

BUREAU OF INDIAN STANDARDS

AGENDA

Name of the Committee	No. of Meeting	Date and Time	Mode: Virtual (Webex)
Freight Containers Sectional Committee, TED 33	Sixth (6 th)	27 th September 2024 (Friday) from 10:30 AM onwards	Meeting Link: https://bismanak.webex.com/bismanak/j.php?MTID=m37646b479bfb9d0e1421411d86c6654f Meeting No.: 2516 593 0126 Password: inQ8FXh533q

CHAIRMAN: Dr N. C. SAHA

HEAD (TED): Shri A.P.D. DWIVEDI

MEMBER SECRETARY: Shri GAURAV JAYASWAL

ITEM 0 WELCOME ADDRESS

0.1 Welcome Remarks by Head (TED)

0.2 Opening Remarks by the Chairperson

ITEM 1 CONFIRMATION OF THE MINUTES OF LAST MEETING

The Minutes of the Fifth (5th) Meeting of Freight Containers Sectional Committee, TED 33 held on 12th February 2024 in Physical mode were circulated through BIS Portal. No comments with regards to decision of committee have been received.

The Committee may formally confirm the Minutes.

ITEM 2 SCOPE & COMPOSITION OF THE SECTIONAL COMMITTEE

2.1 Scope

The present scope of the committee is as follows :

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a) Standardisation of Freight Containers including General and Specific Purpose Containers, Methods of Tests to be performed, Performance requirements, Identification, Marking and Communication requirements along with Safety and related Handling and Securing Equipments.

b) Co-ordination of work with ISO/ TC 104, its subcommittees and working groups.”

The Committee may please note.

2.2 The committee may review the present composition of the Committee given in **Annex- 1**.The committee may deliberate and decide on further continuation/ deletion of organizations from the committee composition and co-option of new organizations in the committee composition.

2.3 Co-option

2.3.1 The committee decided co-opted following members during its 3rd and 4th Meetings and following is the status of follow ups:

Sl. No.	NAME OF THE ORGANIZATION	FOLLOW UP STATUS
1.	Lloyd's Register of Shipping	Email for co-option was sent to shri Shobhit Kapoor, M&O Operation Manager LR dt. 22/09/2023 along with two reminders after receipt of contact details of LR from IRS. Email : I st Reminder dt.31/10/2023 , II nd reminder dt.22/01/2024 & III rd reminder dt.28/08/2024 Response is still awaited.
2.	Braithwaite & Co. Ltd.	Email for co-option was sent to Shri Dilip Saha, General Manager, Braithwaite & Co. Ltd dt. 22/09/2023 along with two reminders after receipt of contact details of Braithwaite & Co. from IRS. I st Reminder dt.07/02/2024 II nd reminder dt.28/08/2024 Response is still awaited.
3.	Rail tech India Pvt Ltd.	Email for co-option was sent to Shri Kunal Jain from M/s Railtech Technologies Pvt. Ltd. dt. 07/02/2024. Response is awaited.
4.	Tata Steel	Email for co-option was sent to Shri Avtar Singh Saini, Chief, Quality Assurance, TATA Steel Limited dt. 07/02/2024 after receipt of contact details with Metallurgical Department , BIS.

		<p>TATA Steel responded positively and stated that they are interested to be a part of the committee.</p> <p>Again reminder dt. 28/08/2024 was sent to Shri Avtar Singh Saini, Chief, Quality Assurance, TATA Steel Limited for co-option. He further nominated Shri Surya Narayan Lenka through revert email dt. 29/08/2024.</p> <p>An email dt. 02/09/2024 has been written to shri Surya Narayan Lenka for providing the contact details of suitable representatives for SC TED 33.</p> <p>The nominations are however awaited.</p>
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The committee may deliberate and decide.

2.3.2 In addition to above, it was decided to further co-opt following organizations in committee in the previous (5th) meeting. The Status of follow up is given below:

Sl. No.	Name of Organization	Status
1.	DP World India (Container Terminal Division)	<p>Email dt. 29/08/2024 was written to Shri Ashok Kumar, DCM Containers to provide contact details of M/s DP World India (Container Terminal Division).</p> <p>Contact details of M/s DP World were provided by Shri Ashok Kumar through email dt. 30/08/2024.</p> <p>Email/Letter dt.05/09/2024 & reminder dt.10/09/2024 was sent to the representative of M/s DP World India whose contact details were given by Shri Ashok Kumar.</p> <p>Response is awaited. The committee may pls note.</p>
2.	Container Shipping Line Association (CSLA)	<p>Email dt.29/08/2024 was sent Mr.Ashok Singh(DCM container) to provide contact details. Reply was received through email dt. 30/09/2024 from Mr. Ashok Singh stating that Contact details of CSLA is not available with him.</p> <p>The committee may deliberate and decide.</p>

3.	Association of Container Train Operators (ACTO)	<p>Email/Letter dt.29/08/2024, reminder dt.02/09/2024 & reminder 11/09/2024 was sent to Kalyani cast to provide Contact details from ACTO.</p> <p>Response is awaited. The committee may deliberate and decide.</p>
4.	INOXCVA	<p>Email/Letter dt.10/092024 was sent to M/s INOXCVA . (Contact details were received through SC TED 26)</p> <p>Response is awaited. The committee mayb please note.</p>
5.	SCA Heavy Equipment Pvt Ltd	<p>Email dt. 02/09/2024 was written to Shri Ashish Bhargav, CONCOR to provide contact details of M/s SCA.</p> <p>Contact details of M/s SCA was received from M/s CONCOR through email dt. 02/09/2024.</p> <p>Email/Letter dt.05/09/2024 & reminder dt.10/09/2024 was sent to representatives of M/s SCA .</p> <p>Response is awaited.</p> <p>The committee may please note.</p>
6.	Loadstar	<p>Email dt. 02/09/2024 was written to Shri Ashish Bhargav, CONCOR to provide contact details of M/s Loadstar.</p> <p>Contact details of M/s Loadstar was received from M/s CONCOR through email dt. 02/09/2024.</p> <p>Email/Letter dt.05/09/2024 was sent to representatives of M/s Loadstar seeking details of representatives to participate in activities of SC TED 33.</p> <p>The details of representatives were received through email dt. 13/09/2024. The same have been updated on BIS Portal.</p> <p>The committee may please note.</p>

7.	TIL	<p>Email dt. 02/09/2024 was written to Shri Ashish Bhargav, CONCOR to provide contact details of M/s TIL.</p> <p>Contact details of M/s TIL was received from M/s CONCOR through email dt. 02/09/2024.</p> <p>Email/Letter dt.05/09/2024 & reminder dt.10/09/2024 was sent to representatives of M/s TIL .</p> <p>Response is awaited. The committee may please note.</p> <p>The committee may please note.</p>
8.	DG Shipping	Co-Option letter will be sent shortly.
9.	TUV India Pvt Ltd	Co-Option letter will be sent shortly.

The committee may deliberate and decide.

2.3.3 New Co-option Membership request has been received as given below:

Sr. No.	Name	Organization	Remarks
1	Dr G. Venkatesan	Individual Capacity	CV is attached at 0
2	Shri Darius Aga	Individual Capacity	CV is attached at Annex- 3

The committee may note.

2.4 The details of Panels working under the purview of SC TED 33 is given below:

Panel	Composition	Assignment	Discussions in Previous Meetings	Status in 6 th Meeting
Panel 1 : Packing, Stowing and Securing of Cargo Inside Freight	1. Mr. Haresh Lalwani, AMTOI (Panel Convener) 2. CONCOR {Representative from	1. Finalization the composition of Panel 2. Revision of following Indian standards: i. IS 11466 (Part 1) : 1985 ii. IS 11466 (Part 2) : 1985 iii. IS 13112 : 1991	Panel Convener Mr. Lalwani informed that he has talked with federation of freight forwarders	Email dt.02/09/2024 & reminder dt.11/09/2024 was sent to Mr. Haresh

Containers and Handling of Cargo	<p>Cargo Handling Division}</p> <p>3. Representation from Chemical Manufacturers</p> <p>4. Representation from Industry Manufacturing Cargo Securing Products</p> <p>5. Representation from Cargo Packing Industry</p> <p>6. Representation from Freight Forwarders</p> <p>7. Representation from Container Freight Stations (CFS) / Inland Container Depots (ICDs)</p> <p>8. Representation from Ports / Handler Companies</p>	<p>3. Identification of New Subject for formulation of Indian Standards in the domain of Packing, Stowing and Securing of Cargo Inside Freight Containers</p>	<p>association (FFFA), Indian National Shipowners' Association and Indian Chemical Council (ICC) and these organizations have responded positively to participate in the panel meeting.</p> <p>Mr. Lalwani also stated that Representatives from Cargo Packing Industry and Cargo Securing Products Industry are being followed up for participation.</p> <p>The committee requested Mr. Lalwani to expedite the follow up with other members and conduct the panel meeting at the earliest.</p> <p>Status in 5th Meeting</p>	<p>Lalwani for conducting first panel meeting.</p> <p>Response is awaited.</p> <p>The committee may deliberate and decide.</p>
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	<p>9. Other Members as Proposed by panel convener and approved by SC TED 33.</p>		<p>Reminder on progress have been sent to the panel convener. Response is awaited from Mr. Lalwani on progress of the panel.</p> <p>Decision in 5th Meeting The committee requested the panel convener to conduct the first meeting of the panel at the earliest and Finalize the composition of the group and report the same to BIS Secretariat.</p>	
<p>Panel 2 : Handling of Containers</p>	<p>1. Mr. Ashish Bhargav, CONCOR {Panel Convener}</p> <p>2. MECTO Engineers</p> <p>3. Representation from Twist Lock Manufacturers</p> <p>4. Representation from Container Spreader</p>	<p>1. Finalization the composition of Panel</p> <p>2. Revision of following Indian standards:</p> <p>i. IS 10880 : 2006 ii. IS 9881 : 2007</p> <p>3. Identification of New Subject for formulation of Indian Standards in the domain of Design of Freight Containers and their accessories</p>	<p>Mr. Ashish Bhargav (Panel Convenor) informed that he is following up with container spreaders and twist lock manufacturers and will conduct the panel 2 meeting at the earliest.</p>	<p>Email dt.02/09/2024 & reminder dt.17/09/2024 was sent to Mr. Ashish Bhargav to submit the minutes of first panel meeting.</p> <p>The minutes are still awaited.</p>

	<p>Manufacturers</p> <p>5. Other Members as Proposed by panel convener and approved by SC TED 33.</p>		<p>Status in 5th Meeting</p> <p>Mr. Ashish Bhargav (Panel Convener) conducted the first panel meeting on 8th February 2024.</p> <p>The minutes of the meeting is however awaited from the panel convener.</p> <p>Decision in 5th Meeting</p> <p>The committee noted. The committee also requested Panel Convener to submit the minutes of first panel meeting to BIS at the earliest.</p>	<p>The committee may deliberate and decide.</p>
<p>Panel 3 : Refurbishing of Freight Containers</p>	<p>1. Mr. Dauji, Bay Container Terminal Pvt. Ltd. (Panel Convener)</p> <p>2. Mr. Sujoiy Sammadar, Anchor Container</p>	<p>1. Finalization the composition of Panel</p> <p>2. Revision of following Indian standards:</p> <p>i. IS 15734 : 2007</p> <p>ii. IS 15739 : 2007</p> <p>3. Identification of New Subject for formulation of Indian Standards in the domain of</p>	<p>Mr. Dauji (Panel Convener) stated that he studied both the Indian Standards for refurbishing of freight containers and is compared them with</p>	<p>Panel Convener submitted the draft on IS 15734 via email dt.11/09/2024 and the same is attached at Annex- 4.</p>

	<p>Services Pvt. Ltd.</p> <p>3. Mr. Karthik S, Indian Register of Shipping (IRS)</p> <p>4. Lloyd's Register Of Shipping</p> <p>5. Bureau Veritas</p> <p>6. Other Members as Proposed by panel convener and approved by SC TED 33.</p>	<p>Refurbishing of Freight Containers</p>	<p>IICL Manuals. He also explained his comments on IS 15734 to the committee.</p> <p>Mr. Dauji assured the committee to conduct the panel meeting before the next SC Meeting.</p> <p>Status in 5th Meeting</p> <p>Mr. Dauji (Panel Convenor) conducted the first panel meeting on 8th February 2024.</p> <p>The minutes of the panel meeting is attached as Error! Reference source not found. of the agenda.</p> <p>Decision in 5th Meeting</p> <p>The committee discussed the recommendations given by panel and requested Shri Dauji, the</p>	<p>The draft will be sent for wide circulation shortly.</p> <p>The committee may please note.</p>
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			panel convener of panel 3, to submit the draft for revision of IS 15734 after incorporation of the recommendations of the panel. Member secretary was also requested to send the draft for Wide Circulation for 60 days.	
Panel 4 : Design of Freight Containers and their Components	<ol style="list-style-type: none"> 1. Mr. Naresh Kumar, Kalyani Cast (Panel Convener) 2. DCM 3. APPL 4. CONCOR 5. IRS 6. BV 7. Any other member suggested by Panel Convener and approved by Committee 	<ol style="list-style-type: none"> 1. To prepare a draft Standard on “<i>Specification of Dry Steel Freight Containers</i>” intended for certification of Dry Freight Containers, consolidating/referencing all other relevant Indian standards which exists for Freight Containers. { The committee discussed the importance of drafting this draft standard with the understanding that it will intended for certification of Dry Freight Containers. The panel was requested to thoroughly review all pertinent Indian 	-	Email Dt. 02/09/2024 & reminder dt. 11/09/2024 was sent to fix up the date for the first meeting of Panel 4 .

		standards, along with the IRS Guidelines for Container Certification released in April 2021 and September 2021, as well as any other relevant documents, regulations, or guidelines as deemed necessary. Additionally, the panel was also requested to clearly outline the material specifications for freight containers. }		
		4. Identification of New Subject for formulation of Indian Standards in the domain of Design of Freight Containers and their accessories.		
Panel 5 : Raw Materials for Freight Containers	<ol style="list-style-type: none"> 1. Dr. Anjana Deva, SAIL (Panel Convener) 2. JSW 3. TATA STEEL 4. DCM 5. APPL 7. CONCOR 	<ol style="list-style-type: none"> 2. Comparative Study of Amendment 1 to IS 11587 and IRSM 41, SPA-H (JIS – G 3125), ASTM A-588, Corten A SAILCOR. 		<p>Panel 5 meeting was conducted by the panel convener (SAIL) dt.13/09/2024.</p> <p>However minutes of the panel meeting is still awaited.</p> <p>The committee may</p>

				deliberate and decide.
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The Committee may review the panel composition and progress made.

ITEM 3 ISSUES ARISING OUT OF THE MINUTES OF THE LAST MEETING

Sr. No.	IS Number / Doc Number	Title	Status/Decisions in Previous Meeting(s)	Status in Previous Meeting	Status in 6 th Meeting
1.	IS 13288: Part 3: 2002	Series 1 freight containers - Specification and testing: Part 3 tank containers for liquids, gases and pressurized dry bulk (First Revision)	<p>Status in 2nd Meeting :</p> <p>IS 13288 (Part 3): 2002 is an identical adoption of ISO 1496 (Part 3): 1995.</p> <p>However in the meantime, the ISO Document has been revised in 2019.</p> <p>As per the information available on ISO Portal, This latest (fifth) edition (ISO 1496-3: 2019) cancels and replaces the fourth edition (ISO 1496-3:1995) which has been technically revised. It also incorporates the Amendment ISO 1496-3:1995/Amd 1:2006. The main changes compared to the previous edition are as follows:</p> <ul style="list-style-type: none"> — the container type codes have been revised in accordance to ISO 6346; — the ratings and stacking forces have been 	<p>Status in 5th Meeting</p> <p>The document is being edited for sending for printing.</p> <p>The committee may please note.</p> <p>Decision in 5th Meeting</p> <p>The committee noted.</p>	<p>The document has been sent for printing and is under publication stage.</p> <p>The committee may please note.</p>

			<p>revised in accordance to ISO 668;</p> <ul style="list-style-type: none"> — the load transfer areas of base structure have been referenced to ISO 668; — the stacking test no. 1 ratings have been revised in accordance with ISO 668; — the insulation thermal test has been referenced to ISO 1496-2. <p>In view of the above, the committee may decide to revise the standard to align it with latest version of ISO.</p> <p><i>(A corresponding Review document has separately been circulated via BIS Portal to all the committee members.)</i></p> <p>Decision in 2nd Meeting :</p> <p>The committee decided to revise the standard to align it with latest ISO Standard {ISO 1496 (Part 3): 2019}</p> <p>The committee authorized the member secretary to send the National Foreword related to this standard for wide circulation of 60 days.</p>		
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			<p><u>Status in 3rd Meeting :</u> National Foreword has been sent for approval of HoD for Wide Circulation.</p> <p>The committee may please note.</p> <p><u>Decision in 3rd Meeting :</u> The committee noted.</p> <p><u>Status in 4th Meeting:</u> The National Foreword document was sent for wide circulation of 60 days. No comment has been received. The committee may deliberate and decide.</p> <p><u>Decision in 4th Meeting:</u> The committee approved the document for printing.</p>		
2.	IS 11466 : Part 1 : 1985	Guidelines for packing, stowage and securing of cargo inside the freight container: Part 1 general cargo	<p><u>Status in 2nd Meeting :</u> In an effort to review/revise all the Pre-2000 standards on priority, a Preliminary draft (P-Draft) has been prepared to revise IS 11466 (Part 1): 1985 and the same has been circulated to all the committee members as TED 33 (20910) P.</p>	<p><u>Status in 5th Meeting</u> Reminder on progress have been sent to the panel convener. Response is awaited from Mr. Lalwani on progress of the panel.</p> <p><u>Decision in 5th Meeting</u></p>	<p>Email dt.02/09/2024 & reminder dt.11/09/2024 was sent to Mr. Haresh Lalwani for conducting first panel meeting. The response is awaited.</p>

			<p>The last date to comment on this draft is 17/11/2022.</p> <p><i>(A corresponding Review document has separately been circulated via BIS Portal to all the committee members.)</i></p> <p>Decision in 2nd Meeting : The committee noted.</p> <p>The chairman requested Mr. Haresh Lalwani to study the document in depth and come up with comments, if any.</p> <p>Status/Decision in 3rd Meeting:</p> <p>The committee decided to give the subject to Panel 1 for Study and deliberation.</p> <p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting: Email dt. 17/01/2024 was sent to Panel 1 Convener, Shri Haresh Lalwani to seek the update on progress made on the standard. The response is awaited.</p>	<p>The committee requested the panel convener to conduct the first meeting of the panel at the earliest and Finalize the composition of the group and report the same to BIS Secretariat.</p>	<p>The committee may deliberate and decide.</p>
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			<p>Panel Convener Mr. Lalwani informed that he has talked with federation of freight forwarders association (FFFA), Indian National Shipowners' Association and Indian Chemical Council (ICC) and these organizations have responded positively to participate in the panel meeting.</p> <p>Mr. Lalwani also stated that Representatives from Cargo Packing Industry and Cargo Securing Products Industry are being followed up for participation.</p> <p>The committee requested Mr. Lalwani to expedite the follow up with other members and conduct the panel meeting at the earliest.</p>		
3.	IS 11466 : Part 2 : 1985	Guidelines for packing, stowage and securing of cargo inside the freight containers: Part 2 dangerous goods	<p>Status in 2nd Meeting :</p> <p>In an effort to review/revise all the Pre-2000 standards on priority, a Preliminary draft (P-Draft) has been prepared to revise IS 11466 (Part 2) : 1985 and the same has been circulated to all the committee members as TED 33 (20918) P.</p>	<p>Status in 5th Meeting:</p> <p>Reminder on progress have been sent to the panel convener.</p> <p>Response is awaited from Mr. Lalwani on progress of the panel.</p>	<p>Email dt.02/09/2024 & reminder dt.11/09/2024 was sent to Mr. Haresh Lalwani for conducting first panel meeting.</p> <p>The response is awaited.</p>

			<p>The last date to comment on this draft is 17/11/2022.</p> <p><i>(A corresponding Review document has separately been circulated via BIS Portal to all the committee members.)</i></p> <p>Decision in 2nd Meeting :</p> <p>The committee noted.</p> <p>The chairman requested Mr. Haresh Lalwani to study the document in depth and come up with comments, if any.</p> <p>Status/Decision in 3rd Meeting:</p> <p>The committee decided to give the subject to Panel 1 for Study and deliberation.</p> <p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting:</p> <p>Email dt. 17/01/2024 was sent to Panel 1 Convener, Shri Haresh Lalwani to seek the update on progress made on the</p>	<p>Decision in 5th Meeting:</p> <p>The committee requested the panel convener to conduct the first meeting of the panel at the earliest and Finalize the composition of the group and report the same to BIS Secretariat.</p>	<p>The committee may deliberate and decide.</p>
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			<p>standard. The response is awaited.</p> <p>Panel Convener Mr. Lalwani informed that he has talked with federation of freight forwarders association (FFFA), Indian National Shipowners' Association and Indian Chemical Council (ICC) and these organizations have responded positively to participate in the panel meeting.</p> <p>Mr. Lalwani also stated that Representatives from Cargo Packing Industry and Cargo Securing Products Industry are being followed up for participation.</p> <p>The committee requested Mr. Lalwani to expedite the follow up with other members and conduct the panel meeting at the earliest.</p>		
4.	IS 13112 : 1991	Cargo securing systems for general purpose freight containers general requirements	<p>Status in 2nd Meeting :</p> <p>In an effort to review/revise all the Pre-2000 standards on priority, a Preliminary draft (P-Draft) has been prepared to revise IS 13112: 1991 and the same has been circulated to all the committee members as TED 33 (21042) P.</p>	<p>Status in 5th Meeting:</p> <p>Reminder on progress have been sent to the panel convener. Response is awaited from Mr. Lalwani on</p>	Email dt.02/09/2024 & reminder dt.11/09/2024 was sent to Mr. Haresh Lalwani for conducting first panel meeting.

