PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF MECHANICAL ENGINEERING

Academic year: 2025-26 Date: 26-07-2025

CIRCULAR

Additive Manufacturing Club of Mechanical Engineering Department in association with Career Guidance Cell is organizing a Seminar to the Mechanical Engineering students on 29th July 2025. The Theme of the Seminar is *"Exploring the Process of Recycling PET Bottles into 3D Printing Filament"*.

Event	:	Seminar.
Date of the Event	:	29th July 2025.
Venue	:	CAD Lab.

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PRAGATI ENGINEERING COLLEGE

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INDUSTRY 4.0 CLUBS

ADDITIVE MANUFACTURING CLUB

ORGANISED BY DEPARTMENT OF MECHANICAL ENGINEERING IN ASSOCIATION
WITH
CAREER GUIDANCE CELL

EXPLORING THE PROCES OF RECYCLING PET BOTTLES INTO 3D PRINTING FILAMENT

SPEAKER :
Mr. P. Siva Shankari (23A35A0322)

FACULTY COORDINATOR

Mr. P. Ram Prasad
Assistant Professor
Mechanical Engineering Department

VENUE: CAD Lab
DATE: 29th July 2025
TIME: 1:00 PM Onwards

STUDENT COORDINATOR

Mr. P.Eswar Prasanth (23A31A0341)
Mechanical Engineering Department

PRAGATI ENGINEERING COLLEGE

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(Recognized by UGC Under Sections 2(f) and 12 (b) of UGC act, 1956)
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DEPARTMENT OF MECHANICAL ENGINEERING

A SEMINAR

ON

"EXPLORING THE PROCESS OF RECYCLING PET BOTTLES INTO 3D PRINTING FILAMENT"

A.Y 2025-26

Dt. 29.07.2025

The Additive Manufacturing Club of the Mechanical Engineering Department, in collaboration with the Career Guidance Cell, successfully organized a seminar titled "Exploring the Process of Recycling PET Bottles into 3D Printing Filament."

The event was held in the CAD Lab and witnessed enthusiastic participation from 45 III year Mechanical Engineering students. The seminar was open to all interested students, fostering an inclusive environment that encouraged curiosity and learning about innovative manufacturing technologies.

The session was delivered by Mr. P. Siva Shankari (23A35A0322), who captivated the audience with her engaging presentation. Her insightful discussion made complex concepts accessible, especially those related to transforming waste materials into valuable resources through additive manufacturing.

The seminar primarily addressed the growing issue of plastic pollution, particularly from single-use PET bottles, and highlighted the increasing relevance of 3D printing as a sustainable manufacturing method. By connecting these two pressing topics, the session explored how recycling PET bottles into 3D printing filament offers both an environmentally responsible and economically feasible solution.

Participants gained a clear understanding of the end-to-end process involved in converting waste PET into high-quality filament for 3D printers. The discussion emphasized the role of such practices in promoting a circular economy and driving innovation in sustainable manufacturing systems.

The seminar proved to be an inspiring and informative experience, equipping students with valuable insights into real-world applications of mechanical engineering and sustainability.

Process of Recycling PET Bottles into 3D Printing Filament

1. Collection and Sorting

- Collection: PET bottles are gathered from households, recycling bins, or waste management facilities.

- Sorting: Bottles are sorted by material type (only PET) and sometimes by color. Non-PET parts like caps (HDPE/PP), rings, and labels are removed manually or mechanically.

2. Cleaning

- Bottles are thoroughly washed with water and detergent to remove:
  - Food or drink residues
  - Adhesives from labels
  - Dirt and oils
- Sanitization is often done using hot water or chemical treatment to ensure purity.

3. Drying

- Cleaned PET is dried completely (typically at 70–90°C) to remove all moisture.
- This is important because PET is hygroscopic and moisture can cause bubbling or poor filament quality during extrusion.

