GUEST LECTURE REPORT

Structural Engineering Fundamentals

Andhra Polytechnic, Kakinada — Department of Civil Engineering

An industry–institute interaction session taking diploma students from the fundamentals of structural mechanics to the decisions made every day on a live construction site

TOPIC OF THE GUEST LECTURE
Structural Engineering Fundamentals — From Classroom to Construction Site

INSTITUTION Andhra Polytechnic, Kakinada	**DATE** 23rd September 2026
RESOURCE PERSON Er. S. Soma Sekhar Naidu, Founder & MD, D2D Engineers	**TIME** 10:30 AM – 12:00 Noon
VENUE Department of Civil Engineering, Andhra Polytechnic, Kakinada	**FORMAT** Guest Lecture + Interaction with Students
PARTICIPANTS Diploma Civil Engineering students & faculty	**ORGANISED BY** Department of Civil Engineering

ABOUT THE RESOURCE PERSON

Er. S. Soma Sekhar Naidu, M.E., AMIE, AIV (Chartered Engineer), is the Founder & Managing Director of Desire 2 Design (D2D) Engineers, Visakhapatnam — an ISO 9001 certified structural consultancy and turnkey construction firm delivering structural design, architectural planning, geotechnical investigation, NDT testing, DGPS surveys, waterproofing, project management and construction execution. Through MoUs with more than ten engineering and polytechnic institutions, he has made industry-linked training a core part of the firm's work, and has addressed and trained over 500 students across the region.

10	50+	500+	1000+
Offices	Professionals	Students Trained	Projects Completed

PURPOSE OF THE SESSION

Diploma students learn Strength of Materials and Theory of Structures as formulae on a blackboard, but rarely see how those formulae decide the size of a beam or the position of steel on a real site. D2D Engineers conducts guest lectures at polytechnics and engineering colleges to close that gap. At the invitation of the Department of Civil Engineering, Andhra Polytechnic, Kakinada, Er. Naidu took up the fundamentals of structural mechanics and carried each one through to the site decision it controls.

OBJECTIVES OF THE SESSION

- Strengthen students' grasp of the core concepts of structural mechanics — supports, equilibrium, stress and bending.
- Show how each concept is applied in real structural design and on the construction site.
- Explain why structures fail, and how understanding failure leads to safer and more economical design.
- Expose diploma students to current industry practice, codes and testing methods.
- Offer career guidance for diploma holders entering design, execution, survey and testing roles.

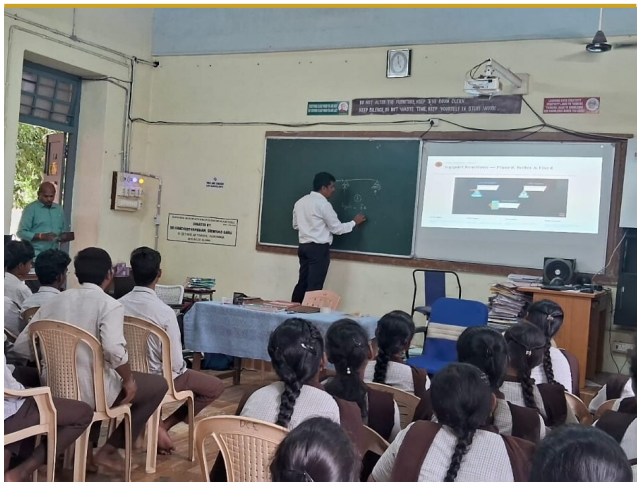
GUEST LECTURE — KEY TOPICS

The session moved step by step from first principles to site practice, with each concept worked out on the blackboard and then tied to a real project situation from D2D's work.