			<p>The last date to comment on this draft is 17/11/2022. (A corresponding Review document has separately been circulated via BIS Portal to all the committee members.)</p> <p>Decision in 2nd Meeting :</p> <p>The committee noted.</p> <p>The chairman requested Mr. Haresh Lalwani to study the document in depth and come up with comments, if any.</p> <p>Status/Decision in 3rd Meeting:</p> <p>The committee decided to give the subject to Panel 1 for Study and deliberation.</p> <p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting:</p> <p>Email dt. 17/01/2024 was sent to Panel 1 Convener, Shri Haresh Lalwani to seek the update on progress made on the</p>	<p>progress of the panel.</p> <p>Decision in 5th Meeting:</p> <p>The committee requested the panel convener to conduct the first meeting of the panel at the earliest and Finalize the composition of the group and report the same to BIS Secretariat.</p>	<p>The response is awaited.</p> <p>The committee may deliberate and decide.</p>
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			<p>standard. The response is awaited.</p> <p>Panel Convener Mr. Lalwani informed that he has talked with federation of freight forwarders association (FFFA), Indian National Shipowners' Association and Indian Chemical Council (ICC) and these organizations have responded positively to participate in the panel meeting.</p> <p>Mr. Lalwani also stated that Representatives from Cargo Packing Industry and Cargo Securing Products Industry are being followed up for participation.</p> <p>The committee requested Mr. Lalwani to expedite the follow up with other members and conduct the panel meeting at the earliest.</p>		
5.	IS 10880 : 2006	Twist locks for lifting freight containers - Specification (First Revision)	<p>Status in 2nd Meeting :</p> <p>The committee may deliberate and decide to either take up the document for Revision or Reaffirm the document.</p> <p>Decision in 2nd Meeting :</p> <p>The committee decided to reaffirm the document as of now.</p>	<p>Status in 5th Meeting:</p> <p>Mr. Ashish Bhargav (Panel Convener) conducted the first panel meeting on 8th February 2024.</p> <p>The minutes of the meeting is</p>	Email dt.02/09/2024 & reminder dt.17/09/2024 was sent to Mr. Ashish Bhargav submit the minutes of first panel meeting.

			<p>However Mecto Engineers, Coimbatore was assigned the task to study the standard in depth and give their comments to Amend/Revise/Withdraw the standard.</p> <p>Status/Decision in 3rd Meeting:</p> <p>The committee decided to give the subject to Panel 2 for Study and deliberation.</p> <p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting:</p> <p>Email dt. 18/01/2024 was sent to Panel 2 Convener, Shri Ashish Bhargav, Concor to seek the update on progress made on the standard.</p> <p>The response is awaited.</p> <p>Mr. Ashish Bhargav (Panel 2 Convenor) informed that he is following up with container spreaders and twist lock manufacturers and will conduct the panel 2 meeting at the earliest.</p>	<p>however awaited from the panel convener.</p> <p>Decision in 5th Meeting:</p> <p>The committee noted. The committee also requested Panel Convener to submit the minutes of first panel meeting to BIS at the earliest.</p>	<p>The response is awaited.</p> <p>The committee may deliberate and decide.</p>
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<p>6.</p>	<p>IS 9881 : 2007</p>	<p>Container spreaders - Specification (First Revision)</p>	<p>Status in 2nd Meeting : The committee may deliberate and decide to either take up the document for Revision or Reaffirm the document.</p> <p>Decision in 2nd Meeting : The committee decided to reaffirm the documents as of now.</p> <p>Mecto Engineers, Coimbatore was assigned the task to study the standard in depth and give their comments to Amend/Revise/Withdraw the standard.</p> <p>Status/Decision in 3rd Meeting: The committee decided to give the subject to Panel 2 for Study and deliberation.</p> <p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting:</p> <p>Email dt. 18/01/2024 was sent to Panel 2 Convener, Shri Ashish Bhargav, Concor to seek the update</p>	<p>Status in 5th Meeting:</p> <p>Mr. Ashish Bhargav (Panel Convener) conducted the first panel meeting on 8th February 2024.</p> <p>The minutes of the meeting is however awaited from the panel convener.</p> <p>Decision in 5th Meeting: The committee noted. The committee also requested Panel Convener to submit the minutes of first panel meeting to BIS at the earliest.</p>	<p>Email dt.02/09/2024 & reminder dt.17/09/2024 was sent to Mr. Ashish Bhargav submit the minutes of first panel meeting.</p> <p>The response is awaited.</p> <p>The committee may deliberate and decide.</p>
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			<p>on progress made on the standard.</p> <p>The response is awaited.</p> <p>Mr. Ashish Bhargav (Panel 2 Convenor) informed that he is following up with container spreaders and twist lock manufacturers and will conduct the panel 2 meeting at the earliest.</p>		
7.	IS 15734 : 2007	Freight containers - Repair before refurbishing - Guidelines	<p>Status in 2nd Meeting :</p> <p>The committee may deliberate and decide to either take up the document for Revision or Reaffirm the document.</p> <p>Decision in 2nd Meeting :</p> <p>The committee decided to reaffirm the documents as of now.</p> <p>Mr. Dauji singh from Bay Container Terminal Private Limited, Mumbai, was assigned the task to study the standard in depth and give their comments to Amend/Revise/Withdraw the standard.</p> <p>Status/Decision in 3rd Meeting:</p> <p>The committee decided to give the subject to Panel 3 for Study and deliberation.</p>	<p>Status in 5th Meeting:</p> <p>Mr. Dauji (Panel Convenor) conducted the first panel meeting on 8th February 2024.</p> <p>The minutes of the panel meeting is attached as Error! Reference source not found. of the agenda.</p> <p>Decision in 5th Meeting:</p> <p>The committee discussed the recommendations given by panel and requested Shri Dauji, the panel convener of panel 3, to submit the draft for revision of IS 15734 after incorporation of</p>	<p>Panel Convener submitted the draft on IS 15734 via email dt.11/09/2024 and the same is attached at Annex- 4.</p> <p>The draft will be sent for wide circulation shortly.</p> <p>The committee may please note.</p>

			<p>The Panel was requested to come up with its recommendations / Draft for revision of the standard in next meeting.</p> <p>Status/Decision in 4th Meeting: Email dt. 18/01/2024 was sent to Panel 3 Convener, Shri Dauji, Bay Container Terminal Pvt. Ltd. to seek the update on progress made on the standard.</p> <p>The response received through email dt. 20/01/2024 is attached as Error! Reference source not found.of the agenda of 4th meeting.</p> <p>Mr. Dauji (Panel Convenor) stated that he studied both the Indian Standards for refurbishing of freight containers and is compared them with IICL Manuals. He also explained his comments on IS 15734 to the committee.</p> <p>Mr. Dauji assured the committee to conduct the panel meeting before the next SC Meeting.</p>	<p>the recommendations of the panel. Member secretary was also requested to send the draft for Wide Circulation for 60 days.</p>	
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ITEM 4 REVIEW OF PUBLISHED INDIAN STANDARDS

4.1 As per the statutory requirement of the Bureau, every standard should be reviewed by the Sectional Committee responsible not more than five years after publication, reaffirmation or revision to establish whether it is still current. Circumstances may lead to any earlier review, too.

When reviewing a standard, a committee has five options available:

- a) **reaffirmation** indicating continuing current of the standard without change;
- b) **amendment and reaffirmation** indicating the continuing currently of standard after necessary changes to bring it up to date;
- c) **revision** involving the routine procedure for new project and reaffirm for time being;
- d) **declaration of obsolescence** indicating by amendment that the standard is not recommended for use in new equipment but needs to be retained to provide for the servicing of existing equipment that is expected to have a long working life;
- e) **Withdrawal** indicating that the standard is no longer needed.

4.2 As on-going activity, as indicated at **4.1** above, Sectional Committee reviews the Indian Standards formulated by it at an interval of five years from the date of publication/last review. Following standard are falling due for review during 2024-25:

Sl. No.	IS Number	IS Title
1.	IS 13288 (Part 2) : 2020 ISO 1496-2 : 2018	Series 1 Freight Containers — Specification and Testing Part 2 Thermal Containers (<i>Third Revision</i>)
2.	IS 13288 (Part 5) : 2020 ISO 1496-5 : 2018	Series 1 Freight Containers — Specification and Testing Part 5 Platform and Platform-based Containers (<i>Second Revision</i>)
3.	IS 6566 : 2020 ISO 668 : 2013	Series 1 Freight Containers — Classification, Dimensions and Ratings (<i>Fourth Revision</i>)
4.	IS 6569 : 2004 ISO 830:1999	Freight containers - Vocabulary (<i>Third Revision</i>)

The Committee May Please Note.

ITEM 5 PRESENT POSITION OF WORK

5.1 The List of Published Indian Standards along with their relevant International standard pertaining to SC TED 33 is given below :

Sl. No.	IS Number	IS Title	Corresponding ISO Document
1.	IS 6569 : 2004	Freight containers - Vocabulary (Third Revision)	ISO 830 : 1999
2.	IS 6566 : 2020	Series 1 Freight Containers — Classification, Dimensions and Ratings (Fourth Revision)	ISO 668 : 2020
3.	IS 13288 (Part 1) : 2021	Series 1 Freight Containers - Specification and Testing Part 1 General Cargo Containers for General Purposes (First Revision)	ISO 1496-1 : 2013
4.	IS 13288 (Part 2) : 2020	Series 1 Freight Containers — Specification and Testing Part 2 Thermal Containers (Third Revision)	ISO 1496-2 : 2018
5.	IS 13288 (Part 3) : 2002	Series 1 freight containers - Specification and testing: Part 3 tank containers for liquids, gases and pressurized dry bulk (First Revision)	ISO 1496-3:1995
6.	IS 13288 (Part 4) : 1993	Series 1 freight containers - Specification and testing part 4 non-Pressurized containers for dry bulk	ISO 1496-4:1991
7.	IS 13288 (Part 5) : 2020	Series 1 Freight Containers — Specification and Testing Part 5 Platform and Platform-based Containers (Second Revision)	ISO 1496-5 : 2018
8.	IS 7694 : 2021	Series 1 freight containers Corner and intermediate fittings Specifications	ISO 1161 : 2016
9.	IS 10880 : 2006	Twist locks for lifting freight containers - Specification (First Revision)	-
10.	IS 9881 : 2007	Container spreaders - Specification (First Revision)	-
11.	IS 11466 (Part 1) : 1985	Guidelines for packing, stowage and securing of cargo inside the freight container: Part 1 general cargo	-
12.	IS 11466 (Part 2) : 1985	Guidelines for packing, stowage and securing of cargo inside the freight containers: Part 2 dangerous goods	-

13.	IS 13112 : 1991	Cargo securing systems for general purpose freight containers general requirements	-
14.	IS 7622 : 2021	Series 1 Freight Containers - Handling and Securing (Third Revision)	ISO 3874 : 2017
15.	IS/ISO TR 15069 : 2018	Series 1 Freight Containers — Handling and Securing — Rationale for ISO 3874:2017 Annexes A To E	ISO/TR 15069 : 2018
16.	IS 15926 : 2012	Freight containers - Straddle carriers for freight container handling - Calculation of stability	ISO 14829 : 2002
17.	IS 15734 : 2007	Freight containers - Repair before refurbishing - Guidelines	-
18.	IS 15739 : 2007	Freight containers - Refurbishing - Guidelines	-
19.	IS 17381 : 2021	Freight containers - Mechanical seals	ISO 17712 : 2013
20.	IS/ISO 18185-1 : 2007	Freight containers - Electronic seals Part 1: Communication protocol	ISO 18185-1 : 2007
21.	IS/ISO 18185-2 : 2007	Freight containers - Electronic seals Part 2: Application requirements	ISO 18185-2 : 2007
22.	IS/ISO 18185-3 : 2015	Freight Containers - Electronic Seals Part 3: Environmental Characteristics	ISO 18185-3 : 2015
23.	IS/ISO 18185-4 : 2007	Freight containers - Electronic seals Part 4: Data protection	ISO 18185-4 : 2007
24.	IS/ISO 18185-5 : 2007	Freight containers - Electronic seals Part 5: Physical layer	ISO 18185-5 : 2007
25.	IS/ISO 15070 : 1996	Series 1 Freight Containers - Rationale for Structural Test Criteria	ISO 15070 : 1996
26.	IS 13697 : 1993	Series 1 freight containers - Interface connections for tank containers	ISO 9669 : 1990
27.	IS/ISO 10368 : 2006	Freight Thermal Containers Remote Condition Monitoring	ISO 10368 : 2006

28.	IS 13698 (Part 1) : 1993	Freight containers - Information related to containers on board vessels: Part 1 bay plan system	ISO 9711-1:1990
29.	IS 13699 : 1993	Freight containers - Automatic identification	ISO 10374:1991
30.	IS 13731 : 2003	Freight containers - Container equipment data exchange (Cedex) - General communication codes (First Revision)	ISO 9897 : 1997
31.	IS/ISO 18186 : 2011	Freight containers RFID cargo shipment tag system	ISO 18186 : 2011
32.	IS/ISO 18625 : 2017	Freight containers Container Tracking and Monitoring Systems CTMS: Requirements	ISO 18625 : 2017
33.	IS/ISO 20854 : 2019	Thermal Containers Safety Standard for Refrigerating Systems Using Flammable Refrigerants Requirements for Design and Operation	ISO 20854 : 2019
34.	IS 6928 : 2001	Freight containers - Coding, identification and marking (Third Revision)	ISO 6346:1995
35.	IS 7917 : 1994	Freight containers - Air/surface (Intermodal) general purpose containers - specification and tests (First Revision)	ISO 8323:1985
36.	IS 19037 : 2023	Transportable Gas Storage Devices Hydrogen Absorbed in Reversible Metal Hydride	ISO 16111:2018

The committee may please note.

5.2 Present program of work of SC TED 33 as available on BIS Portal is as follows:

TED33 : Freight Containers Sectional Committee

Scope : a) Standardization of Freight Containers including General and Specific Purpose Containers, Methods of Tests to be performed, Performance requirements, Identification, Marking and Communication requirements along with Safety and related Handling and Securing Equipment. b) Co-ordination of work with ISO/ TC 104 and its subcommittees ISO/TC 104/SC 1, ISO/TC 104/SC 2 and ISO/TC 104/SC 4.

Liaison : ISO TC-104 (P): Freight containers ISO TC-104 SC-1 (P): General purpose containers ISO TC-104 SC-2 (P): Specific purpose containers ISO TC-104 SC-4 (P): Identification and communication

Published Standards

Sl. No.	IS No.	TITLE	Reaffirm M-Y	No. of Amds	Eqv.
	IS/ISO 10368 : 2006				
1	ISO 10368:2006 ISO 10368:2006	Freight Thermal Containers Remote Condition Monitoring		-	Identical under dual numbering
2	IS 10880 : 2006 Reviewed In : 2022	Twistlocks for lifting freight containers - Specification (First Revision)	November, 2022	-	Indigenous
3	IS 11466 (Part 1) : 1985 Reviewed In : 2022	Guidelines for packing, stowage and securing of cargo inside the freight container: Part 1 general cargo	November, 2022	-	Indigenous
4	IS 11466 (Part 2) : 1985 Reviewed In : 2022	Guidelines for packing, stowage and securing of cargo inside the freight containers: Part 2 dangerous goods	November, 2022	-	Indigenous
5	IS 13112 : 1991 Reviewed In : 2022	Cargo securing systems for general purpose freight containers general requirements	November, 2022	-	Indigenous
6	13288 : 2021 ISO 1496-1 : 2013 ISO 1496-1 : 2013	Series 1 Freight Containers - Specification and Testing Part 1 General Cargo Containers for General Purposes (First Revision)		-	Identical under dual numbering
7	IS 13288 (Part 2) : 2020 ISO 1496-2 : 2018 ISO 1496-2 : 2018	Series 1 Freight Containers " Specification and Testing Part 2 Thermal Containers (Third Revision)	-	-	Identical under dual numbering
8	IS 13288 (Part 3) : 2002 ISO 1496-3 Reviewed In : 2023 ISO 1496-3:1995	Series 1 freight containers - Specification and testing: Part 3 tank containers for liquids, gases and pressurized dry bulk (First Revision)	March, 2023	1	Identical under dual numbering
9	IS 13288 (Part 4) : 1993 ISO 1496-4 Reviewed In : 2019 ISO 1496-4:1991	Series 1 freight containers - Specification and testing part 4 non-Pressurized containers for dry bulk	March, 2019	1	Identical under dual numbering
10	IS 13288 (Part 5) : 2020 ISO 1496-5 : 2018 ISO 1496-5 : 2018)	Series 1 Freight Containers " Specification and Testing Part 5 Platform and Platform-based Containers (Second Revision)	-	-	Identical under dual numbering
11	IS 13697 : 1993 ISO 9669 Reviewed In : 2019	Series 1 freight containers - Interface connections for tank containers	March, 2019	1	Indigenous

	IS 13698 (Part 1) : 1993				
12	ISO 9711-1 Reviewed In : 2019 ISO 9711-1:1990	Freight containers - Information related to containers on board vessels: Part 1 bay plan system	March, 2019	-	Identical under dual numbering
	IS 13699 : 1993				
13	ISO 10374 Reviewed In : 2019 ISO 10374:1991	Freight containers - Automatic identification	March, 2019	1	Identical under dual numbering
	IS 13731 : 2003				
14	ISO 9897 Reviewed In : 2019	Freight containers - Container equipment data exchange (Cedex) - General communication codes (First Revision)	March, 2019	-	Indigenous
	IS/ISO/TR 15069 : 2018				
15	ISO 15069 : 2018 ISO 15069 : 2018	Series 1 Freight Containers " Handling and Securing " Rationale for ISO 3874:2017 Annexes A To E		-	Identical under dual numbering
	IS/ISO 15070 : 1996				
16	ISO 15070 : 1996 ISO 15070 : 1996	Series 1 Freight Containers - Rationale for Structural Test Criteria		-	Identical under dual numbering
	IS 15734 : 2007				
17	Reviewed In : 2018	Freight containers - Repair before refurbishing - Guidelines	February, 2018	-	Indigenous
	IS 15739 : 2007				
18	Reviewed In : 2018	Freight containers - Refurbishing - Guidelines	February, 2018	-	Indigenous
	IS 15926 : 2012				
	ISO 14829 : 2002				
19	Reviewed In : 2022	Freight containers - Straddle carriers for freight container handling - Calculation of stability	November, 2022	-	Indigenous
	IS 17381 : 2021				
	ISO 17712 : 2013				
20	ISO 17712 : 2013	Freight containers Mechanical seals		-	Identical under dual numbering
	IS/ISO 18185-1 : 2007				
	ISO 18185-1:2007				
21	ISO 18185-1:2007	Freight containers Electronic seals Part 1: Communication protocol		-	Identical under dual numbering
	IS/ISO 18185-2 : 2007				
	ISO 18185-2:2007				
22	ISO 18185-2:2007	Freight containers Electronic seals Part 2: Application requirements		-	Identical under dual numbering
	IS/ISO 18185-3 : 2015				
	ISO 18185-3:2015				
23	ISO 18185-3:2015	Freight Containers Electronic Seals Part 3: Environmental Characteristics		-	Identical under dual numbering
	IS/ISO 18185-4 : 2007				
	ISO 18185-4:2007				
24	ISO 18185-4:2007	Freight containers Electronic seals Part 4: Data protection		-	Identical under dual numbering
	IS/ISO 18185-5 : 2007				
	ISO 18185-5:2007				
25	ISO 18185-5:2007	Freight containers Electronic seals Part 5: Physical layer		-	Identical under dual numbering
26	IS/ISO 18186 : 2011			-	

