



# The Micrometer

AUCKLAND SOCIETY OF MODEL ENGINEERS INC. | Issue 697 | [www.asme.org.nz](http://www.asme.org.nz)

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## *Inside this issue*

**Presidents Report** - January 2024 – Big year ahead what is coming our way

**Clubs Monthly Calendar** – What’s on near you.

**Train Roster** – Are you Next?

**What Is GD&T** – Improve your Drafting

## *Presidents Report*

Hello everyone

I hope that everyone has had a fantastic holiday and had enough time to recharge their batteries. Work on the track has continued during the Christmas period with further work on the subway bridge.

Recently we've also started a Facebook page so as to help spread awareness of our society and to hopefully help boost our membership to help with the Sunday running's so that we can spread the load of working around. You can find it by [clicking on this link here](#). I am well aware that many of our members do not have Facebook and as such, I won't be forcing anyone to get it. However for anyone that uses Facebook, it would be of great benefit to us for you to join!

Cameron Billiau has stepped in to help with the Micrometer publishing and has done some considerable work on redesigning it to bring it up to a new standard, so feedback on the improved quality would be appreciated.

Thanks

Philip Dowdeswell

## *This Month's Calendar*

Tuesday, February 6 <sup>th</sup>	7:30 pm	General Meeting, (Clubhouse) + Second Half of Murray Granger workshop Auction.
Tuesday, February 13 <sup>th</sup>	7:30 pm	Workshop Night, (Clubhouse)
<i>Tuesday, Febuary 20<sup>th</sup></i>	<i>7:30 pm</i>	<i>Committee Meeting</i>

# Train Roster



Date	Electric Driver	Electric Driver	Steam Driver	Train Controller	Station Guard 1	Station Guard 2
4-Feb-24	J Lankow	C Whitisie	Voluntary	<u>T Lawrence</u>	M Vickers*	H Dando
11-Feb-24	M Moore	R Reichardt	Voluntary	<u>S Meikle</u>	R Crook*	B Leung
18-Feb-24	I Ashley	B Matchett	Voluntary	<u>G Wills</u>	M Luxton*	C Whitisie
25-Feb-24	R Shearer	A Van Zon	Voluntary	<u>B Aickin</u>	R Souter*	B Matchett
10:30AM						
3-Mar-24	R Reichardt	B Matchett	Voluntary	<u>P Dowdeswell</u>	R Crook*	S Watson
1:30PM						
3-Mar-24	I Ashley	R Shearer	Voluntary	<u>P Dowdeswell</u>	C Billiau*	H Dando
10-Mar-24	D Housley	J Lankow	Voluntary	<u>D black</u>	M Luxton*	B Leung
17-Mar-24	M Moore	A Van Zon	Voluntary	<u>T Lawrence</u>	R Souter*	K Ryan
24-Mar-24	R Reichardt	M Vickers	Voluntary	<u>S Meikle</u>	B Matchett*	C Billiau
31-Mar-24	I Ashley	C Whitiskie	Voluntary	<u>G Wills</u>	S Watson*	H Dando

## Please Note:

If for some reason you are unable to attend on your rostered date, you are respectfully reminded that it is your responsibility to find a replacement member to fill the gap – please don't let the rest of the team for the day be left short-handed.

Note: The Train Controllers for both affected days must be informed of the swap in advance. It is the responsibility of the person who initiated the swap to do this. Also advise Bob Aickin who is keeping track of the number of duties each of us perform during the year

# Club Notices

## ***Model Engineering Journals***

ASME has an extensive range of Model Engineering Journals (ME and MEW) in the library, managed by Mark Luxton. The collection goes back to the first editions. However as new copies arrive binding takes a while, so the latest may not available for a while.

If you would like to read the latest edition they are free to borrow electronically from Auckland Public Libraries. The easiest way to borrow them is using the LIBBY app. If you are a member of the Auckland Library System (anywhere in the SuperCity), this gives free access to an ME and MEW e-sub. If you encounter difficulties take your device (an iPad is ideal) into any Auckland Library Branch.

Please let the editor know if you have been using this service successfully, or have encountered any difficulties.

## ***Beejax Castings***

One of our new members – Stephen Watson needs a new project!

He has just finished a Stationary Steam engine.

He maybe interested building a loco.

Please contact Greville or the secretary (Dave)

## Bits and Pieces

Mike Jack brought more castings for his 5" gauge model of the BR Std Class 3MT 2-6-2 Tank locomotive. These tubes make up the balance pipe between the two side tanks. They are located under the footplate floor so they need to go in before the reverser can be mounted as it mounts to an extension of the left-hand tank.

