The Micrometer

AUCKLAND SOCIETY OF MODEL ENGINEERS INC. | Issue 698 | www.asme.org.nz

Contacts

Mailing address: PO Box 14570, Panmure, Auckland 1072, New Zealand

Club House: Peterson Reserve, Mt Wellington, Auckland 1060

Tel: 09 570 5196

President	Philip Dowdeswell	021 296 5196
	E-mail Address:	president@asme.org.nz
Secretary	Dave Housley	09 576 3923
	E-mail Address:	info@asme.org.nz
Editor	Cameron Billiau	020 416 622 2796
	E-mail Address:	editor@asme.org.nz
Boiler Inspectors	Mike Banks	020 4001 8366
	Mike Orange	021 137 3464

Inside this issue

Presidents Report

Hello everyone

After a day of tidying up, prepping the tracks and making sure we were all ready for the Panmure Basin Day Festival… The rain came and said dashed our plans. So instead we relaxed, discussed many topics and ate a great lunch together. The festival has been postponed till April 14 th , so it'll be the same thing as what we expected today, only a month later.

Due to rising costs, the committee has made the decision to raise the price of our badges. Originally they were $2 per badge for customers. The new price is now $3 per badge or $5 for two badges. This increase in price is only due to increased costs from our suppliers.

The computer in the club room has been replaced as it failed late last year. Anyone is welcome to use it in order to display content on the projector screen.

I hope everyone has a good weekend and I look forward to seeing everyone at the next general meeting!

Thanks

Philip Dowdeswell

ASME President

This Month's Calendar

Tuesday, March 5th	7:30 pm	General Meeting, (Clubhouse)
Tuesday, March 12th	7:30 pm	Workshop Night, (Clubhouse)
Tuesday, March 19th	7:30 pm	Committee Meeting

Train Roster

	DATE	Electric Driver	Electric Driver	Steam Driver	Train Controller	Station Guard	Station Guard
	10-Mar-24	D Housley	J Lankow	Voluntary	**D Black**	**C Billiau***	B Leung
	17-Mar-24	M Moore	A Van Zon	Voluntary	**T Lawrence**	**M Luxton***	K Ryan
	24-Mar-24	R Reichardt	M Vickers	Voluntary	**S Meikle**	**R Souter***	C Billiau
	31-Mar-24	I Ashley	C Whitiskie	Voluntary	**G Wills**	**B Matchett***	H Dando
	7-Apr-24	D Housley	B Matchett	Voluntary	**B Aickin**	**S Watson***	B Leung
1030am	14-Apr-24	R Reichardt	B Matchett	Voluntary	**P Dowdeswell**	**M Luxton***	S Watson
1:30pm	14-Apr-24	J Lankow	R Shearer	Voluntary	**P Dowdeswell**	**R Crook***	S Watson
	21-Apr-24	M Moore	A Van Zon	Voluntary	**D Black**	**K Ryan***	B Matchett
	28-Apr-24	R Reichardt	M Vickers	Voluntary	**T Lawrence**	**R Souter***	C Whitisie

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)