	ISO 18186:2011 ISO 18186:2011	Freight containers RFID cargo shipment tag system			Identical under dual numbering
	IS/ISO 18625 : 2017				
27	ISO/TS 18625:2017 ISO/TS 18625:2017	Freight containers Container Tracking and Monitoring Systems CTMS: Requirements	-		Identical under dual numbering
	IS 19037 : 2023				
28	ISO 16111:2018 ISO 16111:2018	TRANSPORTABLE GAS STORAGE DEVICES HYDROGEN ABSORBED IN REVERSIBLE METAL HYDRIDE	-		Identical under dual numbering
	IS/ISO 20854 : 2019				
29	ISO 20854 : 2019 ISO 20854 : 2019	Thermal Containers Safety Standard for Refrigerating Systems Using Flammable Refrigerants Requirements for Design and Operation	-		Identical under dual numbering
	IS 6566 : 2020				
30	ISO 668 : 2020 ISO 668 : 2013	Series 1 Freight Containers "Classification, Dimensions and Ratings (Fourth Revision)	-	-	Identical under dual numbering
	IS 6569 : 2004				
31	ISO 830 Reviewed In : 2019 ISO 830:1999	Freight containers - Vocabulary (Third Revision)	September, 2019	-	Identical under dual numbering
	IS 6928 : 2001				
32	ISO 6346 Reviewed In : 2022 ISO 6346:1995	Freight containers - Coding, identification and marking (Third Revision)	March, 2022	-	Identical under dual numbering
	7622 : 2021				
33	ISO 3874 : 2017 ISO 3874 : 2017	Series 1 Freight Containers - Handling and Securing (Third Revision)		-	Identical under dual numbering
	IS 7694 : 2021				
34	ISO 1161 : 2016 ISO 1161 : 2016	Series 1 freight containers Corner and intermediate fittings Specifications		-	Identical under dual numbering
	IS 7917 : 1994				
35	ISO 8323 Reviewed In : 2019 ISO 8323:1985	Freight containers - Air/surface (Intermodal) general purpose containers - specification and tests (First Revision)	March, 2019	-	Identical under dual numbering
36	IS 9881 : 2007 Reviewed In : 2018	Container spreaders - Specification (First Revision)	February, 2018	-	Indigenous

Standards Under Development

Projects Approved

Sl. No. Doc No

TITLE

No Records Found

Preliminary Draft Standards

Sl. No.	Doc No	TITLE
1	TED 33 (20910)	GUIDELINES FOR PACKING STOWAGE AND SECURING OF CARGO INSIDE THE FREIGHT CONTAINER PART 1 GENERAL CARGO
2	TED 33 (20918)	GUIDELINES FOR PACKING STOWAGE AND SECURING OF CARGO INSIDE THE FREIGHT CONTAINERS PART 2 DANGEROUS GOODS
3	TED 33 (21042)	CARGO SECURING SYSTEMS FOR GENERAL PURPOSE FREIGHT CONTAINERS GENERAL REQUIREMENTS

Drafts Standards in WC Stage

Sl. No.	Doc No	TITLE
No Records Found		

Draft Standards Completed WC Stage

Sl. No.	Doc No	TITLE
No Records Found		

Finalized Draft Indian Standard

Sl. No.	Doc No	TITLE
No Records Found		

Finalized Draft Indian Standards under Print

Sl. No.	Doc No	TITLE
1	TED 33 (23645) (ISO 1496-3 : 2019)	

Total Published Standards:35
Total Standards Under development : 4

Aspect Wise Report

Code of Practices :	6
Methods of Test :	5
Terminology :	1
Dimensions :	3
System Standard :	6
Safety Standard :	3
Others :	0
Service Specification :	0
Process Specification :	0
Unclassified :	0

Total :36

Annexure-I :List of Indian Standards Withdrawn/Superseded

Sl. No.	IS No. & Year	TITLE
		No Records Found

Annexure-II :List of Indian Product Standards

Sl. No.	IS No. & Year	TITLE
1	IS 10880 : 2006 Reviewed In : 2022	Twistlocks for lifting freight containers - Specification First Revision
2	IS 13112 : 1991 Reviewed In : 2022	Cargo securing systems for general purpose freight containers general requirements
3	13288 : 2021 ISO 1496-1 : 2013 ISO 6558 (Pt-2):1992	Series 1 Freight Containers - Specification and Testing Part 1 General Cargo Containers for General Purposes First Revision
4	IS 13288 (Part 3) : 2002 ISO 1496-3 Reviewed In : 2023 ISO 1496-3:1995	Series 1 freight containers - Specification and testing Part 3 tank containers for liquids gases and pressurized dry bulk First Revision
5	IS 13288 (Part 4) : 1993 ISO 1496-4 Reviewed In : 2019 ISO 1496-4:1991	Series 1 freight containers - Specification and testing part 4 non-Pressurized containers for dry bulk
6	IS 13697 : 1993	

	ISO 9669	Series 1 freight containers - Interface connections for tank containers
	Reviewed In : 2019	
	IS 17381 : 2021	
	ISO 17712 : 2013	
7	60603-6 : 1987	Freight containers Mechanical seals
	IS/ISO 18186 : 2011	Freight containers RFID cargo shipment tag system
8	ISO 18186:2011	
	IS 19037 : 2023	TRANSPORTABLE GAS STORAGE DEVICES HYDROGEN ABSORBED IN REVERSIBLE METAL HYDRIDE
9	ISO 16111:2018	
	IS 7694 : 2021	Series 1 freight containers Corner and intermediate fittings Specifications
10	ISO 1161 : 2016	
	IS 7917 : 1994	
	ISO 8323	Freight containers - Air surface Intermodal general purpose containers - specification and tests First Revision
11	Reviewed In : 2019 ISO 8323:1985	
	IS 9881 : 2007	Container spreaders - Specification First Revision
12	Reviewed In : 2018	

Designed, Developed and Maintained by ITSD,BIS, New Delhi

The Committee may review the program of work.

ITEM 6 INTERNATIONAL ACTIVITIES

6.1 BIS membership of ISO Technical Committee relevant to working of TED 33 is given as under:

ISO TC / SC / WG	TITLE	TYPE	MEETING DATE
ISO/TC 104	Freight Containers	Technical Committee	31/10/2024
ISO/TC 104/SC 1	General purpose containers	Sub committee	29/10/2024
ISO/TC 104/SC 2	Specific purpose containers	Sub committee	29/10/2024
ISO/TC 104/SC 4	Identification and communication	Sub committee	30/10/2024

The committee may Note.

ITEM 7 DATE AND PLACE OF NEXT MEETING

ITEM 8 ANY OTHER BUSINESS

ANNEX- 1
(Item 2.2)

FREIGHT CONTAINERS SECTIONAL COMMITTEE, TED 33

3rd Meeting 25th September 2023 Webex
 4th Meeting 23rd January 2024 Hybrid (NITS, Noida)
 5th Meeting 12th February 2024 Physical (WROL, Mumbai)

Sl. No.	NAME OF THE ORGANIZATION	REPRESENTED BY Principal member (Alternate member) (Young Professional)	Attendance of the meetings			
			3 rd	4 th	5 th	Total
1.	In Individual Capacity	Dr. N C Saha (Chairman)	Y	Y	Y	3/3
2.	Anchor Container Services Private Limited, New Delhi	Shri Sujoiy Kumar Sammaddar (P)	Y	N	Y	2/3
3.	Association of Multi Modal Transport Operators of India, Mumbai	Shri Arun Kumar (P) Shri Haresh Lalwani (A)	Y	Y	Y	3/3
4.	Bay Container Terminal Private Limited, Mumbai	Shri Somesh Batra (P) Shri Dauji Singh (A)	Y	Y	N	2/3
5.	Container Corporation of India, New Delhi	Shri Ashish Bhargav (P) Shri Ajay Kumar Maheshwar (A)	Y	Y	Y	3/3
6.	Indian Institute of Technology, Roorkee	Shri A. K. Srivastav (P)	Y	N	N	1/3
7.	Indian Register of Shipping, Mumbai	Cdr. Sandeep Kumar (P) Shri Karthik. S (A)	Y	Y	Y	3/3
8.	Mecto Engineers, Ludhiana	Shri Jagmohan Singh (P) Shri Daras Mohan Singh (A)	Y	N	N	1/3
9.	Shipping Corporation of India Limited, Mumbai	Shri T.V.S. Jagdeep (P) Shri Sushil Oraon (A)	Y	Y	Y	3/3
10.	JSW Steel Limited, Mumbai	Shri Vinay Pandey (P) Shri Alok Seth (A)	Y	Y	Y	3/3
11.	DCM Containers & Engineering Pvt. Ltd.,	Shri Rudra Shriram (P) Shri Ashok Kumar Singh (A)	Y	Y	Y	3/3
12.	Bureau Veritas India Private. Limited, Mumbai	Shri Nana Saheb K. Shirke (P) Shri Ranjit D. Naik (A)	Y	Y	Y	3/3

Sl. No.	NAME OF THE ORGANIZATION	REPRESENTED BY Principal member (Alternate member) (Young Professional)	Attendance of the meetings			
			3 rd	4 th	5 th	Total
13.	Kalvani Cast Tech Limited, New Delhi	Shri Naresh Kumar (P) Shri Devender Kumar (A)	-	-	Y	1/1
14.	Aawadkrupa Plastomech Private Limited, Bhavnagar	Shri Hasmukh Viradiya (P) Shri Vallabh Viradiya (A)	-	-	Y	1/1
15.	Steel Authority Of India Limited (SAIL), Research & Development Centre for Iron & Steel, Ranchi	Dr. Anjana Deva (P) Shri Santosh Kumar (A)	-	-	Y	1/1
16.	Loadstar Equipment Limited, Bengaluru	Shri Gautam Valiveti (P) Shri Ravi Kumar Karunakaran (A) Shri Sumukh Bharadwaj (YP)	-	-	-	-

ANNEX- 2
(Item 2.3.3)

CV of Dr G. Venkatesan



**Department of Civil Engineering
University College of Engineering Tiruchirapalli
BIT Campus, Anna University
Tiruchirapalli–
620024 Tamil Nadu,
India.**

Dr.G. Venkatesan

+91 9486814120 ☎ 91 -431-2573066.

Assistant Professor (Sr.Gr)

Email:gvenkat1972@yahoo.co.in

Website: <http://drgv.webs.com/>

Ph.D. Thesis Title : Comparative studies on clay liner with and without microsilica, in permeation of Municipal

Research Interest: Solid waste management, Environmental
Geotechniques, landfill design , Structural
Engineering and Water management techniques

Educational Qualifications: M.E, Ph.D. in Civil Engineering

Ph.D. (2004-2010) : Environmental Geotechnics, National Institute of Technology
Tiruchirappalli.

M.E. (2000 -2003) : Water Resources Engineering and Management, Regional Engineering
College Tiruchirappalli.Bharathidasan University, Tiruchirappalli.

B .E (1989 -1993) : Civil Engineering, Kongu Engineering College, Bharathiyar University,
Coimbatore.

solid waste leachate.Under Guidance of *Dr.G. Swaminathan (20.02.2010)*

M.E Thesis Title : Water Management study for rice crop using staggered growing seasons
under Guidance of *Prof.S.Krishnamoorthi*

Academic Achievements:

- ❖ Scored 100% in Mechanics of Solids - I in Degree level
- ❖ Scored 100% in Mathematics in SSLC

Languages known : Tamil, English, Hindi and Telugu.

**Professional Experience: 23 Years (18 Years for Teaching, Research Experience and 5 years site
work and Industry experience)**

Assistant Professor(Sr.Gr) : University College of Engineering Tiruchirappalli (BIT Campus),Anna University, 2015– Present

Assistant Professor : University College of Engineering Tiruchirappalli (BIT Campus),Anna University, 2009– 2015.

Assistant Professor : SASTRA University,Thanjavur, 2006 –2009.

TEQIP Research Scholar : National Institute of TechnologyTiruchirappalli, 2005 –2006. Research Associate : National Institute of TechnologyTiruchirappalli, 2002 –2005.

Project Associate : National Institute of TechnologyTiruchirappalli, 2001 –2002. Application Assistant : Geo Info Labs, Pondicherry,2000-2001

Junior Engineer : Sathipal(India) Ltd , Chennai,1998 –1999.

Site Engineer : Span Constructions & Designs (P) Ltd,Chennai 1996 –1997

Appetence Trainee : Public Works Department, Mettur Dam 1994 –1995

Site Engineer : PWD Contractor Mettur Dam 1993 –1994

Awards:5

1. ***Vishwakarma Award*** for the category of *Academician* for the year 2017 organized by Construction Industry Development Council (CIDC),Government of India on 7.3.17.
2. ***Rashtriya Gaurav Award Outstanding achieves and Services*** for the year 2015 by the by India International friendship society New Delhi on 15.4.15
3. ***Ground water Expert*** published in directory of ground water professionals, Central Ground Water Board, Ministry of Water Resources December 2014 to till date.
4. ***Best research paper award on Environmental Issues in the Department of Environment, Government of Tamil Nadu*** state award for the year of 2012 on 05.06.2013.
5. ***Certificate of Recognition*** from Eco city builders USA for presentation of Eco city conference 2006.

1. ***IPHE council Member*** of Institution of Public health Engineers, India for the year of 2012 to 2018.
2. Presented on 'Permeable reactive barrier ' ***Brain Storming Session on Environmental Geotechnics***' held on January 24-25, 2017, at Goa Organized by Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, under the aegis of Science and Engineering Research Board (SERB), Department of Science and Technology (DST) India.

3. **IGS Trichy Chapter Executive committee member of** Indian Geotechnical Society, from 2.10.16 to till date.
4. **IGS Trichy Chapter Founder Secretary**, Indian Geotechnical Society, from 14.2.2014 to 1.10.16.
5. **Member in Environmental and Water Resources Systems Committee**, American Society of Civil Engineers from December 2005 to till date
6. **Chartered Engineer** (AM 089348-2) in Institution of Engineers (India), Kolkatta, from 14.01.2005 to till date.
7. **Outstanding contributions as a reviewer** for Environmental Monitoring and Assessment, Springer publication, 10th July 2013.
8. **Certificate of Appreciation** for producing hundred percentage result in the Landfill Engineering and Remediation Technology for the academic year 2018-2019
9. **Member** in Network of Expert and Resources for Subsurface Investigations and Remediation of Contaminated Sites (NERCS) sponsored by MoEF&CC at IIT Delhi,
10. **Lead Auditor** in ISO 14001:2015 Environmental Management system.
11. **Technical Expert** in National Accreditation Board for Testing and Calibration Laboratories (NABL).
12. **Tamil translation** of technical terms in Energy Conservation Building code (ECBC) Tamilnadu Building Cell Department.
13. **Primary Evaluator** In Toyathon 2021 organized by Ministry of Education's Innovation Cell and AICTE

PUBLICATIONS :

Website:

Google Scholar :

[https://scholar.google.co.in/citations?user=roiWnRUAAA&hl=en&aut](https://scholar.google.co.in/citations?user=roiWnRUAAA&hl=en&authuser=4)

[huser=4](https://www.researchgate.net/profile/Venkatesan_Govindan4) Research gate :

http://www.researchgate.net/profile/Venkatesan_Govindan4

academia.edu :

<https://annauniv.academia.edu/VenkatesanGovindan>

Orchid id : <http://orcid.org/0000-0001-5159-4265>

ResearcherID : [M-3232-2014](https://publons.com/researcher/452717/venkatesan-govindan/)

Research ID : <https://publons.com/researcher/452717/venkatesan-govindan/>

Twitter : [venki@gvenkat2018](https://twitter.com/venki@gvenkat2018)

Kudos : <https://www.growkudos.com/hub/133400/publications>

linkedin : <https://www.linkedin.com/in/venkatesan-govindan-506a8215a/>

Mendeley : <https://www.mendeley.com/settings/account/>
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	All	Since 2019
<u>Citations</u>	364	266
<u>h-index</u>	12	10
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19. M.Rajeswari and G.Venkatesan, “ Decolourization of dye effluent by using adapted bacterial strain”, International conference on Eco-conservation for sustaibale development (ICECSD - 2012) organized by PG& Research Department of Plant Bilogy and Plant Biotechnology,Quaid-E-Milath Government college for Women, Chennai, pp73, 1st to 3rdFebruary 2012 .
20. G. Venkatesan R. Nallusamy and G. Swaminathan, “A suitability and performance of liners in Indian conditions”, the sixth international eco city conference (Eco-city 6), Bangalore, India Organizer Killen miler and Richard register organized by Ecocity builders USA, 4th to 6th December 2006.
21. G.Venkatesan, S.Krishnamoorthi and M.Tamilselvam, “Methods for water potential estimation and techniques for water management”Internationalconference on Sustainable development and management of natural resources organized by Holycross college, Tiruchirappalli held on pp14,15-17 March 2003.