4. Shredding

- Dried PET bottles are passed through a plastic shredder or grinder to convert them into small flakes or chips.
- Uniform flake size ensures better melting and extrusion consistency.

5. Extrusion (Filament Production)

a) Feeding

- PET flakes are fed into a filament extruder, either manually or using a hopper system.

b) Melting

- The PET flakes are heated in the extruder barrel to a melting temperature (~250–270°C).

c) Filament Formation

- The melted PET is pushed through a nozzle (usually 1.75 mm or 2.85 mm in diameter).
- The hot filament is then pulled through a cooling system (air or water bath).

6. Diameter Monitoring and Pulling

- As the filament exits the extruder, sensors measure and adjust the diameter tolerance.
- A puller system ensures consistent speed and smooth extrusion.

7. Cooling and Spooling

- The filament passes through a cooling system to harden it.
- It is then spooled onto reels for storage and later use in 3D printers.

8. Optional: Additives or Modifiers

- In some cases, additives are mixed in for:
  - Color
  - UV resistance

- Flexibility or improved printability

9. **Testing and Quality Control**
   - The final filament is tested for:
     - Diameter consistency
     - Moisture content
     - Tensile strength
     - Extrusion temperature stability

10. **Storage and Use**
    - Filament is stored in dry, airtight containers (PET absorbs moisture easily).
    - It is now ready for use in FDM 3D printers.

Environmental Impact

- Reduces landfill waste and ocean plastic.
- Saves energy compared to virgin plastic production.
- Promotes local recycling initiatives and circular economy.

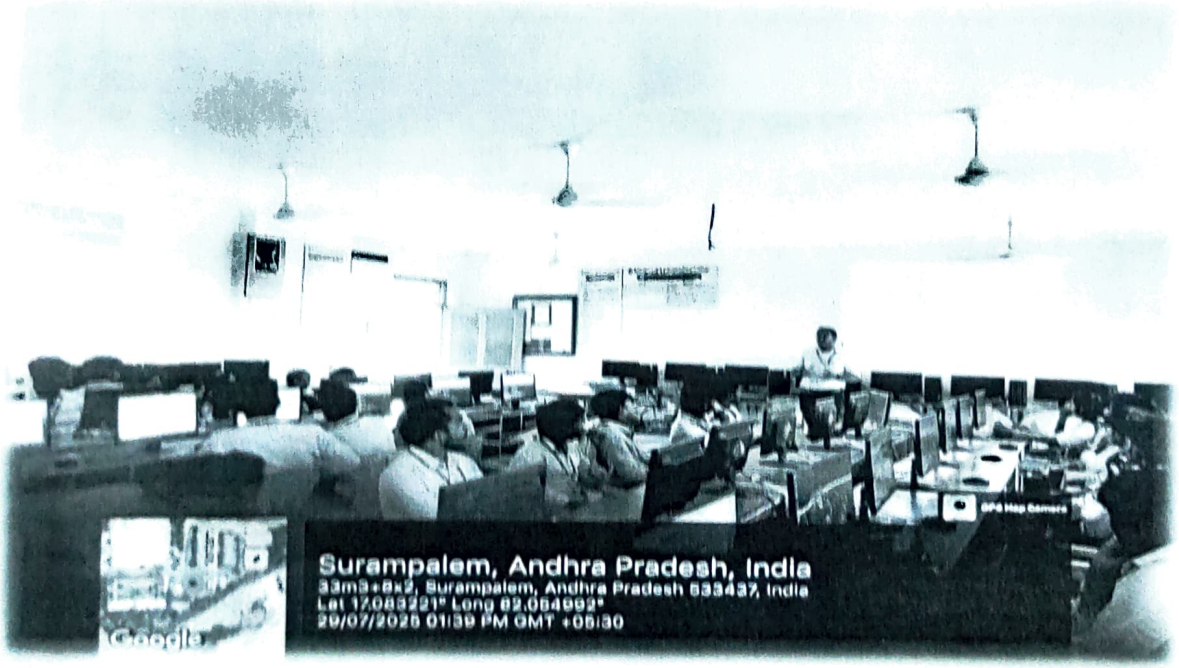
Economic Aspects

- Cost-effective material for makers and educational institutions.
- Reduces raw material dependence and supports upcycling startups.