- **Support Reactions — Pinned, Roller & Fixed** — How each support type holds a structure, what it restrains, and how load travels from a beam into the ground.
- **Conditions of Equilibrium** — $\Sigma Fx = 0$, $\Sigma Fy = 0$, $\Sigma M = 0$ — the three equations behind every hand calculation, and how determinate and indeterminate structures differ.
- **Stress & Strain** — $\sigma = P/A$ and $\varepsilon = \delta L/L$ explained through simple, relatable analogies before any formula was applied.
- **The Bending Equation — Flexure Formula** — $M/I = \sigma/y = E/R$, and why it decides beam depth and places steel at the tension face of an RCC beam.
- **Beams, Trusses & Load Paths** — Reading a framed structure as a load path, and sketching bending moment behaviour for common loading cases.
- **Why Structures Fail** — The fundamental failure modes of structural members, and the lessons real failures have taught the profession.
- **Classroom to Construction Site** — How a formula on the board becomes a judgement call backed by IS codes, material testing and site experience.

SESSION HIGHLIGHTS

Er. Naidu began with support conditions, sketching pinned, roller and fixed supports on the board and asking students to identify them in structures around the campus. He then built up the equilibrium equations and worked through the bending relation, pairing each step with a site situation — why a beam is deepened rather than widened, why steel is placed where it is, and what happens when detailing is ignored. Students followed the derivations on the board alongside the projected slides, and the department faculty joined the discussion throughout.



Working out support reactions on the blackboard



Explaining equilibrium conditions to the students



Deriving the bending equation, M/I = σ/y = E/R



Diploma Civil Engineering students at the session

INTERACTION WITH STUDENTS

The second half of the session was kept open for questions. Students asked about design software, site responsibilities of a diploma engineer, higher studies and the skills employers look for. Er. Naidu answered each question with examples from ongoing D2D projects, and encouraged students to visit sites and testing laboratories during their diploma itself.



Session coordinated by the Department of Civil Engineering



Er. Naidu interacting with students during the Q&A

CAREER GUIDANCE FOR DIPLOMA ENGINEERS

- **Master the Fundamentals** — Supports, equilibrium and bending are the base of every design — get them right and software becomes easy.
- **Learn on Site First** — Early site exposure builds the practical judgement that no textbook can replace.
- **Know the Codes** — IS codes are the language of professional practice — read them, not just their summaries.
- **Add a Skill** — AutoCAD, quantity estimation, surveying or NDT testing makes a diploma engineer immediately useful on site.
- **Build Across Disciplines** — Structural, geotechnical, NDT and project management exposure together make an engineer versatile.
- **Serve Society** — Every structure carries a responsibility for public safety — let integrity guide every decision.

OUTCOME & CONCLUSION

The session gave the students of Andhra Polytechnic, Kakinada a clear line from the formulae in their syllabus to the decisions taken on a live construction site. The fundamentals of supports, equilibrium and bending were revised from first principles and then demonstrated in practice, and the interaction that followed gave students a realistic picture of the roles, skills and responsibilities awaiting them in the construction industry. The department and D2D Engineers agreed to continue such industry–institute interactions for the benefit of the students.

FELICITATION

Mr. K. Srinivasa Murty, Head of the Department of Civil Engineering, Andhra Polytechnic, Kakinada, was felicitated with a memento by Er. S. Soma Sekhar Naidu, Founder & Managing Director of Desire 2 Design Engineers, in appreciation of the department's support in organising the session and its continued association with the industry.



Felicitation to Mr. K. Srinivasa Murty, HOD, Department of Civil Engineering, by Er. S. Soma Sekhar Naidu (MD & Founder, Desire 2 Design Engineers)

COURTESY MEETING

After the session, Er. Naidu met Sri V. Vizia Kumar, Principal, Andhra Polytechnic, Kakinada, and discussed industry–institute collaboration, student training programmes and internship opportunities for diploma students at D2D Engineers.



Er. Naidu in a courtesy meeting with Sri V. Vizia Kumar, Principal, Andhra Polytechnic, Kakinada

> *A formula on the blackboard becomes engineering only when you can point to the beam it saved. Learn the fundamentals well, and the site will always have a place for you.*
>
> **— Er. S. Soma Sekhar Naidu, Founder & Managing Director, D2D Engineers**