Publication in National Conferences -42 Proceedings as Full Papers with ISSN Number-13

1. J.Vijayargavan , Jeevakumar R, Venkatesan G, Rengasamy M and Thivya J “Study on Geopolymer coatings Evaluation of corrosion protection of Steel Reinforcements in R.C.C structures , National conference on Advancements in Civil Engineering organized by Vigan Insitute of Technology and science Hyderabad , ISBN 978-81-947313-7-5 on 29th and 30th December 2020 pp 1-9.
2. G.Venkatesan and N.Vijayargavan “Analysis the behavior of PSC Pole cast with rubber partially as fine aggregate in Concrete” National conference on recent trends in Civil and Environmental Engineering, organized by the Department of Civil Engineering , BIT Campus, Anna University, Trichy on 26th August 2020 pp 82-86.
3. Sadayappan.V, Nitees k.Sukla, Rajkumar.K, Venketesan.G, Kalaivani R.A “Review article: Effective utilization of waste tire rubber to avoid environmental pollution”. National conference on recent trends in Civil and Environmental Engineering, Organized by the Department of Civil Engineering , BIT Campus, Anna University, Trichy on 26th August 2020 pp 216-220.
4. Thirumal.J , G.Venkatesan and Shalk Qadir.M “Influmece of cation binding agent (STPP) Induced defloculation for diary sludge distegration Third National seminar on Advanced Oxidation Processes (AOP 2017) organized by the Department of Chemistry, BIT Campus, Anna University, Trichy in association with Society for Environmental Chemistry and Allied Sciences (SECAS) ,India on 17th to 19st December 2017 pp 157-159

5. Vidhya V, G.Venkatesan and K.Jothivenkatachalam, “Study on removal of Toxic metal from the industrial wastewater by Biopolymer based composites ”, TEQIPII sponsored National conference on Research Advances in materilas sciences and applications, organized by Bharathidasn Institute of Technology ,Tiruchirappalli,pp47,19th and 20thAugust 2016

6. Nithya MN, G.Venkatesan and K.Jothivenkatachalam, "Recent Technologies in waste water treatment", TEQIPII sponsored National conference on Research Advances in materials sciences and applications, organized by Bharathidasan Institute of Technology, Tiruchirappalli, pp43, 19th and 20th August 2016
7. Rajagopalan.V, and G.Venkatesan, "Geotechnical Characterization of clay admixed with Quarry fine as potential liner material", National conference on recent advances in Geotechnical Engineering", organized by Government college of Technology, Coimbatore, pp 12-15, 17th April 2015.
8. Murugesan.A., G.Venkatesan and R.VijayaSarathy, "Experimental investigation on partial replacement of coarse aggregate with polystyrene", National conference on recent trends in Civil Engineering towards sustainable development, organized by Kings College of Engineering, Pudukkottai, pp 101-106, 9th March 2015.
9. R.Raja and G.Venkatesan, "Behavior of high performance concrete using granite powder and study of its mechanical properties", National conference on Engineering Approach for sustainable development, organized by Modular based credit banking scheme, Anna university of Technology, Tiruchirappalli, Tiruchirappalli, pp5, 27th September 2011.
10. S.ShanmugaSundarabopathy and G.Venkatesan, "Characteristic study of concrete using ash of coconut coir pith- A Review.", National conference on Engineering Approach for sustainable development, organized by Modular based credit banking scheme, Anna university of Technology, Tiruchirappalli, Tiruchirappalli, pp6, 27th September 2011.
11. S.Raghuraman and G.Venkatesan, "Flexural behavior of reinforced concrete beams using high volume fly ash concrete confinement in compression zone", National conference on Engineering Approach for sustainable development, organized by Modular based credit banking scheme, Anna university of Technology, Tiruchirappalli, Tiruchirappalli, pp10, 27th September 2011.
12. S.Kannan and G.Venkatesan, "Strength and durability of concrete by partially replacing fine aggregate by pond ash and cement by silica fume", National conference on Engineering Approach for sustainable development, organized by Modular based credit banking scheme, Anna university of Technology, Tiruchirappalli, Tiruchirappalli, pp25, 27th September 2011.
13. A.Arjunan and G.Venkatesan, "Green concrete with demolished concrete waste", National conference on emerging trends in Engineering, Management and Computer Applications organized by Anna university of Technology, Tiruchirappalli, Tiruchirappalli, pp84, 1-2 April 2011.

National conference -29

1. M. Santhosh kumar, G.Venkatesan and C.Ravichandran "Assessment of air pollution by using urban Vegetation", UGC sponsored Heber National conference on Ensuring Environmental

Sustainability Organized by PG& Research Department of Environmental sciences Bishop Heber college Tiruchirappalli held on pp 78 ,22nd and 23th March 2019.

2. T.Ajithkumar , G.Venkatesan and A.Alagappa Moses “Assessment of Bio-Medical Liquid waste management system” , UGC sponsored Heber National conference on Ensuring Environmental

Sustainability Organized by PG& Research Department of Environmental sciences Bishop Heber college Tiruchirappalli held on pp 94 ,22nd and 23th March 2019.

3. S.Koteshwaran, M.Rengasamy and G.Venkatesan “Green synthesis of nano particles and its application in dye effluent treatment plant ” , International conference on Recent Advances in computer, Electrical , Electronics , Civil and mechanical Engineering Organized by Ranganathan Engineering College held on Coimbatore ,22nd and 23th March 2019.
4. G.Venkatesan , M.Saravankumar, Bharath P.Kapgate and K.Rajkumar “Study on waste tire moratar for green Environment , IRMRA 23rd Rubber conference and international workshops on Organized by IRMRA Mumbai held on 14th and 15th December 2018..
5. C. Anupriya, G.Venkatesan and M.Rengasamy “Removal of Oil Spill from Sea Water using Novel Adsorbents” Innovative Practices, Recyclable Materials and Energy Efficient Methods in Civil Engineering organized by the Civil Engineering PSG Institute of Technology and Applied Research Coimbatore on 23th to 24th March 2018 pp 198-202
6. Aarthi.B., S.UdayaBhanu and G.Venkatesan , “Synthesis of Iron oxide Nanoparticles for Removal of Rhodamine B Dye ”, National Conference on recent trends in Civil Engineering , organized by EGS Pillay Engineering College, Nagapattinam, pp 3,27th March 2015 .
7. Mohamed Ismail,,S. UdayaBhanu and G.Venkatesan , “Graphite and mild steel Electrodes fro degradation of Dye by Electrofonton process ”, National Conference on recent trends in Civil Engineering , organized by EGS Pillay Engineering College, Nagapattinam, pp 1,27th March 2015 .
8. Palaniappan S. and G.Venkatesan, “Experimental investigation on self compacting concrete using marble powder and silica fume”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized byBharathidasn Institute of Technology ,Tiruchirappalli,pp 50,21st and 22nd March 2014 .
9. Ponraj.A and G.Venkatesan, “ Feasibility study on strength of concrete on partial replacement of cement by using seashell ash”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized byBharathidasn Institute of Technology , Tiruchirappalli,pp 51,21st and 22nd March 2014 .
10. Balachandar. P and G.Venkatesan, “ An Experimental study on partial replacement of cement by chalcedony ”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized byBharathidasn Institute of Technology , Tiruchirappalli,pp 55,21st and 22nd March 2014 .
11. Manesh Kumar.C.S and G.Venkatesan, “ A Experimental study on the strength of concrete produced with waste ceramic tiles as aggregates ”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized byBharathidasn Institute of Technology , Tiruchirappalli,pp 59,21st and 22nd March 2014 .
12. Arun Raj. R and G.Venkatesan, “Environmental impact assessment of strengthening & Four

laneing of SH79 from Malliyakari to Erode in the state of Tamil Nadu ”, TEQIPII sponsored
National conference on recent

- trends in civil and Environmental Engineering, organized by Bharathidasan Institute of Technology , Tiruchirappalli, pp 66, 21st and 22nd March 2014 .
13. Shanmuharajan. M.B and G.Venkatesan, “Impact of leachate on groundwater quality at Sorathur, Thuraiyur: A Modeling study ”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized by Bharathidasan Institute of Technology , Tiruchirappalli, pp 67, 21st and 22nd March 2014 .
 14. Kowsalaya Devi. A and G.Venkatesan, “Studies on removal of chromium in waste water by using raw Cucurbita Pepo Peel (Pumpkin) ”, TEQIPII sponsored National conference on recent trends in civil and Environmental Engineering, organized by Bharathidasan Institute of Technology , Tiruchirappalli, pp 84, 21st and 22nd March 2014 .
 15. S.Sasi kumar and G.Venkatesan, “ Experimental studies of compacting in concrete using steel fiber”, National conference on recent trends in civil and Environmental Engineering , organized by Bharathidasan Institute of Technology , Tiruchirappalli, organized by Dr.R.Illangovan pp 34, 19th April 2013
 16. M.S Senthil and G.Venkatesan, “ Assessment of Ground water resources in unconfined aquifer of hard rock terrain –Ground water balance application in Truchirappalli District ”, National conference on Global perspectives on water resources and Environment, organized by Annamalai university , Annamalai Nagar , organized by Dr.S.Poongothai and Ms.K.Ezhaisaivallabi pp 25, 22nd and 23rd March 2012 .
 17. G.Venkatesan and K.Bhuvaneshwari , “ Study on Adsorption of Nickel (II) using foundry sand ” National conference on Advanced trends in Civil Engineering, organized by Karpagam university , Coimbatore , organized by M.Karthickkumar pp 96, 2nd and 3rd March 2012
 18. S.Kannan and G.Venkatesan, “Strength and durability of concrete by replacing fine aggregate by pond ash and cement by silica fume”, National conference on Emerging Technologies, organized by M.Kumarasamy college of Engineering, Karur, pp 41, 25th February 2012 .
 19. S.Shanmuga Sundarabopathy and G.Venkatesan , “Impact of compressive strength of cement using ash of count cor pith”, National conference on Emerging Technologies, organized by M.Kumarasamy college of Engineering, Karur, pp 41, 25th February 2012 .
 20. R.Raja and G.Venkatesan , “Behaviour of high performance concrete using Granite Powder”, National conference on Emerging Technologies, organized by M.Kumarasamy college of Engineering, Karur, pp 41, 25th February 2012 .
 21. Esther Yazhini. D, G.Hemapriya and G.Venkatesan , “fuel free soil using chrysopogon zizanioides”, National conference on recent trends in Civil and Mechanical Engineering organized by Anna university of Technology, Tiruchirappalli, Tiruchirappalli, organized by Dr.P.Rajesh prassana and Dr.T.Senthil kumar pp 115, 8th and 9th April 2011 .
 22. V.Rajagopalan , G. Venkatesan and U .Senthil Nathan, “Municipal solid waste and its potential

for energy invention”, Clean Green Environment by implementing Renewable Energy Technologies organized by Oxford Engineering College, Trichy organized by Dr.Jaishankar held on 16-17th July 2010,115-119.

23. U .Senthil Nathan ,G. Venkatesan and V .Rajagopalan ,” Wind energy-An overview”, Clean Green Environment by implementing Renewable Energy Technologies organized by Oxford Engineering College, Trichy held on 16-17th July 2010,168-172.
24. R. Nallusamy , G. Venkatesan and G. Swaminathan, “Effect of chemical constituents water on concrete”, National conference on Environmental degradation and pollution control organized by PSG college of Technology, Coimbatore, India held on 28-30 December 2006, 199-202.
25. G.Venkatesan , G.Swaminathan and K.Palanichamy,“Institutional Solid waste Management-A case study of National Institute of Technology Tiruchirappalli Campus”, in National seminar on Role of Environmental Engineers in Sustainable Development organized by The Institution of Engineers (India),Tiruchirappalli local centre held on 12th and 13th November 2005,24-35.
26. G.Venkatesan and G.Swaminathan, “Integrated selection of Waste dumps and landfills”, in National conference on Geotechnics in environment protection-GEN-2005 organized by Motilal Nehru National Institute of Technology, Allahabad held on 9th and 10th April 2005, VI 4-6.
27. G.Venkatesan and G.Swaminathan, “Water Management study for rice crop using staggered growing season”, in National seminar on Innovative Techniques for sustainable development of water resources- ISWR-2005 organized by Annamalai University, Annamalinagar held on 24th and 25th March 2005, 222- 231.
28. G.Venkatesan and G.Swaminathan , “Site selection and safe disposal of solid waste landfills”, in National seminar on Solid Waste and Waste water management and Treatment Technologies organized by Bharath Institute of Higher Education and Research ,Chennai held on 11th March 2005,89-95.
29. G.Venkatesan, “New concepts of low cost housing”a symposium on modern trends in construction organized by Kongu engineering college, perundurai held on 13th September 1991.

Faculty development programme /Workshop Attended/Seminar/ Industrial Training: 30 Faculty development programme : 11

1. AICTE sponsored faculty Development Programme on “Incorporating Universal Human Values in Technical Education” All India Council for Technical Education (AICTE) 20.12.2021 to 24.12.2021.
2. Electronics &ICT Academics sponsored faculty Development Programme on ICT Tools for teaching, Learning process and Institute 10.08.2020 to 21.08.2020.
3. AICTE sponsored faculty Development Programme on “Analysis and limit state design of structural steel works as per IS:1893-2016&IS 800-2007” at Government College of Engineering Salem 13.11.2019 to 26.11.2019.
4. UGC sponsored Refresher Course on “Geosciences” at UGC Human resources Development Centre

,Bharathidasan University held on 15.11.18 to 5.12.18

5. Two week Faculty development programme on “Multi-disciplinary approaches in Chemical sciences ” Conducted by Department of Chemistry, Bharathidasan Institute of Technology ,Tiruchirappalli held on 18.7.16 to 31.7 2016.
6. Faculty development programme on “Sustainable Technologies for Waste to Energy “Conducted by Government college of Technology, Coimbatore through TEQIP. held on 10.8.15 to 14.8.15.
7. Summer research fellowship at Indian Institute of Sciences, Bangalore titled on “ studies on permeable reactive barrier” organized by Indian Academy of Sciences Bangalore attended at Indian Institute of Science Bangalore 1.5.2015 to 30.6.15
8. Two week Faculty development programmed on ““SMART Teaching for the NET Generation” Conducted by National Institute of Technical Teachers Training & Research Chennai, Trichy held on 9.12.13 to 23.12. 2013.
9. One week Faculty development programmed on TEQIP-II sponsored ““Recent Advances in the Design and Construction of Sustainable Pavements “Conducted by Department of Civil Engineering, Pondicherry Engineering College ,Pondicherry held on 2.12.13 to 7.12.2013.
10. One week Faculty development programmed on TEQIP-II sponsored “ Advances in Building Technology “Conducted by Department of Civil Engineering, Bharathidasan institute of Technology ,Tiruchirappalli held on 19th to 25thAugust 2013.
11. Faculty development programmed on TEQIP-II intuitions “CE2351 Structural Analysis - II”Conducted by Centre for faculty development, Anna University, Chennai held on 23rd to 27thJuly 2013.

Workshop Attended: 11

1. Workshop on “Recent trends in Geotechnical Engineering ” at National Institute of Technology, Tiruchirappalli held on 7th and 8th June 2019.
2. Workshop on “Challenges in Geotechnical Investigation and Foundation Design” at National Institute of Technology, Tiruchirappalli held on 14th-15th February 2014.
3. Workshop on “Challenges ahead in the ground water sector of Tamil Nadu” Conducted by Central Ground Water Board, South Eastern Coastal Region, Chennai held on 9th February 2011.
4. Workshop on “Indo-US Workshop on Forensic Engineering” at National Institute of Technology, Tiruchirappalli held on 15thto 17th December 2010.
5. Workshop on “Environment and Hygiene” at National Institute of Technology, Tiruchirappalli held on 9thDecember 2006.
6. All India Workshop on “Sewage Treatment and Disposal” at Institution of Engineers (India), Tiruchirappalli held on 17th to 19th March 2006.

7. Workshop on “Seismic Structural Analysis and Design” at National Institute of Technology, Tiruchirappalli held on 22nd and 23rd October 2005.
8. Workshop on “Renewable Energy-Energy of the future” at National Institute of Technology, Tiruchirappalli held on 20th August 2005.

9. Workshop cum Discussion on “Small Hydro Power Projects” at National Institute of Technology, Tiruchirappalli held on 22nd and 23th April 2005.
10. Workshop on “Environment and pollution awareness” at Thiagarajar college of Engineering, Madurai held on 25th September 2004.
11. Workshop on “Innovative pollution control Techniques for sustainable Environmental Management” held on 24.09.2004 at Pondicherry Engineering College, Pondicherry.

Seminar :3

1. Terzaghi Memorial seminar on “Dynamics of soils and Foundation” at National Institute of Technology, Tiruchirappalli held on 14th October 2017.
2. Training and Awareness Program on Tree Cover Assessment to combat Urban Pollution in Tiruchirappalli Municipal Corporation organized by Forest College and Research Institute, Mettupalayam is on 4th February 2014 .
3. National Symposium on “Impact of computers and Information Technology in Civil and Structural Engineering” at Karunya Institute of Technology, coimbatore held on 24th and 25th August 2001.

Industrial Training : 2

1. Industrial Training Programme at Planning and Design Division , Water Resources Department , Public works Department , Tiruchirappalli 22.06.2021 to 05.07.2021.
2. Industrial Training on “ Telecom Tower Construction ” at BSNL, Tichy organised by Rajiv Gandhi Memorial Telecom Training Centre 15.05.2020 to 05.06.2020.

Swayam Course: 4

1. AICTE Approved FDP NPTEL course Wastewater Treatment and Recycling (12 Weeks) on the SWAYAM platform 25 Jul 2022 to 14 Oct 2022.
2. AICTE Approved FDP NPTEL course Air pollution and Control (12 Weeks) on the SWAYAM platform
24
January 2022 to 15 April 2022.
3. AICTE Approved FDP NPTEL course Integrated Waste Management for a Smart City (12 Weeks) on the SWAYAM platform 26 Jul 2021 to 15 Oct 2021
4. AICTE Approved FDP NPTEL course Environmental Geomechanics (12 Weeks) on the SWAYAM platform 27 Jan 2020 to 17 Apr 2020
5. Annual Refresher Programme in Teaching (ARPIT) 16 weeks Course for Career Advancement Scheme(CAS) promotion Climate change: a guide for teachers of all disciplines 01

Sep 2019 to 09 Feb 2020

Research and Consultancy Projects : 23

Sponsored Research Projects: 1

1. *Studies on structural element by totting tire derived aggregate*, Indian Rubber Manufacturers Research Association (IRMRA), Ministry of Commerce and industry Government of India. IRMRA/DR RK/Dir/16-17/03/01/Ext-R&D dated 10.4.17.to 31.10.2020.

Consultancy Projects : 17

1. *preparation of detailed project report (DPR) for construction of tail end structure “conducting surveying and leveling, sub soil investigation and model studies for the construction of tail end wall across coleroon river to arrest sea water intrusion at Thirukazhipalaivillage of Chidambaram Taluk in Cuddalore district and Alakudy village of Sirkazhi Taluk in Nagapattinam district” , Provision of Environmental study, PWD/WRD, Government of Tamilnadu, Planning and Design Division,Thanjavur-9. Planning and Design Division,Thanjavur-9. Dated on 03.08.2020.*

Prepare of feasibility study report for the implementation of additional mitigation measures for controlling fugitive air emission in Power and Furnace division by M/s Sree Rengaraj Ispat Industries

(P) Ltd. Perundurai dated on 10.02.2020

2. *Detail Engineering drawing of Lus roof cover in madurai division for southern railway proof checking by RMK ENGINEERING dated on 19.09.2019 .*
3. *Adequacy report for the storm water management and rain water harvesting plan VGN Fairmount project by VGN property developers Private Limited , E2E solutions Chennai dated 29.1.19*
4. *Adequacy report for STP plant of 300 KLD, Red Sea Eco Solutions & Instruments (p) Ltd, Chennai dated 26.11.18*
5. *Validation of Sewage Treatment Plant Design ,Red Sea Eco Solutions & Instruments (p) Ltd, Chennai dated 23.10.18*
6. *Vetting and approving of the design of sewage treatment, plant , Dugar Homes Chennai dated 15.10.18*
7. *Design Adequacy of sewage treatment plant , Saveetha Medical and Educational Trust, Chennai dated 15.6.18*

TNIAMP works -Mix Design for M₁₅ and M₂₀ Grade Concrete for a)Distributory No 3,4,5,6 and 8, dated

18.5.18 b) Distributory No 1,2, Public Works Department NKHLC Section-I Trichy dated 11.7.18

8. *a) Structural design and Drawings for substructures of proposed Road over bridge (LC.No-157) between Varalpattu and Thirupparippuliyur stations, Railway Proof checking. , Thomas Iyadurai infrastructure Pvt.Ltd Chennai dated 1.2.18*

b) *Structural design and Drawings for the RCC box of proposed Road under bridge (LC.No-22) between Tirusulam and Pallavarm stations , Railway Proof checking, G.Sakthi*
Constructions Railway contractor , Chennai dated 1.2.18

Improvements and Rehabilitation of Irrigation structures in Cauvery Basin- Preparation of Detailed project report(DPR) to improvements and Rehabilitation of Irrigation structures for lower coleroon

Anicut system- Determine of conveyance efficiency, Field application efficiency and overall efficiency Foundation design

9. dated 05.1.18
10. **Construction of Road over bridge in lieu of existing LC No:323 at Km 399/500-600, Railway**
Proof checking Railway contractor dated 20.3.17.