These castings were designed from the original works drawing for the full-size locomotive and were produced from direct wax printed patterns for investment casting. These were done several years ago and failed in casting.

The core of investment material was too long in relation to its cross section which makes it vulnerable to breakage when the molten metal is poured into the mould; it can break and dislodge the core with it resting against the side of the mould, creating a hole through the side.

The engineering solution was to add in "core prints" to support the core. This gives the core more strength but also leaves holes through the casting. These holes are plugged with discs of bronze, silver soldered in place. These plugs are doing the same thing as the "frost plugs" in a car's engine block.



### Did You Know?

**Investment casting** is an industrial process based on lost-wax casting, one of the oldest known metal-forming techniques.

Investment casting has been used in various forms for the last 5,000 years. In its earliest forms, beeswax was used to form patterns necessary for the casting process.

## Bits and Pieces



Mike Banks tabled a fragment of wing skin from a Boeing 767 (ZK-NBJ) which shows the grain of the

alloy. This aircraft had been written off by Air New Zealand as it had been replaced and had no value

on the second-hand aircraft market. Its wings were removed and the body is now used for fire

fighting training at Mangere Airport.



Mike Moore showed a sample bottle of crude oil sourced from the Maui No.1 well. These bottles

were donated to the Rotary Club to be used to raise funds. The contents is generally thick and

grease-like with some more volatile components having separated into liquid

## Bits and Pieces



Mike Moore showed an example of a FonaDek. These were popular in the 1970's to convert an

existing telephone into a speaker 'phone. The telephone's handset was placed in the cradle and the

incoming signal to the speaker was picked up by an induction coil and amplified then played through

the speaker, which could be placed remotely. The handset's transmitter was positioned in an

acoustical cavity to enhance the sound coming from the person sitting at a desk.

# What is GD&T

Have you ever spent countless hours pondering how to accurately dimension a drawing or convey critical design information to a workshop only to have your part not turn out how you envisaged?

In this series we will dive into the world of GD&T and how you can apply it to your drafting.

Written by: Cameron Billiau

GD&T stands for **Geometric Dimensioning and Tolerancing**. It is a system used in engineering and manufacturing to communicate and control the dimensional and geometric specifications of a part.

GD&T is a symbolic language that allows engineers, designers, and manufacturers to convey information about the size, form, orientation, and location of features on a part.

The traditional methods of dimensioning and tolerancing involve specifying dimensions and tolerances individually for each feature on a drawing. GD&T, on the other hand, provides a more comprehensive and systematic approach by using symbols to convey information about the relationships between features. This can lead to clearer communication, better understanding of design intent, and improved interchangeability of parts.

The key components of GD&T found on drawings include:

1. **Datums:** Reference surfaces or points used as a basis for measurements and tolerances.
2. **Symbols:** Special symbols used to indicate specific geometric controls, such as flatness, parallelism, perpendicularity, concentricity, and more.
3. **Feature Control Frames:** A box of symbols and values used to specify the geometric characteristics of a feature.
4. **Modifiers:** Additional symbols or annotations used to modify the tolerance applied to a feature.

GD&T is applied to drawings in accordance with international standards, such as the ASME Y14.5 standard used in the United States, or the ISO 8015 (most common) and/or ISO 1101.

To ensure consistency and compatibility across different manufacturing processes and industries. The use of GD&T helps to achieve more precise and functional designs, reducing the need for overly tight tolerances and promoting cost-effective manufacturing.

In this series we will refer to the ASME Y14.5 – 2009 standard, breaking it down and improving your drafting.



# What is GD&T

So, let's start breaking it all down! In the following series we will refer/use in some terminology and a coordinate system in figure 1. This system is often referred to as the right-hand rule figure 2. What this means is on your drawing when facing a part directly, Z axis is going out the page towards you

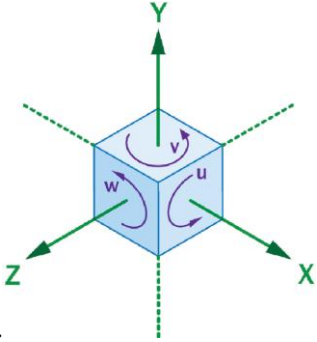


Figure 1

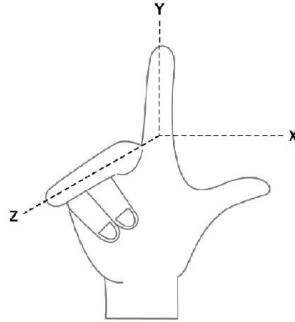


Figure 2

In a 3D space we have three axis X, Y, and Z. These are considered translational degrees of freedom. However, rotation about the axis is considered a rotational translation and are named U, V, and W. These form what is termed the "Six Degrees of Freedom".