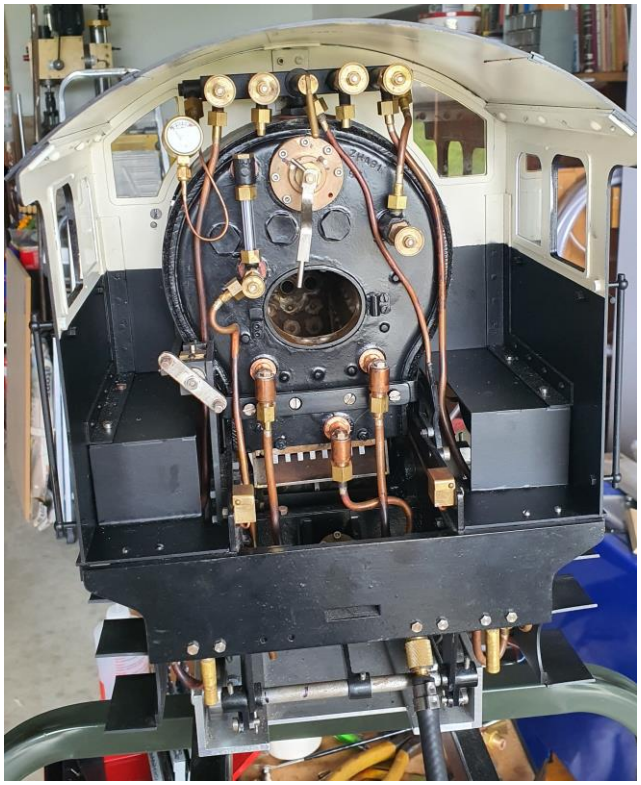
Bits and Pieces

At the end of last year (2023) workshop night was held in the workshop at the club. Members discussed the large lathe and it's controls various tooling types, speeds and feeds and generally getting to know the beast. We have a job ready for it in the New Year So we will put it and Steve Watson to the test!

The lads bought in an array of items first the block Steve is wanting to turn down, and I am sure we will all see the results in the coming year. Martin Plant brought in a clack valve that he turned up in brass to see if he could it turned out fine so he made the other components in stainless to finish off his Springbok after a on off build period of twenty years but was too big to present so photos will have to do. It runs smoothly on air just waiting to get some steam in. Steve Watson brought in a couple of screw jacks he built and had not done a bad job of internal and external screw cutting.

Dave Housley

Bits and Pieces



Bits and Pieces

Dave Housley bought in his fixture that he will be employing to make his conrods for his big steamer. The fixture retained the blank conrods and coupled rods allowing them to be machined on the mill. From his pictures you can see how he delicately holds the rods and can machine in any plane. Dave informed me he stabbed round the radius and finished them off by hand with a file as his works round table was in use.

Bits and Pieces

Roger S decided to bring in some of his takings from the Auction held earlier in February. With so much to show and tell we were treated to about 200+ M5 nylock nuts. So, I am sure if you need a nylock nut Roger is your man.

DID YOU KNOW?

Metric thread development started in Switzerland in 1876 with a metric thread with an angle of 47.5 degrees developed for the clock screw market by professor Thury. This was followed in Germany in 1894 by Leopold Loewenherz who designed a thread with a flank angle of 53 degrees 8 minutes. A metric standard thread evolved from these Swiss and German threads that were agreed but not formalised by the American, British and French in 1919. Metric threads are based upon a 60-degree flank angle with flat crests and rounded roots**.** It was not until 1947 with the re-founding of the International Standards Organisation (ISO) that further development took place eventually leading to the promotion of the ISO standard metric thread in 1960.

What is GD&T Part 2

Have you ever spent countless hours pondering how to accurately dimension a drawing or convey critical design information to a workshop only to have you loco 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 you drafting.

Written by: Cameron Billiau

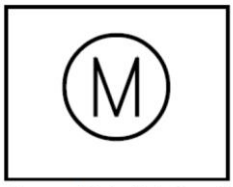
GD&T stands for **Geometric Dimensioning and Tolerancing**. It is a system used in engineering and manufacturing to communicate and control the dimensional and geometric specifications of a part.

So where can you apply these controls? GD&T can apply to two different types of features on a design drawing.

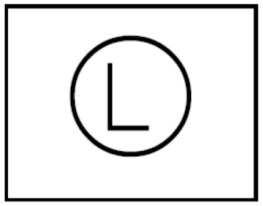
1. Surface features – This is a surface with no dimensions
2. Features of Size – Any feature or section that has dimensional size to it.

When designing your creation, you may think to yourself that it has many "Features of size" and they can be both internal and externally to the part. Think a spigot vs a bored hole for example. For the purpose of GD&T features of size that are created internally are called "Internal Features" and are defined by the standard as a lack of material i.e. Hole or slot. Quickly you can probably guess how external features are defined? That's right, By the presence of material like a pin or a spigot.

