



Koneru Lakshmaiah Education Foundation

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Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA.

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Department of Mechanical Engineering

A.Y 2025-2026, Even Semester

Industry Guest Lecture Report

In view of department activities, Department of Mechanical Engineering conducted an Industry Guest Lecture with **Mr. Dileep Kotte**, working as **Sr. Lead Stress Engineer – Aerospace, Cyient Limited, Hyderabad on 30-01-2026** by Smart manufacturing cohort. He gave lecture from 02:00 P.M to 02:45 P.M on the topic **“Overview of GD&T in an industry perspective”**. In on-line mode, he given presentation in google meet platform in which 57 participants (53 students and 04 faculty) of ME department were participated in blended mode.

With his extensive experience in aerospace engineering and stress analysis, the speaker provided valuable insights into how Geometric Dimensioning and Tolerancing (GD&T) is applied in industry, particularly in high-precision sectors such as aerospace.

The lecture was interactive, application-oriented, and focused on developing clarity among students regarding the interpretation and importance of GD&T symbols in engineering drawings.

Google meet Link:

<https://meet.google.com/fdr-capm-wwc>

Key points covered during guest lecture session:

Mr. Dileep Kotte began the session with a brief introduction to GD&T, explaining its role as a symbolic language used in engineering drawings to clearly communicate design intent. He emphasized that GD&T is essential for ensuring functional requirements, interchangeability of parts, and quality control in manufacturing.

The speaker highlighted the limitations of conventional plus-minus tolerancing and explained how GD&T overcomes these limitations by providing clear and unambiguous tolerances related to form, orientation, location, and profile.



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meet.google.com/fdr-capm-wwc

Dileep Kotte (Presenting)

33

- The foundation of GD&T was developed during World War II to ensure mass production consistency and was later standardized as ASME Y14.5. Today, it is widely used across automotive, aerospace, and manufacturing industries.
- ASME Y14.5 – 2018
 - ASME: American Society of Mechanical Engineers
 - Y14.5: Standard Number
 - 2018 : The standard was officially approved in the year 2018
- There is another predominant standard used in parts of the world. The International Standards Organization (ISO) is an organization that has published an associated series of standards on dimensioning and tolerancing.
- The ISO dimensioning standards and the Y14.5 -2018 dimensioning standard are about 90% common.

Introduction to GD&T

WWII Origins

ASME Y14.5 STANDARD

Geometric Dimensioning & Tolerancing

The Language of Engineering Drawings

Form

Orientation

Runout

Location

Ensure Fit & Function

Used in Manufacturing & Aerospace

Consistent, Precise, and Clear!

BURAGADDA K...

Dileep Kotte

I'm hruthik Naidu

Eesha Kodali

Pavan Sai Band...

Naraharisetti D...

25 others

Kanchu Rajesh

2:09 PM | fdr-capm-wwc

30°C Sunny

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ENG IN

14:09 30-01-2026



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One of the most engaging parts of the lecture was the explanation of GD&T concepts using a *parking analogy*. Mr. Dileep used this simple real-life example to help students understand complex tolerancing concepts intuitively.

He compared vehicle parking constraints such as space limits, alignment within parking lines, and position of the vehicle to GD&T controls applied to machine components. This analogy helped students visualize how tolerance zones work and why proper control of geometry is crucial for functionality and safety.

meet.google.com/fdr-capm-wwc

Dileep Kotte (Presenting)

Admit 1 guest 34

GD&T Explained Using a Parking Analogy

Simplifying Geometric Dimensioning & Tolerancing with Everyday Concepts

Imagine parking a car in a parking spot 🚗

- Size tolerance says: "Your car must be smaller than this space."
- Location tolerance (True Position) says: "You can park anywhere inside this marked zone."
- Orientation tolerance says: "Your car must be straight — not angled."
- Profile tolerance says: "Stay inside the painted lines, no matter the shape."

GD&T is simply a set of rules that defines how much imperfection is acceptable — while still making sure everything fits and works.

Key Takeaway: GD&T isn't just about dimensions; it's a comprehensive language for defining function, fit, and manufacturing reality.

SIZE = (Car Width / Part Dimension)
Ensures the object fits within the allowed space, but doesn't control its exact location.

TRUE POSITION = (Allowed Parking Zone / Theoretical Exact Location)
Defines the precise center boundary where the feature (car) must be located for proper function.

ORIENTATION (Car Alignment / Angular Control)
Controls the angle or parallelism of the feature relative to a reference (datum).

PROFILE (Painted Boundary / Surface Shape & Boundary)
Defines a uniform boundary around the entire surface, controlling both size and form simultaneously.