Improvements and Rehabilitation of Irrigation structures in Cauvery Basin- Preparation of Detailed project report(DPR) to improvements and Rehabilitation of Rajavoikkal project(Raja, Kumarapalayam&Poiyeri and Mohanur Channels)- Determine of conveyance efficiency, Field application efficiency and overall efficiency , Plan formulation PWD, Government of Tamilnadu, dated 20.7.16

11. **Ambient Air quality monitoring survey for the proposed Desilting of Vagai Dam Reservoir, Pechiparai Reservoir , Mettur Dam Reservoir and Amaravathy Dam in the District of Theni, Kanayakumari , Salem and Tirupurrepectively in Tamil Nadu** ,WAPCOS Limited, Ministry of Water Resources, River Development and Ganga Rejuvenation dated 4.2.16 ,
12. **Ambient Air quality monitoring survey for the proposed establishment of sea front facilities at Nellore**, Andra Pradesh for NIOT, WAPCOS Limited, Ministry of Water Resources, River Development and Ganga Rejuvenation dated 11.2.16
13. **Ambient Air quality monitoring survey for climate adaptation in vennar sub basin in Cauvery delta project(CAVSCDP)**:WAPCOS Limited, Ministry of Water Resources, River Development and Ganga Rejuvenation dated 17.10.15 ,
14. **Third party quality control and assurance executed by CPWD at National Institute of Technology Tiruchirappallion** 18.09.2015

Testing Works: 5

1. **Analysis of water and soil samples for EIA study for Desilting of Vagai Dam Reservoir, Pechiparai Reservoir , Mettur Dam Reservoir and Amaravathy Dam in the District of Theni, Kanayakumari , Salem and Tirupurrepectively in Tamil Nadu** ,WAPCOS Limited, Ministry of Water Resources, River Development and Ganga Rejuvenation dated 9.3.16 ,

Analysis of water and soil samples for EIA study” Climate adaptation in Vennar sub basin in Cauvery Delta Project(CAVSCDP) on WAPCOS dated 30.10.15,

2. **Conducting siltation studies for silt factor at Grand Anicut canal project** on WAPCOS dated dated 27.10.15,

Testing of Water sample Valady to Manaparai Railway line project for southern railway Contractor: CDM smith (P) Ltd.Bengaluru. dated 17.11.2014 ,

3. **Water quality analysis Valady to Manaparai Railway line project for southern railway**
Contractor: CDM smith (P) Ltd.Bengaluru. dated 16.7.2013 ,

Research Projects Assisted :2

1. MHRD sponsored thrust area project on “*Engineered Study on Solid Waste Management Systems for Resource and Energy Recovery*” at National Institute of Technology, Tiruchirappalli
2. Institute of Water studies, WRO,PWD research project on “**Water Management studies in Agniar river basin**” at National Institute of Technology, Tiruchirappalli

Students Sponsored Projects under my supervision: 13 Ph.D : 3

1. IRMRA Sponsored Project, Senior Research Fellow M. Saravana Kumar from 22.01.2018 to 18.10.2019.
2. TEQIPII financial Assistantship ,S.Pitthaikani, ground water contamination transport modeling for Noyal River basin.(Rs 12,0000 per month, 1.3.2016 to 31.12.16)
3. TEQIPII financial Assistantship, S.Lakshminarayanan “ A Adsorption study on Removal of heavy metals from industrial wastewater”(Rs 12,0000 per month, 6.2.2015 to 31.12.16)

M.E :5

1. *CTDT, Anna University* sponsored Programme under Student Innovate projects “Landfill gases detection from municipal solid wastes in Trichy with lab scale model using Internet of Things (R.Mithuna and S.Gandhimathi, 2019 P-1819S4304/CTDT dated 08.05.2019)
2. *Tamil Nadu State council Science and Technology, Chennai* sponsored Programme under Student Project Scheme “Studies on partial replacement of clay by waste tire chips in landfill Liner (C Yogesh prabhu, 2013 TNSCST/SPS/AR/2017-2018 dated 31.01.2018)
3. TEQIPII financial Assistantship of, M.Maheswari, “Photocatalytic removal of toxic pollutant in effluent water by nanocomposite materials”. (Rs 20,0000 ,M.E Environmental Engineering ,June 2016).
4. TEQIPII financial Assistantship, K.MohamedIsmail, “Studies on removal of Textile dye by eco friendly Electro-Fenton method using Ecofriendly Fe(II) and Hydrogen peroxide. (Rs 20,0000 ,M.E Environmental Engineering ,June 2015).
5. TEQIPII financial Assistantship,,R.Suchithra, “Watershed impact assessment using remote sensing and GIS application. (Rs 20,0000 ,M.E Environmental Engineering ,June 2015).

B.E : 5

1. *Tamil Nadu State council Science and Technology, Chennai* sponsored Programme under Student Project Scheme “Catalytic degradation of organic dyes using green synthesis of silver nano particles from ficus religiosa tree bark (P.Anusuya, R.Bruntha, P Gowthaman and

P.Vetriarasan),TNSCST/SPS/AR/2019- 2020 dated 20.03.2020)

2. *Tamil Nadu State council Science and Technology, Chennai* sponsored Programme under Student Project Scheme “Green building materials- Solar Tiles - a Case Study (A.Kaviyaran ,M.Krishnamoorthy M.Sanmuga Sakkaravarthy ,TNSCST/SPS/AR/2017-2018 dated 31.01.2018)
3. TEQIPII financial Assistantship, A.Adhiyaman ,S.Anbudurai ,R.Arumbu ,R.Gop, ,”Water balance study on Iluppur watershed”(Rs 10,0000 ,2016).
4. TEQIPII financial Assistantship, L.K.Ahalya, R.Marikani,A.Saravanan,RajSivadharsan ,”Soft speed Analysis for road safety”(Rs 10,0000 ,2015).
5. TEQIPII financial Assistantship ,A.Dhivyabarthi, G.RajaSwedna, V.Ramakrishnan, V.Sivanesan,,” Analysis of Octagonal shaped Multistory commercial complex”(Rs 10,0000 ,2015).
6. TEQIPII financial Assistantship ,P.Usha, S.Latha, M.Praneedha, R.C.Ramya, Estimate of Desilting tank at Sorriyur Village (Rs 10,0000 ,2015).
7. *Tamil Nadu State council Science and Technology, Chennai* sponsored Programme under Student Project Scheme “Ground improvement technique using low density polymer - (Abinaya.V, Arunkumar.P,Priya.K, Saravanakkumar.M, TNSCST/SPS/AR/2013-2014 dated 15.04.2014)

Key Note speaker/Chairman/Jury of conference and Symposium: 20 International: 6

1. Chair for the session titled “Waste Management” Heber international conference on Climate Adaption and Resilience Organized by Department of Environmental sciences Bishop Heber college Tiruchirappalli held on 22nd April 2022.
2. Key note speaker on Sustainable materials and its green Technologies for Industry 4.0 (SMiGT 2021) organized by Adithya Institute of Technology Coimbatore ,06-09 April 2021.
3. Session Chair on Sustainable materials and its green Technologies for Industry 4.0 (SMiGT 2021) organized by Adithya Institute of Techology Coimbatore ,06-09 April 2021.
4. Jury of the International Conference on Advances in Civil and Mechanical Engineering at Sri Shakthi Institute of Engineering and Technology Coimbatore held on 30th and 31st December 2020.
5. Jury of the International Conference on Advances in Materials research-2019 at Bannari Amman Institute of Technology Sathamangalam held on 6th and 7th December 2019.
6. Key note speaker on International conference on newer Engineering concepts and Technology (CONNECT2K18) organized by K.Ramakrishnan College of Technology Trichy,23th March

2018.

National level :6

1. Key note speaker on AICTE sponsored online training programme (STTP) A Beeline for circular economy through sustainable waste management topic of Integrated solid waste management in smart city at KSR College of Engineering held on 21.9.2021
2. Key note speaker National level workshop on sustainable practices in Solid waste Management at topic on solid waste management Techniques at M.Kumarasamy College of Engineering Karur held on 22.2.2020
3. Session speaker AICTE sponsored STTP on Application of Geosynthetics in Construction Industry topic on Application of Geosynthetics in Construction Industry organized by Kumaraguru College of Technology Coimbatore held on 01.02.2020.
4. Session chair on UGC sponsored Heber national conference on Ensuring Environmental Sustainability Organized by PG& Research Department of Environmental sciences Bishop Heber college Tiruchirappalli held on 23th March 2019.
5. Chief guest on National conference on recent trends in Civil Engineering Organized by Mother Teresa College of Engineering and Technology Illuupur held on 21.3.2019
6. Co-chair theme of Geo Environmental Engineering 6th Indian young Geotechnical Engineers conference Organized by Indian Geotechnical Society Trichy Chapter and Department of Civil Engineering National Institute of Technology Tiruchirappalli held on 10.3.2017 and 11.03.2017.
7. Key note speaker on Column studies on removal of cadmium ions from polluted water using wood of *Derris indica* based on activated carbon, under the sub theme of Wastewater, off-site disposal, on-site disposal and Cutting Edge Technologies in the 25th IPHE national convention on 'Environmental Engineering & 3rd International conference and Exhibition ENVISION 2025 jointly organized by IPHE, Chennai-Pondicherry Regional Center and CLRI at Center for Leather Research Institute, Chennai, 13th March 2014.

University / College level :11

1. Chief guest and Resources person for value added course on " Green House effect and Climate Change " organized Muthayammal Engineering College Rasipuram held on 12.11.2021.
2. Resources person for association inaugural BRECCIA 2k21 and guest lecture on Application of waste tyres in concrete in Rover Engineering College Perambalur held on 22.10.2021.
3. Chief Guest and delivering a lectures in National level technical symposium topic on Climate Change in Urban Cities PRIST Deemed to be University Thanjavur held on 24.09.2019.
4. Guest lecture and act as judge for paper presentation TECXPLO'18 topic Water Resources Management Mookambigai College of Engineering Pudukkottai held on 28th September 2018.
5. Chair person on Student Association Inaugural function topic by Air pollution Management Rover Engineering College Perambalur held on 25th August 2018.
6. Expert lecture on ADB Environmental Monitoring and improvements works in Venna sub basin under climate adaptation for sub basin development programme topic of perspective on recycle ,

reuse and waste water reclamation organized by Tamil nadu PWD held on 21.08.2018.

7. Chief guest on National level Technical Symposium “CMS TECH FEST 2K18” Organized by CMS College of Engineering Namakkal held on 21.3.2019

8. Chief guest deliver a lecture on prefabricated structures Organized by National level Symposium CK College of Engineering and Technology Cuddalore held on 27.2.2018
9. Special lecture on Recent trends in waste water Engineering and Management , National level Technical symposium, ChozhaBuilt -206 ,Organized by Department of Civil Engineering in University college of Engineering Ariyalur held on 18.03. 2016.
10. Jury of the National level student technical symposium iTechfest'13 held on 14th September 2013 at IFET college of Engineering , Villupuram.
11. Chairman of the national level technical symposium(EUREKA'13) held on 12th April 2013 at University college of Engineering ,Thirukkuvalai.

Guest Lecture/Invited talks Delivered- 39

1. Guest Lecture on E Waste Management strategies in the Developing Countries organized by Er.Perumal Manimekhalai College of Engineering , Housur on 06.3.2023.
2. Lecture on use of construction chemicals in civil Engineering and application of waste tyre concrete to the Assistant Engineers/ Junior Engineers in Agricultural Engineering Department organized by Agricultural Engineering Tanning Institute , Triuchirappalli on 19.01.23
3. Lecture on use of construction chemicals in civil Engineering and application of waste tyre concrete to the Assistant Engineers/ Junior Engineers in Agricultural Engineering Department organized by Agricultural Engineering Tanning Institute , Triuchirappalli on 11.11.22
4. Lecture on Concrete properties and its Nonstructural Engineering application using Rubberized materials organized by SRM TRP Engineering College , Triuchirappalli on 16.9.2022.
5. Special lecture on Integrated solid waste management for smart city organized by MIET Engineering College , Triuchirappalli on 24.8.2022.
6. Guest speaker on Integrated solid waste management in a typical city organized by Paavai Engineering College, Namakkal on 05.6.2022.
7. Lecture on Climate change and risk assessment organized by ACTE sponsored six days online STTP , Department of Civil Engineering, University College of Engineering Triuchirappalli, on 14.12.2021.
8. Lecture on Environmental risk assessment during disaster organized by ACTE sponsored six days online STTP , Department of Civil Engineering, Geotechnic, on 11.12.2021.
9. Lecture on Advances in Municipal solid waste Management organized by Latha Mathavan Engineering College, Madurai on 20.10.2021.
10. Lecture on Laboratory studies on Landfill liner and Groundwater quality impact on solid waste dumping yard organized by AICTE Sponsored online one week faculty Development programme(ATAL) Department of Civil Engineering ,University College of Engineering,

Ramanathapuram on 13.09.2021 and 14.09.2021

11. Lecture on faculty Development Programme on CE8301 strength of Materials I organized by Department of Civil Engineering, University College Of Engineering, Ramanathapuram on 09.06.2021.

12. Lecture on Case studies on Corrosion aspects of Repair and Rehabilitation on AICTE Sponsored two week faculty Development Programme on Assessment Repair and Rehabilitation of structures organized by Sri Krishna College of Engineering and Technology , Coimbatore on 17.05.2021.
13. Lecture on Corrosion aspects of Repair and Rehabilitation of structures on AICTE Sponsored two week faculty Development Programme on Assessment Repair and Rehabilitation of structures organized by Sri Krishna College of Engineering and Technology , Coimbatore on 13.05.2021.
14. Lecture on Conjunctive use of surface and Ground water on Induction training to the newly recruited Assistant Engineers PWD (2017-2018) organized by Irrigation Management Training Institute , Tiruchirappalli on 01.2.21
15. Speaker on Application of Remote sensing in soil and Groundwater contamination Assessment on AICTE Sponsored one week faculty Development Programme on organized by Sri Krishna College of Engineering and Technology , Coimbatore on 12.09.2020.
16. Lecture on Managing Eradicating legacy waste landfill AICTE Sponsored one week faculty Development Programme Industrial and Municipal solid waste management for Green India organized by PSR Engineering College Sivakasi on 28.08.2020
17. Speaker on Application of Remote sensing in soil and Groundwater contamination Assessment on AICTE Sponsored one week faculty Development Programme on organized by Sri Krishna College of Engineering and Technology , Coimbatore on 08.08.2020.
18. Speaker on Application of Remote sensing in soil and Groundwater contamination Assessment on AICTE Sponsored one week faculty Development Programme on organized by Sri Krishna College of Engineering and Technology , Coimbatore on 01.08.2020
19. Guest Lecture on Municipal solid waste landfill liner system in smart city organized by SNS College of Technology , Coimbatore on 20.6.20.
20. Webinar session on Ensuring safety during Landfill Design organized by Amity University , Haryana on 04.9.20.
21. Lecture on Selection of liner for landfill on DST NIMAT Sponsored two week faculty Development Programme organized by Bannari Amman Institute of Technology Sathamangalam on 06.12.19
22. Guest Lecture on Indoor quality management at MIET Engineering College , Tiruchirappalli on 03.9.19
23. Lecture on Environmental Disaster on AICTE –Margdasrshan Sponsored FDP Application of Soft Computing Tools In Disaster Modeling organized by National Institute of Technology , Tiruchirappalli on 02.8.19
24. Lecture on Environmental system modeling and application workshop on Hands on Training on software Application in Civil Engineering organized by University college of Engineering Tiruchirappalli on 21.3.19.

25. Guest Lecture on Advanced Techniques in Prefabricated structures organized by Kongunadu College of Engineering & Technology on 7.2.19

26. Expert Lecture on Municipal solid waste landfill liner organized in One week short term course on Waste Management organized by Department of Energy and Environment , National institute of Technology , Tiruchirappalli on 27.9.18
27. Lecture on Perspective on Recycle, Reuse and Waste water reclamation - ADB Environmental Mentoring and improvements works in Vennar Sub basin –under climate Adoption for sub basin developments Workshop Organized by Public Works staff training Institute Tiruchirappalli on 9.8 2018
28. Lecture on irrigation Scheduling ,PIM with case study , Anna university sponsored Faculty Development Programme on CE6703 Water Resources and Irrigation Engineering , Organized by University college of Engineering ,Panruti held on 13.06 2018.
29. Lecture on Improvements and Increasing soil wealth - ADB Environmental Mentoring and improvements works in Vennar Sub basin –under climate Adoption for sub basin developments Workshop Organized by Public Works staff training Institute Tiruchirappalli on 23.1. 2018
30. Lecture on Special Training course on Modernization Technologies in Irrigation Managemnt for MLO/JLOS of PWD lecture on Environmental Aspects in Water Resources Organized by Public Works staff training Institute Tiruchirappalli on 1.8. 2017.
31. Resource person of Orientation courses for NSS Programme officers lecture deliver on “Role of NSS Po’s and volunteers in Disaster preparedness and Management” Organized by National Service scheme empanelled traning Institution (ETI) Chennai on 12.06.2017
32. Lecture on Momentum balance and its applications, Anna university sponsored Faculty Development Programme on Fluid flow operations , Organized by Petrochemical Technology in Bharathidasn Institute of Technology, Tiruchirappalli, held on 23.12 2016.
33. Guest lecture “Air pollution Management”, Jayram College of Engineering &Technology, Trichyheld on 1.09.2016.
34. Lecture on Application of Remote sensing and GIS in IT , TEQIP II sponsored Faculty Development Programme on Top tech trends –Driving the future of IT , Organized by Department of Computer Science and Engineering in Bharathidasn Institute of Technology, Tiruchirappalli, held on 8.7 2016.
35. Lecture on Joints in prefabrication , TEQIP II sponsored Faculty Development Programme on Prefabricated structures , Organized by Department of Civil Engineering in Bharathidasn Institute of Technology, Tiruchirappalli, held on 15.6 2016.
36. Lecture on Wall Making Technology , TEQIP II sponsored Faculty Development Programme on Prefabricated structures , Organized by Department of Civil Engineering in Bharathidasn Institute of Technology, Tiruchirappalli, held on 8.6 2016.
37. Lecture on Design Site investigation and selection of foundation in the subject of CE 6502 Foundation Engineering organized by Department of Civil Engineering ,University College Of Engineering, Patukkottai on 12.05.2016.

