Institute of Technology and Sciences, Coimbatore	Associate Professor
6	Madhu Soodhanan PG	Hindusthan college of engineering and technology	Student - UG
7	S MONISHA	Aarupadai veedu Institute of technology	Assistant Professor
8	R. Yamni	Sri Venkateswara College of Engineering	Student - UG
9	SIDHARTH SARAVANAN. T	Sri Venkateswara College of Engineering	Student - UG
10	CHANDRAPRABA K	Hindusthan college of engineering and technology	Student - UG
11	Sankar K	Saveetha Engineering College, Chennai	Assistant Professor
12	Dhinesh Kanna Ramkumar	Vellore Institute of Technology	Student - UG
13	SUNKESULA NAZEER AHAMED	Annamacharaya Institute of Technology & Sciences, Rajampet	Assistant Professor
14	S.Gowri	Avinashilingam Institute for home science and higher education for women	Research Scholar
15	P.Sridharan	Rajalakshmi Engineering College	Assistant Professor
16	Dr.C.Freeda Christy	Karunya Institute of Technology and Sciences, Coimbatore	Associate Professor
17	Venkat prasanna K	SRM Ramapuram	Student - UG
18	Prof R JAGADEESH KUMAR	JANSONS INSTITUTE OF TECHNOLOGY	Assistant Professor
19	Abiramy S	Avinashilingam Institute for Home Science and Higher Education for Women	Assistant Professor
20	R.Bathrinarayanan	St.Joseph College of Engineering	Assistant Professor
21	Sudharsan Balaji	ABS Consults	Other
22	MAGENDIRA RAJ S	Sri Venkateswara College of Engineering	Student - UG
23	ABIRAMI R	AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY	Assistant Professor
24	Bhargavi Haripriya A	SRM Institute of Science and Technology	Assistant Professor
25	ABIRAMI R	AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY	Assistant Professor
26	B. BALAJI	ABS CONSULTS	Industry Person
27	Pyrkhat Wanki Dkhar	Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology	Student - UG
28	S. MANI BHARATHI	Sri Venkateshwara college of engineering	Student - UG
29	Mohamed Yacin Sikkandar	Majmaah University	Associate Professor
30	APARNA . B	ABS CONSULTS	Industry Person
31	Pa.Suriya	Aarupadai Veedu Institute of Technology	Assistant Professor

S.No.	Name of the Participant	Name of the Institution / Industry	Category
32	ABIRAMI R	AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY	Assistant Professor
33	Konreddy Rajitha	Annamacharya institute of technology and sciences , rajampet	Assistant Professor
34	ABDUL BASITH M	HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY	Student - UG
35	Prof R JAGADEESH KUMAR	JANSONS INSTITUTE OF TECHNOLOGY	Assistant Professor
36	Dr. A. BHASKARAN	Sri Venkateswara College of Engineering	Professor
37	Dr Suresh Anand BS	Rajalakshmi Engineering College	Associate Professor
38	Diravia Balan S	Sri Venkateswara College of engineering	Assistant Professor
39	YUVABHARATHI.G	SRI VENKATESWARA COLLEGE OF ENGINEERING	Student - UG
40	R. MONISHA	SRM INSTITUTE OF SCIENCE AND TECHNOLOGY	Research Scholar
41	Soundharya.M	Sri Venkateswara College of engineering	Student - UG
42	YOGITHA S	Rajalakshmi Engineering College,Thandalam,Chennai	Student - UG