26 others

Kanchu Rajesh

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The fundamentals of GD&T were explained using the concept of **SLOF**, which represents:

- **S – Size**
- **L – Location**
- **O – Orientation**
- **F – Form**



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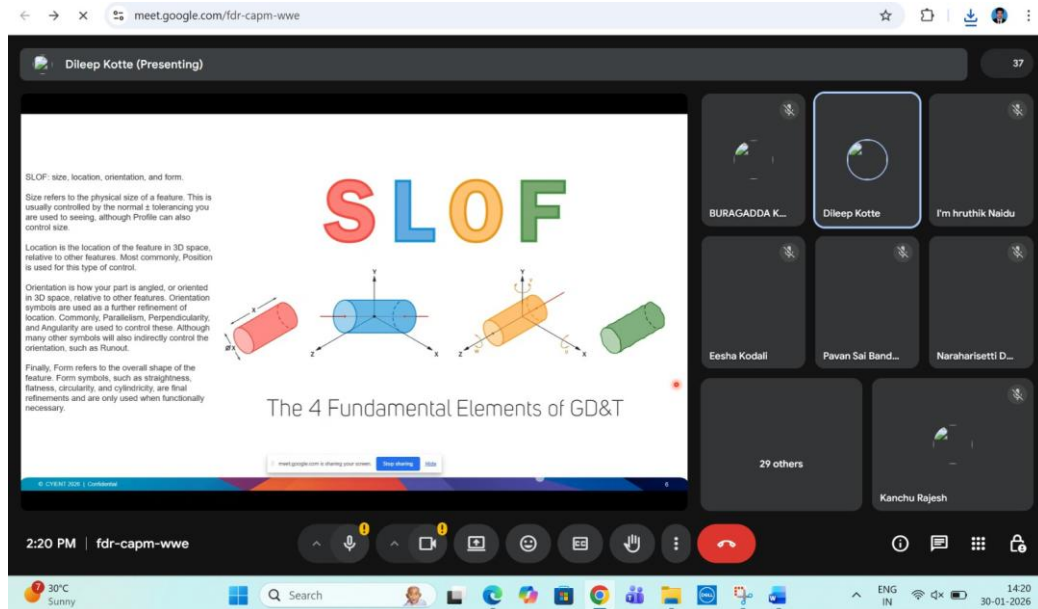
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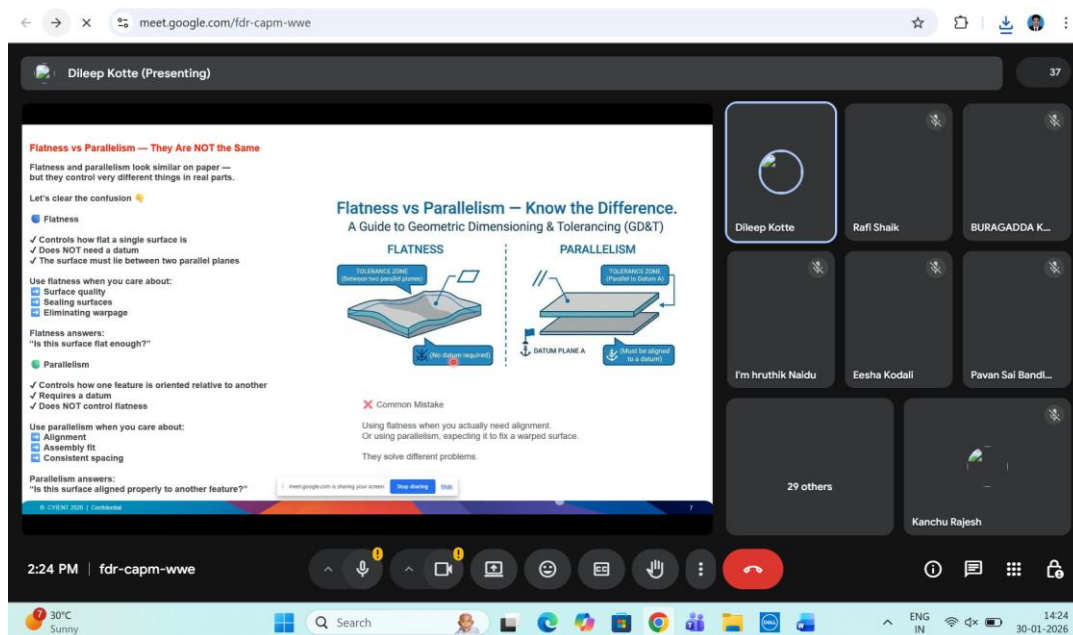
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Mr. Dileep explained how each of these aspects plays a critical role in defining the geometry of a component. He clarified that size alone does not guarantee proper assembly or function, and that location, orientation, and form controls are equally important in industrial applications.



The speaker provided a clear comparison between **Flatness** and **Parallelism**, two commonly confused GD&T controls.

Flatness controls the form of a surface without reference to any datum. **Parallelism** controls the orientation of a surface or axis relative to a datum. Through practical examples, he explained when flatness is sufficient and when parallelism must be specified to ensure correct assembly and performance of components.