38. Lecture on Recent trends in waste water Engineering and Management at University college
of

Engineering Ariyalur 23.03.16

39. Lecture on prefabricated structures FDP Organized by Department of Civil Engineering in MAM college of Engineering held on Tiruchirappalli, held on 10.01.2016.
40. Guest lecture on Environmental application of Remote sensing and GIS , TEQIP II sponsored Faculty Development Programme on Application of GIS and Remote Sensing ,Organized by Department of Civil Engineering in Bharathidasn Institute of Technology , Tiruchirappalli, held on 27.04.2015
41. Guest lecture on Watershed impact Assessment using Remote sensing and GIS Application TEQIP II sponsored Faculty Development Programme on Application of GIS and Remote Sensing ,Organized by Department of Civil Engineering in Bharathidasn Institute of Technology , Tiruchirappalli, held on 26.04.2015
42. Guest lecture on prefabricated structures for the Training Programme on “Cost-Effective and Disaster Resistant Technologies” organized by Building Materials and Technology Promotion Council Ministry of Housing and Urban Poverty Alleviation ,Government of India, New Delhi held at Bharathidasn Institute of Technology , Tiruchirappalli, on 27.2.2015.
43. Guest lecture on “Land fill liner in solid waste dump yards“for the National level workshop on Solid and E Waste Management held at Bannari Amman Institute of Technology Sathyamangalam on 21.02.2015.
44. Guest lecture “Greenhouse effect and climate change ”Prestentia-14, held on 24th, Kings college of Engineering, Puttukottai.27.09.2014
45. Lecture on Design earthquake ,concept of peak acceleration ,Site specific response and spectrum Effect of soil properties and damping in the subject of CE2403 Basics of Dynamics and Aseismic Design organized by Department of Civil Engineering ,University College Of Engineering, Dindigul on 22.06.2014.
46. Chief Guest and deliver the address on the theme “Small Islands and Climate Change”, on the occasion of World Environment Day held on Institute of Engineers India (IEI), Tiruchirappalli local centre on 10.06.2014.
47. Guest lecture on Forces on Dam, Design of weirs TEQIP II sponsored two days seminar Programme on Recent trends in Irrigation Engineering ,Organized by Department of Civil Engineering in Bharathidasn Institute of Technology , Tiruchirappalli, held on 11.10.2013.
48. Guest lecture “Environmental Engineering ” held on MAM College of Engineering and Technology, Tiruchirappalli.12.2.2013

Subjects
Handled

Under Graduate :

1. Air Pollution Management
2. Municipal Solid Waste Management
3. Irrigation Engineering
4. Foundation Engineering
5. Environmental Engineering
6. Environmental Studies
7. Ground Water Engineering
8. Hydrology
9. Water Resources Engineering
10. Prefabricated structures
11. Mechanics of Fluids
12. Applied Hydraulic Engineering
13. Highway Engineering
14. Basics of Civil Engineering

Post Graduate :

M.E Environmental Engineering :

15. Climate Change and Adaptation
16. Air Pollution and Control
17. Physical and Chemical Treatment of Water and Wastewater
18. Rural Water Supply and onsite Sanitation
19. Solid and Hazardous Waste Management
20. Biological Treatment of Water and Wastewater
21. Environmental Chemistry

M.E Structural Engineering :

22. Pre fabricated structures
23. Design of substructures
24. Concrete Technology
25. Maintenance and Rehabilitation of Structures

Job
Responsibilities

- To handle lecture classes for Under Graduate and Post Graduate
- To Co-ordinate Research Activities
- To set question papers for the subjects handled
- To assist in administrative work

Other Responsibilities:

Department Assignments : 1. Environmental chemistry Lab In charge (PG)

- 2 B.E Environmental Engineering Lab In charge
3. Department Technical Education Quality Improvement Programme (TEQIP) coordinator
4. Student Association Coordinator
5. P.G Programme coordinator (Environmental Engineering)
6. Web portal Faculty In charge course completion certificate both U.G and

P.G Programme

7. B.E Civil Engineering Final year class coordinator(2013-2014)
8. M.E Environmental Engineering project coordinator(2014 -2019)
9. Project proposals, Seminar, conference, Workshop and short term course incharge
10. Student fortnight report in charge (2011-2012)
11. Department Assessment Test coordinator(2011-2012)
12. Consultancy works associated with Civil Engineering
13. Guiding the students M.E Environmental Engineering and M.E (P.T) Structural Engineering
14. Guiding the three Research scholars at AUC (2210164)

College / University Level : 1. Member Anti Ragging committee

2. NBA Core Coordinating Member and Safety committee member.
3. Member Product Development Cell
4. Acted as chairman and Vice chairman in Anna University central valuation.
5. Committee Member Graduation Day.
6. Member in Affiliation committee Anna University
7. Committee Member Graduation Day Stage, Decoration and Banners
8. Member in Research Centre recognition Anna University
9. Maintenance coordinator (2012-2013)
10. Board of studies in-charge (2011-2012)
11. Tamil book securitize committee member (2011)

Participated past Assignments:

1. Served as Board of studies in- charge , Anna University Technology Tiruchirappalli

2. Served as Midterm test coordinator
3. Served as member in question paper Scrutiny committee Anna University Technology Tiruchirappalli

4. Established in Environmental Microbiology Lab
5. Served as Chairman Affiliation committee Anna University Technology Tiruchirappalli
6. Served as Estate maintenance coordinator in Anna University Chennai Regional office Truchirappalli and University college of Engineering Truchirappalli.
7. Served as B.E Civil Engineering design project coordinator

Other Activities:

1. BOS Member Alagappa Chettiar College of Engineering and Technology , Karikudi
2. Memembr of Syllabus revision for solid mechanics , Sri Krishna College of Engineering and Technology , Coimbatore.
3. Examiner for Scrutinizing the question papers of the Board of Civil Engineering Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology.
4. External Expert staff selection committee Bishop Heber College, Tiruchirappalli.
5. Lab Purchase committee member , Alagappa Chettiar College of Engineering and Technology , Karikudi
6. Project staff selection committee member at Department of Civil Engineering

National Institute of Technology Tiruchirappalli

7. External member of Fluid Mechanics lab purchase committee at National Institute of Technology Tiruchirappalli
8. External member of Geo technical lab purchase committee at National Institute of Technology Tiruchirappalli

Membership in the Organization: 12

1. Life Fellow (LF-0585) in Indian Geotechnical Society, New Delhi , from 16.09.2019 to till date.
2. Life member (LM 1274) in The Indian Society for Hydraulics Pune ,from 1.02.2017 to till date.
3. Life member (LM 1924) in Indian Association of Hydrologists Roorkee ,from 16.09.2016 to till date.
4. Fellow (F3140900151) in International society for Research and Development ISRD from 1.1.15 to till date.
5. Life Fellow(LF666) in Institution of Public health Engineers, India, Kolkata ,from 28.03.2014 to till date.
6. Life Fellow (LF1177) in Indian Water Works Association, Mumbai, from 16.01.2014 to till date.
7. Life member (LM 002) in Indian Geotechnical Society Trichy Chapter from 14.2.2014 to till date
8. Member(L 19794) in The Indian Science Congress Association, Kolkata,from 01.06.2012 to till date.
9. Member in National Solid Waste Association of India (NSWAI), from 01.05.2012 to till date.
10. Member (M -135408-0) in Institution of Engineers (India), Kolkatta,from 15.01.2008 to till date.
11. Life member (LM 869) in Indian Geotechnical Society Chennai Chapter, from 12.04.2007 to till date.
12. Life member (LM 31306) in Indian Society for Technical Education, New Delhi ,from 01.01.2003 to till date.

Fellowships and Grants

1. Ph.D Research Assistantship *under TEQIP, NPIU at NITTruchirappalli* (15.6.05 –13.6.06)

Patents granted:

1. A Solid waste barrier liner composition for landfill with clay and microsilica . Indian Patent No: 361492 and Application No: 201941043080, Dated: 23.10.2019. G. Venkatesan, G. Swaminathan and S. lakshmana prabu
2. A process of preparing an absorbent which use in extracting heavy metals ions. Indian Patent No: 370469 and Application No: 201941018898, Dated: 11.05.2019. G. Venkatesan and S. Lakshmi Narayanan

Books Published/ Conference Editors: 13

1. G.Venkatesan, G.Selvabharathi and K.Anbarasi (2023) Environmental Sciences And Sustainability , Suchitra publications , ISBN 978-81-960819-1-1
2. Venkatesan, G., Renganathan, M., Kavin Raj, L. (2023). Performance of Permeable Reactive Barrier by Using Rubber Particles. Transportation and Environmental Geotechnics . IGC 2021. Lecture Notes in Civil Engineering, vol 298. Springer, Singapore., ISBN 978-981-19-6773-3
3. Lakshmana Prabu S., Rengasamy M. (2022) Sustainability Studies: Environmental and Energy Management. Bentham Books, ISBN 978-981-5039-93
4. G.Venkatesan ,R.Ruthra and S.Arun Kumar (2022) Water Supply and Waste Water Engineering, Suchitra publications , ISBN 978-81-953605-7-4
5. G.Venkatesan , Dr.M.Rengasamy, Dr.P.Saravanan (2022) Waste Water Treatment , Lakshmi publications , ISBN 978-81-953818-4-5
6. Ravichandran, C.; Venkatesan, G. (2021) Toward sustainable solid waste management—Challenges and opportunities. Handbook of Advanced Approaches Towards Pollution Prevention and Control Volume 2: Legislative Measures and Sustainability for Pollution Prevention and Control Edited by: Rehab O. Abdel Rahman and Chaudhery Mustansar Hussain 2, 67–103. ISBN 978-0-12-822134-1.
7. G.Venkatesan, V.Rajagopalan (2020), National Conference on Recent trends in Civil and Environmental Engineering , Jiazym publication, ISBN 9789387360679.
8. G.Venkatesan ,R.Saravanan, P.Balamuran and S.Arun Kumar (2020) Waste Water Engineering Lakshmi publications , ISBN 978-93-87950-48-1
9. G.Venkatesan, J Tirumal (2019) Global Perspectives on Air Pollution Prevention and Control System Design, IGI Global , US ,ISBN13: 9781522572893.

10. Umamaheswari A., Lakshmana Prabu S., Rengasamy M., Venkatesan G. (2018) A Safety Promotion Approach for Handling of Chemicals in the Working Environmental Management. In: Hussain C. (eds) Handbook of Environmental Materials Management. Springer, Cham, ISBN978-3-319-58538-3

11. G.Venkatesan, (2016) Water Management Study for Rice Crop Using Staggered Growing Season by ISBN-13:978-3-659-92983-0, LAP LAMBERT Academic Publishing, Germany, 88 pages
12. S. Lakshmana Prabu, G. Venkatesan (2016) Wastewater Treatment Methods, Advanced Engineering: Current Perspective,95-108, ISBN No 978-93-84443-50-4, Research India publication.
13. பாய்ம் இயந்திரவியல் (Mechanics of fluids -Vernacular book in Tamil medium) Publisher:Anna university of Technology,Tiruchirappalli ,March 2011.

Conference organized /Faculty development programme /Workshop - 19 Faculty development programme:3

1. Coordinator for Centre for Faculty Development Anna University sponsored Faculty Development Programme on CE 8302 Fluid Mechanics conducted by Department of Civil Engineering in Bharathidasan Institute of Technology, Tiruchirappalli, held on 24.6.19 to 29.6.19.
2. Coordinator for TEQIP II sponsored Faculty Development Programme on Prefabricated structures , Organized by Department of Civil Engineering in Bharathidasan Institute of Technology, Tiruchirappalli, held on 4 - 17 , June 2016.
3. Coordinator for TEQIP II sponsored Faculty Development Programme on Application of GIS and Remote Sensing, Organized by Department of Civil Engineering in Bharathidasan Institute of Technology,Tiruchirappalli, held on 24 - 30 , April 2015.

Conference organized: 5

1. Organizing Secretary in online Live (Virtual) National conference on recent trends in Civil and Environmental Engineering, Organized by Department of Civil Engineering in University College of Engineering –BIT campus , Tiruchirappalli, 26th August 2020.
2. Organizing Secretary in TEQIP II sponsored National conference on recent trends in Civil and Environmental Engineering, Organized by Department of Civil Engineering in Bharathidasan Institute of Technology, Tiruchirappalli, 30th and 31st August 2016.
3. Organizing Secretary in TEQIP II Sponsored international conference on Environmental Geotechnics (ICEGEO'14), Organized by Department of Civil Engineering in Bharathidasan Institute of Technology , Tiruchirappalli, held on 30th and 31st October 2014..
4. Co- Convener in TEQIP II sponsored National conference on recent trends in civil and Environmental Engineering, Organized by Department of Civil Engineering in Bharathidasan Institute of Technology, Tiruchirappalli, 2^{1st} and 2^{2nd} March 2014 .
5. Treasurer in National conference on Recent Trends in Civil and Mechanical engineering

organized by Department of Civil and Mechanical Engineering in Anna university of Technology, Tiruchirappalli, Tiruchirappalli, 8th and 9th April 2011 .

Symposium :5

1. Coordinator for national level student symposium (Innogido'20) Organized by Department of Civil Engineering in Bharathidasn Institute of Technology ,Tiruchirappalli, held on 25th February 2020.
2. Coordinator for TEQ IPII sponsored two Day national level student symposium (Innogido'16) Organized by Department of Civil Engineering in Bharathidasn Institute of Technology ,Tiruchirappalli, held on 25th and 26th February 2016.
3. Coordinator for TEQIPII sponsored two Day national level student symposium (Innogido - 2014) Organized by Department of Civil Engineering in Bharathidasn Institute of Technology ,Tiruchirappalli, held on 11th and 12th September 2014.
4. Coordinator for one Day national level student symposium (Innogido - 2013) held on 10th October 2013.
5. Coordinator for two Day national level student symposium (Innogido - 2012) at held on 15th and 16th October 2012.

Workshop :5

1. Coordinator in one day Workshop on Hands on training on software applications in Civil Engineering Organized by Department of Civil Engineering in University College of Engineering , Tiruchirappalli, on 21.3.18.
2. Coordinator in TEQIP II sponsored Industrial workshop on Novel approaches in Civil Engineering, Organized by Department of Civil Engineering in Bharathidasn Institute of Technology, Tiruchirappalli, 30th and 31st August 2016
3. Coordinator for *empanelment agencies for imparting training to civil Engineers, Architects and masons titled on "Cost-Effective and Disaster Resistant Technologies" organized by Building Materials and Technology Promotion Council Ministry of Housing and Urban Poverty Alleviation ,Government of India, New Delhi held at Bharathidasn Institute of Technology , Tiruchirappalli, on 26th and 27th February 2015*
4. Coordinator for IIT Bombay's National Civil Bridge Championship Workshop cum Championship Organized by Department of Civil Engineering in Bharathidasn Institute of Technology, Tiruchirappalli, held on 11th and 12th September 2014.
5. Coordinator of one Day workshop on Sustainable Municipal Solid Waste Management (SMSWM - 2010) at held on 4th October 2010.

Seminar :1

1. Coordinator for TEQIP II Sponsored two Days Seminar on Recent Trends in Irrigation Engineering (RTIE'13), held on 10th - 11th, October 2013.

RESEARCH MENTORSHIP:

PhD Awarded-10

1. Tamilmani.R, “ Analysis of Multiple Contaminants in Cauvery River and its Adjacent Land Zones: A Special Focus on Heavy Metal Impacts by Metal Resistant and Biosorption Screening” .(13.06.2022)
2. S.M.Kavitha “ Stength and durability study on polymer coated stelfibre reinforced self compacting with copper slag and silica fume” . (31.12.2021)
3. Mrs.S.Pitchaikani, “Assessment of groundwater pollution using intrinsic methods .(23.07.2021)
4. Senthil.M.S, “Ground water modeling fractured flow aquifer” .(01.03.2021)
5. S.Pauline “ A comprehensive study on treatment of reverse osmosis brine using capacitive deionization technology” (14.08.2020)
6. Gopinathan S, Durability of aspects of concrete structures,(30.07.2020)
7. Sujatha.S, “Experimental studies on activated carbon developed from Manilkara Zapota tree wood and de oiled soya fro the removal of heavy metal ions ”.(27.12.2018)
8. S.Lakshminarayanan “ A Adsorption study on Removal of heavy metals from industrial wastewater” (07.9.2018)
9. Raja Gopaln. V,, “ Potential use of quarry fines with clay landfill liner in prevention of heavy metals transport ”(17.05.2017)
10. Senthil Nathan.U, “Removal of cadmium, chromium and lead in polluted water using low cost adsorbents” (5.11. 2014).

PhD Guidance(Ongoing) –3

1. Anjali R, “ Optimization and Prediction Ofmechanical Properties Of Wastepolymeric Material Using RSM and hybrid DNN-HHO algorithm “ (2016 on words- Thesis submitted)
2. Saravanakumar M, ” Experimental investigation on flexural behavior and durability study on beam by using high performance light weight concrete” (2016 on words- Confirmation completed).
3. Parthiban. L “The utilization of agricultural waste as a concrete product” (2022 on words- Course Work Completed)

Master of Engineering Guidance -48 Bachelor of Engineering Guidance - 66 AMIE Guidance – 2

Master of Engineering Guidance - 48

1. Ramkumar M, Assesment of seawater intrusion in coastal Region at Pudukkottai District (M.E Environmental Engineering, Mach 2021).
2. Gowthaman.M, A model study on water quality and public aspects of heritage city in srirangam (M.E Environmental Engineering, Mach 2021).

3. Mithuna R, Investigation of emission levels of evolving gases from a food waste using IOT on different degraders (M.E Environmental Engineering, May 2020).
4. Gandhimathi S, Qualitative analysis of leachate contamination for different phases of landfill setup and its treatment by using cantaloupe seed (M.E Environmental Engineering, May 2020).
5. Vijayaragavan, Analysis the behavior of PSC Pole cast with rubber partially as fine aggregate in concrete (M.E Structural Engineering, May 2020).
6. Ajithkumar.T, “Assessment of Bio-medical liquid waste management system in a Bio-medical facility.” (M.E Environmental Engineering, May 2019).
7. Kavina.S , “Design of prototype reactor for chrome plating bath wastewater treatment using metal scraps” (M.E Environmental Engineering, May 2019).
8. Koteswaran.S, “Green synthesis of nanoparticles and its application in dye effluent treatment plant” (M.E Environmental Engineering, May 2019).
9. Santhoshkumar.M, “Assessment of air pollution by using urban vegetation” (M.E Environmental Engineering, May 2019).
10. Meenakshi. N., “An Experimental Investigation on strength of high performance concrete containing supplementary cementing materials” (M.E Structural Engineering, May 2019).
11. Anupriya.C, Removal of oil spill from sea water using Novel adsorbents (M.E Environmental Engineering ,June 2018).
12. Saron.J, Optimization removal of colour and organic solid pollutants from textile industry wastewater by Electro coagulation (M.E Environmental Engineering ,June 2018).
13. Yogesh Prabu.C, Studies on partial replacement of clay by waste tire chips in landfill liner (M.E Environmental Engineering ,June 2018).
14. Venkatesh K , “Experimental investigation on flexural behavior of concrete beam with Hybrid fibre (M.E Structural Engineering June 2018).
15. Nithya .MN , Microbial degradation of pharmaceutical wastewater by bacterial strains isolated from the effluent (M.E Environmental Engineering ,June 2017).
16. Saranya.S , Potential utilization of organic waste by vermicomposting (eudrilus eugeniae) saranya (M.E Environmental Engineering ,June 2017).
17. Vidhya.V, “photocatalytic removal of organic pollutant from wastewater by using nanocomposite materials “(M.E Environmental Engineering ,June 2017).
18. Nethaji I , “Experimental investigation on concrete by partial replacement of wood ash as cement &palm kernel shell as coarse aggregate (M.E Structural Engineering June 2017).
19. Kanniga S, “ Effect Of Silica Fume In Slurry Infiltrated Fibrous Concrete. (M.E Structural Engineering phase-II, June 2016).
20. Maximelia T, “ Structural Inspection and Proposal for Retrofitting of Buildings” . (M.E Structural Engineering phase-II, June 2016).
21. Vineetha M, “One Pot Microwave Assisted Synthesis Of Sepiolite-PDMS Nanohybridfor The

Effective Removal Of Cono Red Dye” (M.E Environmental Engineering ,June 2016).