Any part that has been drafted will have features such as a tapped hole, a chamfer or keyway etc. All these "features" must be controlled in relation to the part geometry and a set of datums. These Datums will be orientated with respect to these axis's.

The "Features" of a part may be a surface, axis, plane, or derived element. It is these elements that GD&T symbols are controlling on your drawing. This is not to be confused with "Datum Feature" This will be discussed later.

The acronym GD&T the **G** stands for "Geometric Tolerance". A geometric tolerance is a tolerance on the Form, Orientation, Location, Profile or Runout of a part. This is differentiated from a size or dimensional tolerance. A size or dimensional tolerance is a tolerance of size that is placed on a feature that has a size dimension. This is the **D** in GD&T. It can be as simple as height, width, thickness, depth, diameter, radius, or angle. Both the **G** and the **D** work together to fully set the manufacturing limits on your drawing and form the tolerance, The **T** in GD&T

# What is GD&T

The first dimension you may see on a drawing is the "Basic Dimension".

Basic dimensions in the ASME Y14.5 – 2009 standard are defined as Theoretically exact dimensions. The biggest thing to note is they DO NOT have a dimensional tolerance. They set the perfect location of the exact or true profile, position, angle or measurement location. Geometric symbols are then used to control the manufacturing tolerances. Figure 3 is a basic dimension. You will mainly find it used with Angularity, Position, Profile, and Datum Target symbols. A basic dimension can be spotted on a drawing as a dimensional size such as 30mm inside a square box. Figure 4 shows the use of a basic dimension on a simple square part



Figure 3 – A basic Dimension

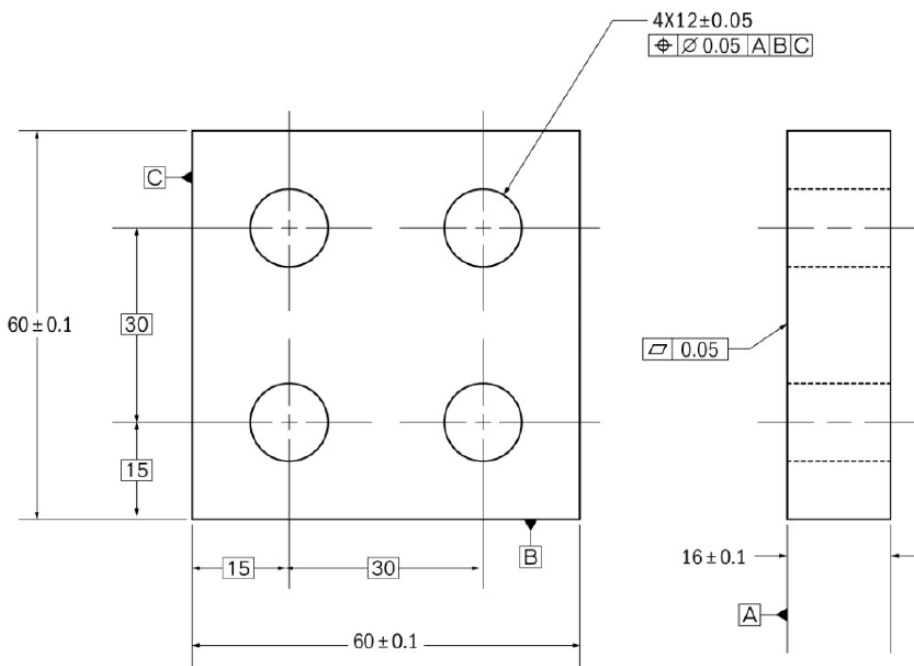


Figure 4 – Four instances of the use of a Basic dimension.

In the next article we will dive into the main rules of ASME Y14.5 – 2009 and start to look at the envelope principal and start introducing more feature controls. Stay tuned.

# Sales and Wanted to Buy

*For Sale:*

## Passenger Bogies:

**Description:** Pair of bogies for a 7 1/2" gauge rail. Both are ground level trollies with a hand operated brake on both. The red rocket is 2m long with plush grey interior seating. The sportier mellow yellow bogie is a cosy 1.14m long sporting black seating.

**Price:** Make a Reasonable Offer

Contact: Greville Wills (09) 411 5092 or [gandj@actrix.co.nz](mailto:gandj@actrix.co.nz)

## Photos:



## *Wanted to Buy:*

Got something you need or want. Email you add to the editor before months end to get a spot in the next Micrometer.