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Mr. Dileep further compared **Parallelism** and **Position** tolerances. He explained that while parallelism ensures correct orientation, it does not control the exact location of a feature. **Parallelism** controls orientation only. **Position** controls the exact location of a feature relative to datums. This distinction was explained with industrial examples, highlighting how improper use of these controls can lead to functional issues in assemblies.

Parallelism vs Position

Parallelism and position are often used interchangeably — but they control very different things. Using the wrong one can create inspection confusion and assembly issues. Here's how to tell them apart.

Parallelism

- ✓ Controls orientation only
- ✓ Requires a datum
- ✓ Does NOT control location

Use parallelism when you care about:

- Alignment between surfaces
- Consistent spacing
- Load distribution

Parallelism answers:

- "Is this feature parallel to the datum?"

Position

- ✓ Controls location (and orientation)
- ✓ Uses a tolerance zone
- ✓ Ideal for locating holes and pins

Position answers:

- "Is this feature where it needs to be?"

Parallelism vs Position — Know the Difference.

Parallelism

- Controls alignment only

Position

- Controls location & orientation

Alignment ≠ Location.

Common Mistake

Using parallelism to control hole location. Parallelism can keep a hole straight — but it won't stop it from being in the wrong place.

Key Takeaway

- Parallelism = alignment
- Position = location

A significant portion of the lecture focused on **True Position**, which Mr. Dileep described as the most misunderstood GD&T symbol. He explained that true position defines a tolerance zone within which the axis or center of a feature must lie. Using diagrams and examples, he clarified common misconceptions and showed how position tolerance helps in ensuring assembly fit, functional alignment, and manufacturing flexibility.

True Position — The Most Misunderstood GD&T Symbol

Clarifying the power and purpose of Geometric Dimensioning & Tolerancing (GD&T)

1. What True Position Controls

- Location
- Orientation
- Form

2. Where it's used

- Hole Patterns
- Bosses
- Brackets

3. Why it's powerful

- Simplified Tolerance
- MMC Bonus
- Assembly Reliability



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The concepts of **Maximum Material Condition (MMC)** and **Least Material Condition (LMC)** were explained in detail. Mr. Dileep discussed how MMC and LMC are used to allow bonus tolerances and improve manufacturability without compromising functionality. He emphasized their importance in aerospace and precision engineering applications, where both safety and cost optimization are critical.

Runout vs Total Runout - Know the Difference.
Understanding GD&T: Circular Variations, Entire Surface Control on a Rotating Part.

Runout (Circular)
Local control
Checks form and orientation variation of a single cross-section along its length. Does not control taper or end position.

Total Runout (Cylindrical)
Full surface control
Checks form, orientation, taper, and axial position variation over the entire surface during rotation.

Key Takeaway: Runout controls a single slice. Total Runout controls the entire surface simultaneously.

Common Mistake:
Using runout when total runout is required — and then wondering why vibration or wear issues still exist.

Key Takeaway:
Runout → local control
Total runout → full-surface control

One real-world example of why total runout is critical for rotating shafts. A part can pass circular runout at a single section, yet still cause vibration at operating RPM because the bearing interacts with the entire shaft length, not just one measured slice. Total runout captures cumulative form, orientation, and alignment errors along the full surface—making it far more critical for functional performance in engine and gearbox applications. Thanks for sharing this!

A **datum feature** is an actual physical feature on a part, such as a surface, hole, or axis, which is used to establish a datum. Datum features are selected based on functional requirements and assembly conditions.

Types of Datum

Primary Datum	Secondary datum	Tertiary Datum
Datum defined with a minimum 3-point contact	Datum defined with minimum 2-point contact	Datum defined with minimum 1 point contact

Datum Order Matters More Than You Think

Datum Order ABC (Functional Assembly)
Datum A (Primary Constraint) → Datum B (Secondary Constraint) → Datum C (Tertiary Constraint)

Datum Order BAC (Different Inspections)
Datum B (Primary Constraint) → Datum A (Secondary Constraint) → Datum C (Tertiary Constraint)

What Datum Order Means

- Primary datum → first point of contact
- Secondary datum → controls orientation
- Tertiary datum → locks final position

Same part. Same tolerance. Different results.

The session concluded with an interactive discussion, where students actively asked questions related to GD&T applications, career relevance, and industry expectations. The lecture helped students:

- Understand GD&T from an industry perspective.
- Interpret GD&T symbols with clarity.
- Relate theoretical concepts to practical applications.
- Appreciate the importance of GD&T in high-precision industries.

The guest lecture on “*Overview of GD&T in an Industry Perspective*” was highly informative and beneficial to B.Tech Mechanical Engineering students. Mr. Dileep Kotte’s industry-oriented approach, practical examples, and simple analogies made complex GD&T concepts easy to understand.

The session successfully enhanced students’ knowledge and awareness of GD&T practices used in industry and motivated them to develop strong fundamentals essential for careers in manufacturing, design, and aerospace engineering.

Few students asked questions and interacted with speaker and then K. Eesha (2300079018) delivered Vote of Thanks to the speaker.

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