22. Maheswari M, “Photocatalytic Removal Of Toxic Pollutant In Effluent Water By Nano Composite Materials(M.E Environmental Engineering ,June 2016).
23. Kumaresan T, “ Identification And Comparative Study Of Oil Removing Efficiency Of Bacillus Group Bacteria Isolated From Calcerious Soil” (M.E Environmental Engineering ,June 2016).
24. S.Premkumar,”Experimental study on polymer concrete and Fiber reinforced concrete with conventional concrete. (M.E Structural Engineering phase-II, June 2015).
25. A.Murugesan,” Experimental investigation on the partial replacement of coarse aggregate with polystyrene. (M.E Structural Engineering phase-II, June 2015).
26. Peter Alexandar,” Influence of bottom ash as replacement of fine aggregates in concrete”. (M.E Structural Engineering phase-II, June 2015).
27. P.Vadivel, “Experimental investigation on stell slag concrete using polyesters fibere. M.E Structural Engineering phase-II, June 2015).
28. B.Aarthi,”Synthesis and properties of Fe_2O_3 Nan particle by Co-Precipitation method for removal of Rhodamine B Dye. (M.E Environmental Engineering phase-II,June 2015).
29. K.MohamedIsmail,”Studies on removal of Textile dye bt eco friensly Electro-Fenton method using Ecofriendly Fe(II) and Hydrogen peroxide. (M.E Environmental Engineering phase-II,June 2015).
30. R.Suchithra, “Watershed impact assement using remote sensing and GIS application. (M.E Environmental Engineering phase-II,June 2015).
31. S.Sathishkumar ,”Salinity Dispersion studies in Ennore Creek. (M.E Environmental Engineering phase-II,June 2015).
32. A.Ponraj, “Feasibility study on strength of concrete on partial replacement of cement using seashell ash ” (M.E Structural Engineering phase-II, June 2014).
33. S. Palaniappan, “Experimental investigation on self compacting concrete using marble powder and silica fume ” (M.E Structural Engineering phase-II, June 2014).
34. C.S ManeeshKumar,“An Experimental study on the strength of concrete produced with waste ceramic tile as aggregates” (M.E Structural Engineering phase-II, June 2014).
35. Balachanadar.P , “An experimental study on partial replacement of cement by chalcedony” (M.E Structural Engineering phase-II, June 2014).
36. M.B Shanmuharajan, “A Modeling based study on impact of leachate on groundwater quality – at sorathur, thuraiyur” (M.E Environmental Engineering phase-II,June 2014).
37. A.Kowsalyadevi, “Batch and column biosorption studies for removal of hexavalent chromium using raw curcurbitapepo peel” (M.E Environmental Engineering phase-II,June 2014).
38. R. ArunRaj , “Assessment of Environmental impacts of strengthening and four laning of SH79 from stretch malliyakarai of Erode ” (M.E Environmental Engineering phase-II,June 2014).
39. S.Thilagavathy, “Environmental impact of municipal sewage waste at Karaikudi municipality” (M.E Environmental Engineering phase-II ,July 2013)

40. S.lakshminarayanan, “A batch and column studies on adsorption of nickel (ii) by using redmud and fly ash” (M.E Environmental Engineering phase-II, July 2013)
41. M.chandrasekaran,, “Flexural strength of RCC beam by partial replacement cement with aluminum industry waste ” (M.E Structural Engineering phase-II ,July 2013)
42. S.Sasikumar , “Experimental studies of compacting in concrete using steel fiber” (M.E Structural Engineering phase-II, July 2013)
43. K.Bhuvaneswari, “Batch and column study on Adsorption of Nickel using Foundry sand” (M.E Environmental Engineering phase-II, May 2012)
44. M.Rajeswari, “Decolorization of Dye effluent by using Microbial Methods ”(M.E Environmental Engineering phase-II, May 2012)
45. R.Raja, “studies on concrete using granite waste powder.”(M.E Structural Engineering phase-II ,May 2012)
46. S.Kannan, “Strength and durability of concrete by replacing fine aggregate by pond ash and cement by silica fume”(M.E Structural Engineering phase-II ,May 2012)
47. S.ShanmugaSundraboopathy, “Characteristic study of concrete using coconut coir pith ash”(M.E Structural Engineering phase-II, May 2012)
48. S.Raguraman, “Flexural behavior of Reinforced concrete beams using high volume fly ash concrete confinement in compression zone”(M.E Structural Engineering phase-II ,December 2011)

Bachelor of Engineering Guidance - 66

1. Ranjith Kumar J, Sundhar E and Ramya S “Emission of greenhouse gases (GHG) in paddy field” (April 2021).
2. Sivakavi T, Thenmozhi A, Saravanan A and Liston fermi C, “Experimental study on threaded joints in reinforcement” (April 2021).
3. Sethu Raja P, Tharani S, Vijayalakshmi S and yasar arabath S, “Manufacturing of geopolymer brick using silicate” (April 2021).
4. Sankar A, sivasankari B, Kiruba T and sivaramakrishnan T, “A novel approach of removal of fluoride in groundwater;a case study at Tamilnadu” (April 2021).
5. Ariharan M , Bharath V, Dhivakar V and Dhivyappriya S, “Experimental investigation of broken tiles as replacement of coarse aggregate” (April 2021).
6. Bharathi S and Hariharan T, “study and strength behaviour of recycling scrap concrete” (April 2021).
7. Gopikrishna J ,Pragathi A. Saminathan B and Sivabalan J, “Experimental study on the behaviour of red soil cement concrete along with nylon fibre” (April 2021).
8. Gopikrishna J ,Pragathi A. Saminathan B and Sivabalan J, “Experimental study on the behaviour of red soil cement concrete along with nylon fibre” (April 2021).
9. Anandh. S, Dhivakar. V, Nethaji. and Rinee. S, “Assessment of ground water quality along kollidam river in kumbakonam municipality” (April 2021).

10. P.Anusuya, R.Bruntha , P.gowthama and P.Vetriarsan, “catalytic degradation of organic dyes using green synthesis of silver nano-particles from ficus religiosa tree bark” (June 2020).

11. M. Shakul hameed , R.Balraj, S.Karthick and S.Anbalagan, “Demographic and land use, land cover change at kodayar river basin using GIS” (June 2020).
12. Vignesh. V, Niruja. R, Monisha. N and Punithavathi. G, “Experimental investigation on addition of waste tyres in rigid pavement” (June 2020).
13. Prasanth S, Thanush kumar G, Soorya K and Kalidoss D, “A study on mechanical properties of high strength fibre reinforced concrete” (June 2020).
14. P.Arul Kumar, G. Karan, L.Pasupathy and M.Periyasamy, “Experimental studies on concrete by using hemp fibre” (June 2020).
15. Jeeva. A , Kalpana.M Keerthana. D and Manikandan. G, “Experimental study of self healing concrete by using bacteria (Bacillus Subtilis) mix concrete” (June 2020).
16. Aswin Raj M, Ramachandran K , Mujahith aslam A, Vasu M, “Effect of Marble powder on strength parameters of concrete using Silica fume” (April 2019).
17. Gurunathan C, Manikumar D, Thirumugilan T, Sathamhussain A, “Sustainable development of integrated Environmental issues Based on Nanotechnology” (April 2019).
18. Ezhilarasan R, Gayathri S, Jinisha R, Myla S M, “Preliminary investigation of Marble and Limestone dust as additives in cement structure”(March 2019).
19. Balaganapathi K, Daniel A, Shruthi A, Mathanraj P, “Textile dying waste water treatment”(March 2019).
20. Archana A, Prakash R, Prasanth J, Sivananthini S, “Experimental Investigation on concrete by using ceramics” (April 2018)
21. Rajadurai C, Rajkumar E, Thamodhiran S, Vignesh R, “Experimental study on Jute fiber Concrete” (April 2018).
22. Kaviyarasan A, Krishnamoorthy M, Sanmugasakkaravarthy M, “Green Building material- Solar tiles” (April 2018).
23. Ajithkumar P, Inbarasan K, Karthikeyan V, Nirmalraj K, “Experimental study on Basalt Fiber Concrete” (April 2018).
24. Sandhiya. R, Sendhamarai E, Arun Kumar P.S, Rettamalai P, “Static and Dynamic Properties of soil stabilized with Industrial Waste” (April 2018).
25. Priyanga.M, .Priyanka.V, “Strength and Behavior of In filled Concrete Tubes in Compression (April 2018).
26. Sandhiya R, Sendhamarai E, Arun Kumar P.S, Retamalai P, Static and Dyamic Properties of Soil Stabilized with Instrial waste” (April 2017).
27. Priyanga M, Priyanka V, Strgth and Behaviour of infilled concrete tube in Compression” (April 2017).
28. Arjun.A,Imran.U,Nova.J, “ Experiental Investigation On Addition Of Groundnut shell Powder In Concrete”(April 2016).
29. Jayakumar V, K.Kalaiselvan, Selvaraj R, “ Physio Chemical Analysis Of River Water At Mudikondan River”(April 2016).
30. Manimegalai k, Nithya.c, Shalini.S, Thenaruvi.R, “Environmental Investigation of Surface and Ground Water For Irrigation Use” (April 2016).

31. Dharaniprabha.M, Jayanthi.R, Kaleeswari.K, Kaniselvi.P, “Reuse Of Waste Glass In Brick Production”(April 2016).
32. Adiyaman.A, Smbudurai.S, Arumbu.R, Gopi.R, “Water Balance Study On Iluppur Watershed”(April 2016).
33. Sivasankari.J, Shornambigai.M, Jayalakshmi.V, “Stabilization Of Clay Soil Using Lime”(April 2016).
34. Ahalya L.K., R.Marikani,A.Saravanan,RajSivadarsan ,”Soft speed Analysis for road safety”(2015).
35. Chandramouliswaran.C, Dharanithan N.R, Dhivakar.M,R,Sundharam ,”Pavement Maintenance Management system in Tiruchirappalli”(2015).
36. Dhivyabarthi,G.RajaSwedna, V.Ramakrishnan,V.Sivanesan,,” Analysis of Octagonal shaped Multistory commercial complex” (2015).
37. JencyCharmichel,G.Raveendiran.S, S.Revathi,K.Ishwarya , “ Impact on agriculture due to climate change” (2015).
38. Narmadha.E, Nivethitha.M and Nivethitha.R.V , “ Estimation of Deslitting supply channel to Anaicut” (2015).
39. NishanthKumar.K, Prabu.K, Praseep.B,Prakash.S,,”Experimental investigation on addition of propylene fiber in light weight concrete ”(2015).
40. Usha P.,S.Latha,M.Praneedha,R.C.Ramya, Estimate of Desilting tank at Sorriyur Village (2015)
41. Thillaiselvan.L, Uma Maheswari,J, Varun.K.V, KanagaRaj.T ,” Analysis of Methane production using kitchen waste” (2015).
42. Maheswari.C,Meena.S, Nandhini@Suguna.R, Prathebha.M, “Study of drought and analysis in kannanurvilage”(2014).
43. Rajesh.K, Karthick.S, Shankar DhayalSharma.P, SarathKumar.N, “Experimental investigation concrete on coarse aggregate with replacement by granite waste ”(2014).
44. SenthilKumar.C, Sophia.M, Sri Krithiga.R, Thivya.S.R, “Redesigning and widening of Thirumayam- Virachilaipanayapatti road MD1007” (2014).
45. Sivakami.C, SriShanmugaPriya.V, Vasuki.D, Gowrl.S, “Design and cost analysis of an ayurvedic hospital building ” (2014).
46. Agnel.A, AjithKumar.U, Akshayaraj.R.T, AneeshFathima.M, “Status of water quality in Nagapattinam district” (2014).
47. Ashwin.M, Karthikeyan.V, Prakash.V, Sundaravel.S, “Inflow outflow studies of upper anicut at Tiruchirappalli” (2014).
48. Azhagammai.S, Mohanapriya.K, QueenShulamite.P, Shanmugapriya.K, “Design and analysis of multi storey building” (2014).
49. Chakravarthy.D, Manikandan.K, Murugan.N, Ramesh.A, “Study of sea water intrusion on ground water AvudaiyarkovilPudukkottai” (2014).
50. Prabhu, P., Thiruchselvam, M., Vadivazhagan, B.”Water quality in Thiruvarur District(2014-Tamil medium)
51. Manoharbhath, U.,Nisha, S. Vairavasundarai, R.”Artificial recharge of ground water by using

design of check dam method across Thalugai river Naganallur village at Thurayurtaluk”, (2014-
Tamil medium)

52. Bhuvaneshwari, S., Ramya, B., Vinodhini, V., Sewage water treatment plant in Thuraiyur municipality (2014- Tamil medium)
53. Arunkumar, P. Priya, K., Saravanakumar, M., Abinaya, V., “Ground improvement techniques using low density polyethylene” (2014-Tamil Medium)
54. Ananthi, V., Elakkiya, M, Heera, V., Rajalakshmi, M, “sustainable study on reused pet bottle and construction waste”(2014-Tamil Medium)
55. Jeevanantham. G, Ramasamy. V, Ramesh. K, Udayasekar K T, “Stabilization of soil using bentonite” (2014- Part time).
56. Backiaraj. J, Kannan S, Navaneethakrishnan.R, Paramasivam. P, “Design and analysis of flexible pavements(2014-Part time)..
57. K. Iswarya, P. Janarthanan, M. Lakshmi, “Waste water analysis and treatment in BHEL, Tiruchirappalli” (2013)
58. G. Dhanalakshmi, P. Jayapradha, K. Ranjini, V. Vima, “Analysis and design of Arch dam in Namakkal”(2013).
59. A. Aarthiponmani, F. Anithamary, P. Panthipreetha, P. Kamalavasan, “Effective management of Biomedical waste ash from incinerator”(2013).
60. R. Sailakshmi, M. Selva Rani, S. Shiny, P. Yogapriya, “Ground water quality analysis at Thiruvarangam”
, Tiruchirappalli”(2013).
61. A. Sathiyamoorthy, S. Damodharan, K. Elumalai, B. Ravikumar, “Expermental study of greener concrete using fused submerged Arc welding flux waste”(2013-P.T B.E).
62. A. Algau Sundram, M. Maraijeyanth Christu Raj, R. Padmanaban, C. Pannerselvam, “Use of broken class material as course aggregate for concrete” (2013-P.T B.E).
63. K. Arokiyadoss, Arun Jesudoss. C, Shanmugasundaram. Nand Sridhar. A, “Proposed construction of sewage treatment plant at Anna university of Technology, Tiruchirappalli” (2012-P.T B.E)
64. B. Balaji, Dhivyabharathi. S, Lidhuvaniya. K. S. S and Sylvester martin. F, “water quality assessment in senthanneerapuram, Tiruchirappalli” (2012)
65. A. Arockia Amalraj, A. Jan Mohamed Khan, K. Jegan and A. Prasannan, “Ground water yield analysis in Agniyar river basin at perungalur village in Pudukkottai district”(2011-P.T B.E)
66. B. Vanchinathan, S. John Britto, S. Prabhakaran “Studies on effect of bio medical waste in clay liner materials “ at SASTRA University(2007)

AMIE Guidance – 2

1. R. Rajarajeswari, “study on strength behavior of concrete using foundry sand” (2013).
2. M. Selvaraj, “Studies on ground water quality in and around tannery industries in Trichirappalli, Tamilnadu” (2010).

Ph.D Examiner :2

1. Mr. B. Haganesh Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr. N. Bala Sundram (22.09.2021)

2. Mr.P.Siva kumar Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr.N.Bala Sundram (22.04.2021)
3. Mr.T V Arul Prakash Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr.M.Natarajan(24.07.2020)

Ph.D Oral Examination board member :4

1. Mr.R.Eilies Yogesh, Faculty of Civil Engineering, Anna University under Guidance of Dr.V.Sekaran and Dr.J.Jegan.(24.01.18)
2. Ms.R.Umamaheswari Faculty of Civil Engineering, Anna University under Guidance of Dr.G.Elangovan(17.11.17)
3. Ms.P.Arulmathi, Faculty of Civil Engineering, Anna University under Guidance of Dr.G.Elangovan(21.10.16)
4. Mr.J.Vijayaragaven, Faculty of Civil Engineering, Anna University under Guidance of Dr.J.Jegan.(12.01.16)

Ph.D Synopsis Viva-Voce member :1

1. Mr.P.Manikandan Ph.D scholar at Faculty of Civil Engineering, Periyar Maniamni University

under Guidance of Dr.S.Senthamil Kumar

Present Doctorial Committee Member : 09

1. Mrs.Pratheba Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr.G.R. Vijay snakar .(24.02.22 - on words)
2. Mr.Caharles Dyson Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr.G.R. Vijay snakar .(12.09.21 - on words)
3. Mr.V Ravisankar Ph.D scholar at Karpagam Academy of Higher Education under Guidance of Dr.M.Natarajan .(12.08.21 - on words)
4. Mr.Shanmuharajan MB Ph.D scholar at SRM Institute of Science and Technology under Guidance of Dr.Aparna S .(8.12.2020 - on words)
5. Mr.Gopinath R Ph.D scholar at Hindustan Institute of Technology & Science under Guidance of Dr.Jessy Rooby (12.10. 2020 - on words)
6. M.Vijayapraksh M Ph.D scholar at Faculty of Civil Engineering, Anna University under Guidance of Dr.V.Rajagopalan (11.12.17 - on words)
7. K.Ramaganesan ,Ph.D scholar at Faculty of Civil Engineering, Anna University under Guidance of Dr.P.Mani.(18.07.17 - on words)
8. T.Balachandran,Ph.D scholar at Faculty of Civil Engineering, Anna University

under Guidance of Dr.T.Bhagavathi Puspha.(21.06.17 - on words)

9. Nimmagaddi Venkata Rao ,Ph.D scholar at School of Civil and Chemical Engineering VIT University under Guidance of Dr.T.Meena .(31.3.16 - on words)
10. R.Tamilalagn,Ph.D scholar at Faculty of Civil Engineering, Anna University under Guidance of Dr.R.Tamilarasan.(20.09.16 - on words)

M.S Committee Member: 1

1. Mrs Mercy , M.S Scholar at CEESAT , National Institute of Technology Truchirappalli.under Guidance of Dr.M.Premalatha(08.07.2013 - on words)

Journal: Editorial Board :12

1. Editorial board member of The Global Environmental Engineers.
2. Reviewer for Environmental Monitoring and Assessment, Springer publication.
3. Reviewer in Journal of Environmental Chemical Engineering, ELSEVIER Publication
4. Reviewer in Desalination and Water Treatment
5. Reviewer in Chemical Industry and Chemical Engineering Quarterly, Association of Chemical Engineers, Serbia.
6. Reviewer of Journal of Environmental Monitoring
7. Reviewer in journal of Civil Engineering and construction Technology
8. Reviewer in Journal of Soil Science and Environmental Management
9. Reviewer in African Journal Pure and Applied Chemistry
10. Reviewer in Journal of Water, Sanitation and Hygiene for Development
11. Reviewer in African Journal of Environmental science and Technology.
12. Reviewer for Special Issue on Solid Waste Management in International Journal of Environment and Waste Management.

Advisory Committee and Reviewer in National/ International Conferences: 12

1. Member in Indian Geotechnical Confrence 2021-Geotechics for infrastructure Development and innovative applications on 16th to 18 December , 2021 at IGS Trichy Chapter and National Institute of technology Tiruchirappalli , Tamil Nadu.
2. Techical Review committee meber in Eight national Conference on Recent Advancements in Geotechnical Engineering organized by Bannari Amman Institute of Technology , Sathyamangalam in Association with IGS Coimbatore Chapter on March 26 2021
3. Advisory committee member E-National Conference on “Emerging trends and advanced Technologies in Civil Engineering ” on 19th March, 2021 at Kings College of Engineering, Tamil Nadu.
4. Advisory committee member Virtual National Conference on “Artificial Intelligence in

Mechanical and Civil Engineering ” on 4th July , 2020 at SRM TRP Engineering College ,
Tamil Nadu.

5. Advisory committee member National Conference on “Innovative Trends and advances in Civil Engineering ” on 19th March, 2019 at Kings College of Engineering, Tamil Nadu.
6. Advisory Board member for National conference on Research Advancements in Civil Engineering MAM Engineering college ,6th March 2019.
7. Advisory committee for National conference on recent advances in Civil Engineering RACE'18, Sudharsan Engineering college ,12th March 2018.
8. Advisory committee for National conference on Technical Innovation and Research in Civil Engineering, M.Kumarasamy college of Engineering ,25th March 2017.
9. Advisory committee for National conference on Modern Infrastructure Development through sustainability

,M.Kumarasamy college of Engineering ,17th March 2016.

10. National Review board member International conference (ICCMEET), SVS College of Engineering, Coimbatore, 26th and 27th February 2016.
11. Technical Committee member International Conference on “Emerging Trends in Engineering, Technology and Science” (ICETETS-2016) 2016 to be held on 24th – 26th February 2016 at Kings College of Engineering, Tamil Nadu.
12. Advisory committee member National Conference on “Trends & Innovation in Civil & Mechanical Towards 2020 (NCTICM'2K15) on 26th September , 2015. at Vel Tech Muthu Dr.RR Dr.S.R Engineering college, Chennai, Tamil Nadu.
13. Advisory panel of 25th IPHE national convention on ‘Environmental Engineering & 3rd International conference and Exhibition ENVISION 2025 jointly organized by IPHE, Chennai-Pondicherry Regional Center and CLRI at Central Leather Research Institute, Chennai, 12th to 14th March 2014.
14. Technical committee member National Conference on “Recent Trends in Civil Engineering towards Sustainable Development” (NC- RTCESD'15) on 9th March, 2015. at Kings College of Engineering, Tamil Nadu.
15. Reviewer in 3rd International Conference (CUTSE 2011) Innovative Green Technology for Sustainable Management held at Curtin University, Sarawak, Malaysia, 8th and 9th November 2011

ANNEX- 3
(Item 2.3.3)

CV of Shri DARIUS ARDESHIR AGA

DARIUS ARDESHIR AGA

3rd Floor, A Block, Banoo Mansions, Kemps Corner, Cumballa Hill, Mumbai 400036
Off: +91 22 2270 3801/ 2265 3414 **Res:** +91 22 23617765 **Mob:** +91 98219 31660
Website: www.pandisurveyor.com **E-mail:** dariusaga@pandisurveyor.com

PROFESSIONAL EXPERIENCE

- **R. A. Podar College of Commerce & Economics** (January 2023 – Present) Designation: Visiting faculty

Course: Bachelor's in Business Administration (Shipping & Logistics Management)

Subjects: Geography of Sea Transport, Packaging & Labelling and Insurance in Shipping & Logistics

- **P & I Services of India** (01st April 2015 – Present) Designation: Partner and principal surveyor

Responsibilities : In charge of administration, business development and daily operations.