Challenges and Limitations

- Variability in waste PET quality can affect filament properties.
- Requires investment in cleaning and extrusion equipment.
- PET is hygroscopic – prone to absorbing moisture from air.
- Not all PET bottles are food-grade or safe for heated reuse.

PICTURES OF THE EVENT:



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Participants List

Name of the Event: Exploring the process of Recycling PET bottles into 3D printing Filament

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Date : 29th July 2025

S.No	Roll No	Name	Signature
1.	23A31A0337	P. Vamsi	P. Vamsi
2	23A31A0339	P. charles stanlin	P. charles
3.	23A31A0325	Ie. Veera Manikanta	K.V. Manikanta.
4.	24A35A0311	P. V. Neelesh kumar.	P.V. Neelesh kumar.
5	23A31A0320	G.V.S. Subrahmanyam	GVSSubrahma
6.	24A35A0312	R. Hari Kiran	
7.	24A35A0317	Y. Siva Shankar	Y. Siva Shanka
8	23A31A0328	K. satya chakra Dhora	K. S. C. Dhora.
9	23A31A0343	R.P. Arun kumar	R.P Arun kum
10.	23A31A0319	ch. Mohan Krishna	
11	23A31A0340	P. Bhanu	P. Bhanu
12.	23A31A0345	S. Siva Sai	S. Siva Sai
13.	24A35A0313	S. Manikanta	S. Manikant
14.	23A31A0322	G. Karun kumar	G. Karun kumar
15.	23A31A0316	CH. Santhosh kumar	ch. Santhosh kumar

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S.No	Roll No	Name	Signature
16	23A31A0303	Swapna. Nagireddy.	Swapna
17	23A31A0304	R. Renuka.	Renuka.
18	23A31A0301	B. Sai Ramya	Ramya
19	23A31A0306	S. Yohanna	Yohanna
20	23A31A0305	Revathi. M	Revathi. M
21	23A31A0302	D. Avanthi	Avanthi D
22	23A31A0335	P Suryateja	P. Suryateja
23	23A31A0333	V. Bala vamsi Krishna	V. Vamsi
24	23A31A0314	B. H. Vardhan	B.H Vardhan
25	24A35A0308	M. Suresh	Suresh
26	23A31A0311	B.H.S.D. MRUTYUNJAY	B. Mrutyunjay
27	23A31A0316	CH. Santhosh kumar	CH. Santhosh
28	23A31A0310	A. Rajesh	A. Rajesh
29.	23A31A0330	M. Hemanth	M. Hemanth.
30	23A31A0332	A. Yaswanth	A. Yaswanth.

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31	23A31A0347	S. Vday	S. Vday
32	23A31A0351	V. Venkata kaushik	V. Kaushik
33	23A31A0348	T. Appala Narashiman	T. Narasimha
34	23A31A0352	V. Veerabadhra Trinath	V. V. B. Trinath
35	23A31A0349	V. Saiganesh	V. Saiganesh
36	23A31A0323	G. V. Ajay kumar	G. Ajay
37	23A31A0321	Y. Satya sai suresh	Y. S.
38	23A31A0315	B. Siva sai	B. Sivasai
39	23A31A0313	B. Sai teja	B. Teja
40	24A35A0306	K. pavan Surya kumar	K. pavan
41	24A35A0310	P. Rishikesh	P. Rishikesh
42	24A35A0307	Mh. Bala Bharani Sankar	Mh. Bala
43	24A35A0304	D. Mouli	D. Mouli
44	24A35A0305	K. Satwik	K. Satwik
45	23A31A0341	P. Prasath	P. Prasath

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