### Category of Participants:

Designation

42 responses

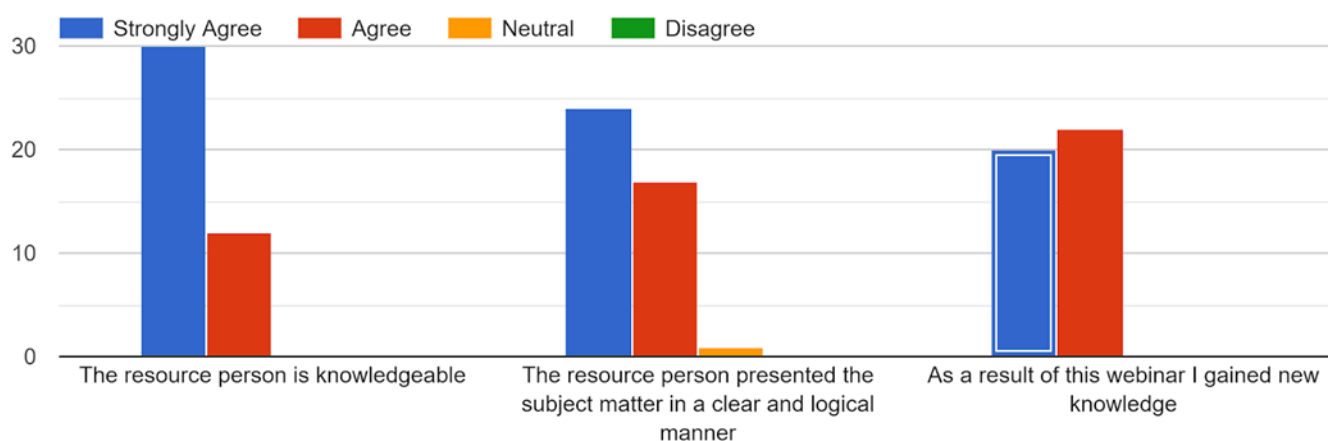




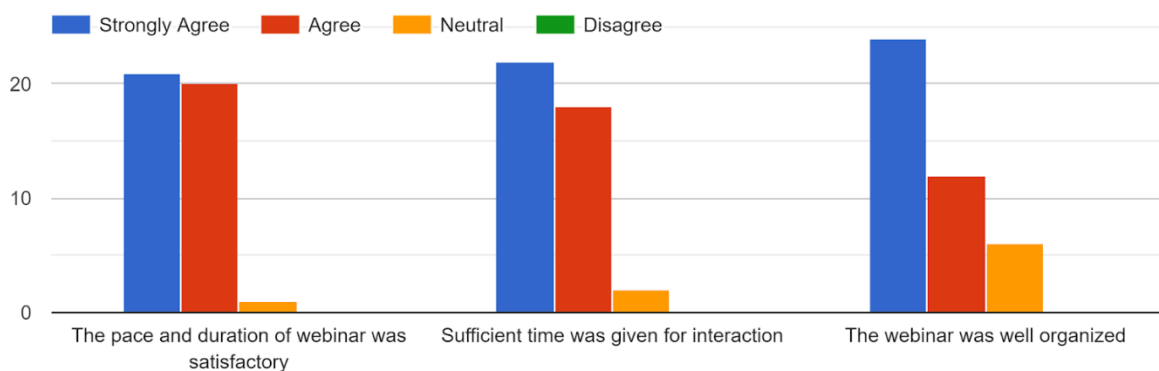
## SUMMARY OF FEEDBACK

<b>Total number of respondents: 42</b>				
<b>Feedback statement</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>
The resource person is knowledgeable	30	12		
The resource person presented the subject matter in a clear and logical manner	24	17	1	
As a result of this webinar I gained new knowledge	20	22		
The pace and duration of webinar was satisfactory	21	20	1	
Sufficient time was given for interaction	22	18	2	
The webinar was well organized	24	12	6	

Satisfactory rate with the content of the webinar

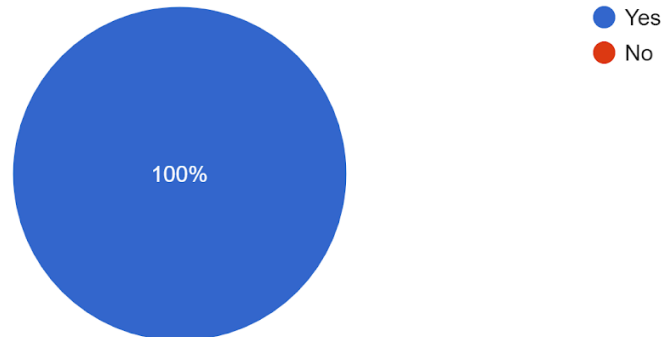


Satisfactory rate with the organization of the webinar



Are you interested in attending such programs organised in future by the department of civil engineering of SVCE.

42 responses



**Additional comments / feedback from Participants:**

- The session is very useful
- Clarity was required from the Resource person
- Good session
- Very informative session
- Great Session
- The resource person would have used a mike rather than laptop inbuilt one. Because throughout the session there was a disturbances.
- Use zoom meetings as usual, very hard to use and listen meetings in cisco WebEx.
- Looking forward for similar programs.
- This is my useful session thank you.
- It's Perfect Sir ....I really appreciate it .Thank you
- Effort by Department of Civil Engineering in conducting series of Webinar is appreciated.

Prepared by:

Dr. P. Venkateswara Rao,  
Professor  
Coordinator

Approved by:

Dr. R. Kumutha  
Professor & HoD / Civil Engg.  
Convener