Key tasks :
 - To carry out all types of marine, container, machinery and cargo surveys. Supervising/ training of surveyors.
 - To ensure that daily operations in the office as well as in the field are carried out to the customers' satisfaction.
 - Acquisition of new customers. To resolve any complaints from customers.
Survey experience :
 - Carried out pre-purchase, condition, bunker, damage, valuation, on-hire, P&I, pre-rightship condition inspections of various bulk carriers and general cargo ships, oil and chemical tankers, LNG vessels, cruise liners, container vessels, anchor handling tugs and barges.
 - Carried out cleanliness & condition, pre & post repair, damage, on & off hire, CSC and valuation inspections of all types of dry, reefer, flat rack and tank containers.
 - Carried out investigations of damage claims of various types of cargo on behalf of insurance companies.

- **Hafnia (previously BW Fleet Management Pte. Ltd.)** (October 2010 –

March 2019)Ranks held: 2nd, 3rd and 4th Engineer

Size of vessels: MR & LR vessels

(50,000 – 76,000 DWT)Type of

vessels: Product/ Chemical Tankers

Type of Main Engine: MAN B&W MC, MC-C and ME-C

Type of Cargo Pumps: Steam turbine operated pumps and FRAMO submersible pumps

Responsibilities : To ensure the efficient and safe operation of all machinery on board so as to minimize the cost of operating the vessel and the downtime.

Key tasks :

- To plan & supervise the maintenance of all machineries on board and carry out risk assessments of the same.
 - To ensure safe working practices are followed on board.
 - Management of personnel, rest hours, stores, spares, fuel & lubricating oil etc.
 - Keeping independent watch in a manned and unmanned engine room.
 - Training of personnel in safety, security and engineering matters.
 - Increasing efficiency of the vessel and minimizing consumption of fuel and lube oil.
 - Supervision of critical operations such as bunkering, manoeuvring, welding inside and outside machinery spaces on tankers.
 - Coordinating with deck department to ensure fast and trouble free cargo operations.
 - To assist and train under the Chief Engineer whenever possible.
 - To ensure that the vessel complies with all rules and regulations.
 - To ensure that no environmental pollution takes place.
 - Interaction with various PSC, Flag State, Classification Society and Vetting inspectors/ surveyors.
 - Assisting various technicians from machinery manufacturers who came onboard to solve problems with respective machineries.
 - To ensure all records and log books are correct and up to date.
 - To carry out maintenance on all fire fighting and life saving equipment and appliances.
- **Seaarland Management Services Pte. Ltd.** (March 2007 –

September 2010)Ranks held: 4th Engineer, Junior Engineer and

Engine Cadet

Size of vessels: Handy size & Aframax

(34,000 – 115,000 DWT)Type of vessels:

Crude Oil and Product Tankers

Type of Main Engine: MAN B&W MC, MC-C

Type of Cargo Pumps: MARFLEX deep well pumps and FRAMO submersible pumps

Responsibilities : In charge of maintenance and performance of 4-stroke diesel generators, fire fighting and life saving equipment and appliances.

Key tasks :

- To plan & carry out the maintenance of 4-stroke diesel generators, fire fighting and life saving appliances.
- To assist and train under 2nd and 3rd engineers.
- To ensure safe working practices are followed on board.
- Management of rest hours, stores, spares, fuel oil etc.
- Keeping independent watch in a manned and unmanned engine room.
- Training of personnel in safety related matters.

- Assisting senior engineers in critical operations such as bunkering, manoeuvring, welding insidemachinery spaces.
 - Coordinating with deck department to ensure fast and trouble free cargo operations.
 - To ensure that the vessel complies with all rules and regulations.
 - To ensure that no environmental pollution takes place.
 - To ensure all records and log books are correct and up to date.
 - To carry out maintenance on all fire fighting and life saving equipment and appliances.
-

CERTIFICATIONS

IICL certified container inspector

The Institute of International Container Lessors (November 2023)

Affiliate Member of *The International Institute of Marine Surveyors* (September 2023)

P&I Qualification Certificate (October 2022)

International Group of P&I Clubs

Designated Person Ashore Course (January 2022)

Indian Register of Shipping Academy

Maritime Internal Auditor Course in ISM/ ISPS/ MLC Code (January 2022)

Indian Register of Shipping Academy

Class Surveyor (June 2021)

Lloyd's Maritime Institute

Fellow of *The Institute of Marine Engineers India* (July 2022)

Chartered Engineer and Member of *The Institute of Engineers India* (July 2020)

Incident Investigation Training Course (May 2018)

Seagull, Horten

Onboard Assessor Course (May 2018)

Ocean Education & Research Centre, Mumbai

MAN B&W Electronic Engine Operation & Analysis Course (April 2018)

MASSA Maritime Academy, Chennai

High Voltage Safety & Switch Gear Course (Management Level) (April 2017)

Ocean Education & Research Centre, Mumbai

MEO Class 1 COC, Motor (January 2017, revalidated in May 2022)

Govt. of India, Mumbai

Safety Officer Training, (January 2011)

Conducted by Videotel Marine International and approved by *Maritime and Coast Guard Agency, Panama Maritime Authority*

EDUCATION

Bachelor of Science, Marine Engineering, (4 year course from August 2003 - August 2007)

Tolani Maritime Institute, BITS Pilani, India.

HSC, Science, 2003

Jai Hind College, Mumbai University, India.

ICSE, March 2001

The Cathedral and John Connon School, Mumbai, India.

OTHERS

- Received the first global scholarship from IGP&I for the P&IQ Course in 2022.
- Currently preparing for Module 4 of the P&IQ Course.
- Trained in welding & gas cutting.

Date of Birth: 28th April, 1985

ANNEX- 4
(Item 2.4)

Draft on IS 15734 received from Panel 3 Convener via email dt.11/09/2024

IS 15734 : 2007

भारतीय मानक
भारवाही कन्टेनर — पुनर्नवीयन से पहले मरम्मत — दिशानिर्देश

Indian Standard

FREIGHT CONTAINERS — REPAIR BEFORE
REFURBISHING — GUIDELINES

ICS 55.180.10

Freight Containers and Pallets Sectional Committee, TED 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Freight Containers and Pallets Sectional Committee had been approved by the Transport Engineering Division Council.

The purpose of repair before refurbishment is to bring a container as nearly as possible to new container condition and for complying with safety factors applicable to safe use of a container.

Statutory requirements, if any shall be adhered to.

Indian Standard

FREIGHT CONTAINERS — REPAIR BEFORE REFURBISHING — GUIDELINES

1 SCOPE

This standard provides guidance for the repair of containers prior to refurbishing. Preventive maintenance of containers is outside the scope of this standard.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
817 (Part 1): 1992	Training of welders — Code of practice: Manual metal arc welding (<i>second revision</i>)
(Part 2): 1996	Oxyfuel welding (<i>second revision</i>)
6569: 2004	Freight containers — Vocabulary (<i>third revision</i>)

3 TERMINOLOGY

For the purpose of this standards definitions given in IS 6569 shall apply.

4 GENERAL REPAIR PROCEDURES

4.1 Repaired containers should meet all applicable requirements of relevant Indian Standards, the international convention for safe containers (CSC) and the customs conventions on containers for the international transport of goods under cover of TIR (Transport International des Routier) carnets.

4.2 After repair, the repaired area should be of equal or higher strength than the original materials and parts used should be of the same or higher strength and thickness than those used in the original manufacture.

4.3 Upon completion of repairs, the repaired area must be prepared for refurbishing. All weld slake, spatter, rust, burned and loose paint, grease and grit must be removed to allow proper adhesion of the coating material.

4.4 All welding should be done by trained welders as per

IS 817 (Part 1) and IS 817 (Part 2). Welding rods, steel sheets, etc, used should be equal to those used in the manufacture of original equipment. ISI Handbook of manual metal-arc welding for welders may be referred for guidance. All welding should be:

- a) Watertight and free of porosity;
- b) Smooth in appearance (no roughness and free of weld spatter, etc);
- c) Free of craters;
- d) Dimensionally accurate (including warpage); and
- e) Free of undercuts.

4.5 Fasteners used for repair should conform to the requirements of the relevant Indian Standards.

Dissimilar metals should be avoided in attachments to minimize electrolysis.

5 REPAIRS TO PARTS AND COMPONENTS

5.1 Corner Fittings

Corner fittings (corner castings) shall not be repaired. These should be replaced with new ones. All welds to corner fittings shall be made with low hydrogen welding rods. To ensure proper engagement of handling devices, it is important that the distance between aperture centres be maintained within the tolerances specified in relevant Indian Standards. Care should be taken to assure that the casting height measured between the top and bottom corner fittings is within specified dimensional tolerances and that the casting is properly positioned horizontally.

5.2 Corner Posts

Damages in corner posts should be repaired in the following way.

5.2.1 Straightening

As far as possible straighten the corner post by using either hydraulic or mechanical means without heating. If a dent is too severe to be straightened without heating, heat may be applied only in the damaged area but must not be heated beyond 650°C (dull cherry red colour).

5.2.2 Inserting

Damage that cannot be repaired by straightening may be repaired by replacing the damaged area with an insert.

However, the following limitations apply to inserts in the front and rear corner posts:

- a) Inserts should be fitted flush with the original material and butt welded.
- b) **There is no limit to the number of inserts allowed in front corner post provided all other limitations listed herein.**
- c) An insert should not extend through more than half of the external cross-section profile of the post, but should extend through at least 75 mm of the cross-sectional profile of the post. Sections through the complete cross-sectional profile of the post are not acceptable.
- d) There is no maximum length limitations for inserts. Full height corner post inserts are acceptable.
- e) When a corner post contains two inserts, no part of either insert may occupy any part of the same horizontal plane.
- f) Horizontal insert welds of rectangular inserts or extremity welds of diamond or oval shaped inserts shall be a maximum of 150 mm apart.
- g) An insert that would terminate within 150 mm of the existing insert should be extended to the existing insert to form a common weld. The common weld should extend horizontally through the profile of the post. When diamond or oval shape inserts are involved, they should, therefore, be cut to provide a horizontal edge that will butt against and be welded to the adjacent insert.
- h) Insert shall not terminate vertically on a formal edge.
- j) Minimum length of insert shall be 150 mm.
- k) If an insert ends within 300 mm of a corner fitting, it should be extended to the fitting.
- m) Inserts may be rectangular, oval or diamond in shape.

5.2.3 Replacement

When damage to a post cannot be repaired by straightening or inserting, the post should be replaced with a new one made out of same type of material and same profile.

5.3 J-Bars

5.3.1 Straightening

Wherever possible, straighten any bend in J-bar without heating. In case straightening cannot be done without heating, apply heat only to the damaged portion up to 650°C (dull cherry red colour). The corner post insert limitations do not apply to J-bars. The only limitation for J-bar inserts are:

- a) Inserts shall be fitted flush with the original

material and butt welded.

- b) Minimum length of inserts is 75 mm.

5.4 Rails

5.4.1 Top Rails

5.4.1.1 Straightening

Any dents or distortions in the rails or header should be straightened without heating. If heating becomes necessary to assist straightening, apply heat only to the damaged portion up to 650°C (Dull cherry red colour).

5.4.1.2 Inserting

Damage that cannot be repaired by straightening should be repaired by replacing the damaged portion with an insert keeping the following limitations in view:

- a) Insert may be of any profile that does not extend through the entire cross-sectional profile of the rail.
- b) Inserts shall be fitted flush with the original material.
- c) Minimum length of an insert should be 150 mm.
- d) If an insert would end within 150 mm of another vertical weld in the rail, that should be extended to that weld.
- e) If an insert in a top side rail would end within 300 mm of a corner fitting that should be extended to the fitting.
- f) If an insert in a header would end within 150 mm of a corner fitting, that should be extended to the fitting.

5.4.1.3 Sectioning

Damage that cannot be repaired by straightening or inserting should be repaired by replacing the damaged section of rail, that is, the entire cross-sectional profile of the rail must be replaced keeping in mind the following limitations:

- a) Replacement material shall be of the same profile, thickness and strength as the original. Sections shall be butt welded to the original rail.
- b) Sections shall be of at least 150 mm in length.
- c) If a section would end within 150 mm of another vertical weld in the rail that should be extended to that weld.
- d) If a section in a side top rail would end within 300 mm of a corner fitting that should be extended to that fitting. If a section in a header would end within 150 mm of a corner fitting that should be extended to that fitting.

NOTE — If the top rail cannot be repaired by straightening, inserting or sectioning, it shall be replaced with a new one of the same size and specifications.

5.4.2 Rain Gutter

5.4.2.1 Straightening

Distortions to the rain gutter should be repaired mechanically without applying heat to the component. If the weld connecting the rain gutter to the corner fitting is broken, it should be rewelded.

5.4.2.2 Removal

If the rain gutter cannot be brought to its original profile by straightening it should be removed by cutting with hack-saw. No gas cutting should be used as that would distort the header, making it thereby rather impossible to close the door air and light tight.

5.4.3 Bottom Rails

Bottom rails should be repaired by straightening, inserting, sectioning or replacement in the same way as top rails, but *extra care* should be taken to see that container's dimensions are not disturbed. Hence, before starting repairs of the bottom rail by any of the aforesaid process, proper folding and gripping are provided to keep the original sizes of the container within specified limits.

5.5 Side and Front Panels

5.5.1 Straightening

Straightening repairs should brought the panel to its original profile. If the damage has stretched the panel to such an extent that the original profile cannot be restored, repair by straightening should not be attempted. Dents and compression lines are to be straightened without heating. To repair splits, cuts, tears or pin-holes when the original profile can be restored, straighten the damaged area, weld the edges of the cut material, clean, mark and prime the repaired area.

5.5.2 Patching or Inserting

If the damage cannot be repaired by straightening, an overlapping exterior patch or a butt welded insert may be installed. However, if such patching is going to cover the major portion of a panel, then it would be better to replace the whole panel.

5.5.3 Replacing Panel Assembly

While attempting to replace complete side or front panel assembly, it is important to note that specified dimensions and tolerances can be affected. Hence, when performing this repair dimensions and tolerances should be checked before, during and after the repair operations.

5.6 Roof

5.6.1 Roof Bows

5.6.1.1 Straightening

Depressed roof bows may be straightened by using a 'T' beam and jack.

5.6.1.2 Replacement

If the roof bow cannot be straightened, it shall be replaced.

Sections or inserts are not permitted in roof bows. The replacement roof bows should be attached to the roof panel in the same manner as the original roof bows.

5.6.2 Roof Panel (Flat or Corrugated)

5.6.2.1 Straightening and welding

To repair spits, cuts, tears or pin holes when the original profile can be restored, straighten the damaged area and weld. After welding welded portion shall be ground smooth.

5.6.2.2 Damage that cannot be repaired by straightening should be repaired by installing an overlapping exterior patch. If such patching is going to cover major portion of a panel, it would be better to replace the whole panel.

5.6.2.3 If roof panel assembly covering the complete roof of a container is damaged at many places and patching is not economical, the entire roof assembly should be replaced. While attempting to replace the entire roof, care should be taken that specified dimensions and tolerances are maintained.

5.7 Understructure (or Under Frame)

The container understructure components may have been protected with one of several and different coatings. After repairing these components, the repaired area should be coated with the same type of material that was originally applied.

5.7.1 Cross-Member (Including Outriggers)

5.7.1.1 Straightening

Cross-members should be straightened by hydraulic or mechanical means without the use of hammering.

5.7.1.2 Inserting

When damage to a cross-member cannot be repaired by straightening it may be repaired by installing an insert keeping in view the following limitations:

- a) Inserts shall be flush with the cross-member;
- b) The top flange of the cross-member securing it to the floor and a minimum of 13 mm of the vertical web shall be left intact. Sections through the complete profile of the cross-member are not permitted except for hot rolled profiles such as I-beams, when a section through the complete

profile is acceptable;

- c) If an insert would end within 150 mm of another vertical weld in the cross-member, the insert shall be extended to the existing weld;
- d) If an insert would end within 150 mm of a bottom side rail to cross-member attachment weld, the insert shall be extended to that weld; and
- e) If damage to the cross-member extends along its entire length but the top flange is undamaged and the cross-member is properly secured, it may be possible to repair the cross-member by installing a full length overlapping angle.

5.7.1.3 Replacement

When a cross-member cannot be repaired by straightening, inserting or patching, that should be replaced with a new one of same profile and design.

5.7.1.4 Forklift pocket assembly

This could be repaired by straightening, inserting, patching or replacing in same manner as done in case of cross-members.

5.7.1.5 Goose neck tunnel

This could be repaired by straightening, patching or replacing in same way as done in case of forklift pockets.

NOTE — While doing repairs to understructure cross-members, Fork-lift pockets and Gooseneck, etc. care should be taken to see that flooring bottom side rails and sills are not damaged or effected in anyway.

5.8 Flooring

Damages to the flooring are usually repaired by replacement (partial or full) of the floor planks or board. While repairing the flooring, the following limitations apply:

- a) **Replacement boards and undamaged remaining boards must cover at least three (3) crossmembers or fork pocket sides. However, if the originally installed by the manufacturer covers only three cross members or fork pocket sides, they may be replaced by boards covering three cross-members or fork pocket sides.**
- b) Adjacent floor boards should not terminate on the same cross-member or fork pocket side.
- c) Replacement board plank should be the same design and specification as the original one.

NOTE — After repairs, the floor should appear like original with top surface leveled properly.

5.9 Door Assembly

5.9.1 Door Panels

Repairs to door panels should be done by straightening or patching.

5.9.1.1 Straightening

Dented portion should be straightened by smithy process as far as possible without heating. Splits, cuts, tears or pin holes should be welded and ground smoothly.

5.9.1.2 Patching

If the damage cannot be repaired by straightening an insert may be installed. Insert should be of minimum 150 mm in length and at least 150 mm apart. Weld should not be made within 150 mm of the corners of the frame or the ends of the stiffeners.

5.9.2 Door Hinges

5.9.2.1 Freeing hinges

Hinge pins should be freed by using penetrating oil lubricate the hinge.

5.9.2.2 Replacement of hinge pin

After freeing the hinges, if it is noticed that there are plays between the bush and the pin, the pin should be replaced with over size pin.

5.9.2.3 Replacement of hinge blade

If the hinge blades holes are enlarged or become oval, it will be necessary to replace the hinge blade with new one. In this case, hinge pin and hinge lugs welded on the 'J-bar' may also have to be replaced as when the hinge blades are worn-out as the lugs holes also must have enlarged or become oval.

NOTE -- While repairing or replacing the hinge mechanism care should be taken to see that the alignment of doors are proper.

5.9.3 Locking Devices

5.9.3.1 Locking bars, if jammed up, should be freed by applying penetrating lubricating oil and/or repairing the defects in the bar such as existence of bends, dents, crack, etc, by straightening and inserting a section.

5.9.3.2 Locking brackets and keepers

If broken, should be replaced. No attempt should be made to reconstruct the brackets or keepers by welding or metalizing.

5.9.3.3 Locking handles and retainers

Repairs to those parts should be done by straightening and/or replacement.

5.9.4 Gaskets

Repairs to gaskets require the use of an adhesive, cyanoacrylate adhesive should be used for bonding door gasket material, however, use of such adhesive is to be

done very carefully as, cyanoacrylate adhesives will bond skin or clothing upon contact to an extent necessitating plastic surgery. Repair to gasket could be done by patching or sectioning, if the gasket on the whole is in good condition to give effective service for at least three years. However, in most cases the gaskets should be replaced.

5.10 Ventilators

5.10.1 Steel Ventilators

Steel ventilators usually get dented or torn. Such damage

could be easily repaired by straightening or replacing. Repairs done on this part should bring the ventilator in original condition free from leakage, etc.

5.10.2 Plastic Ventilators

No repair is advisable on broken plastic ventilators.

It should be replaced with new one in the same manner as the original was fitted.

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 2323 0131, 2323 3375, 2323 9402 Website : www.bis.org.in

Regional Offices :

		Telephones
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 2323 7617 { 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700 054	{ 2337 8499, 2337 8561 { 2337 8626, 2337 9120
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