If you have seen many well drawn designs, you may have seen a dimension having a + or – tolerance on it for size. Good GD&T on your drafting will take that one step further. A very important symbol you may see on a feature control frame is:



Maximum Material Condition



Least Material Condition

What is GD&T

As an example of where you will see this symbol is demonstrated in *figure 1* with it being used to apply a least material control to a dimension of a hole of diameter of 24mm. Now where is this least material symbol you ask? It is in a box called a "Feature Control Frame". So, before we go further a feature control frame associated with a dimension will usually be positioned directly below the dimension it is associated with. It will control a condition of the feature and then its limits and then reference that to a datum, as seen in *Figure 1*.

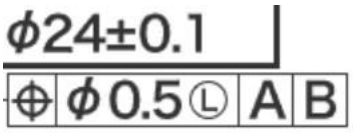


Figure 1

So, for the people now thinking "Hey, Does the material condition vary for each feature type?" Yes, it does. This is where it can get tricky as yes it does invert!
The following table highlights how you may use each material condition on an external or internal feature.

	Maximum Material Condition	**Least material condition**
Internal Feature	Smallest Dimension	**Largest Dimension**
External Feature	**Largest Dimension**	Smallest Dimension

So, to wrap your head around this let's say you had a 24mm diameter hole drilled in some plate *Figure 2*. This drill hole is an internal Feature of size. Thus, if you wanted to add a Least material condition the hole would have to meet the condition specified at its largest dimension in our case 24.1mm. So, this does mean if your hole falls on the smaller dimension of 23.9mm your geometric tolerance increases! This can be often referred to as "bonus tolerance".

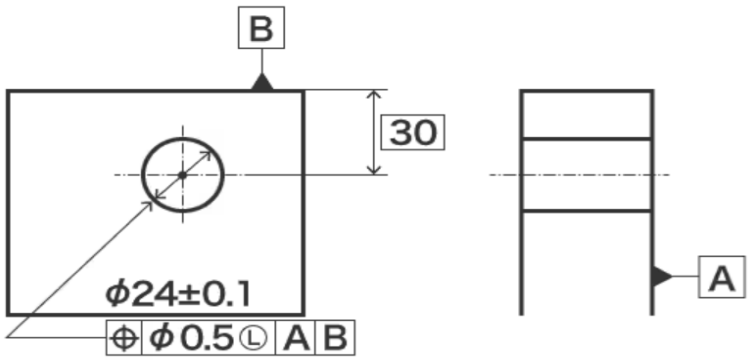


Figure 2

What is GD&T

So, before we break down the least material condition more let's have a quick look at all the parts of a material control frame as seen in *Figure 3*.

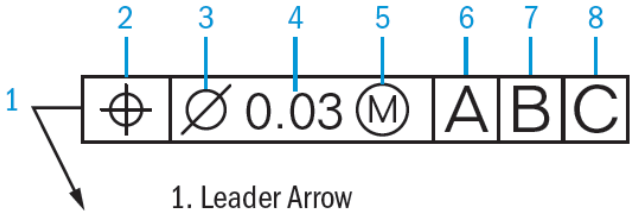


Figure 3

1. Leader Arrow
2. Geometric control symbol
3. Diameter symbol
4. Geometric Tolerance
5. Modifier/Feature of Size
6. Primary Datum
7. Secondary Datum
8. Tertiary Datum

So, all these parts of the feature control frame come together to tell you all you need to know about your control. So, lets take it back a step to Figure 2 and break down what's happening. Imagine the hole on your plate is drilled exactly 24.1mm. This would be the "Least" material condition. At this point you would want good geometric control as the hole moves position the edge distance of 30mm from datum B gets thinner and could lead to failure of the part. So in Figure 2 we see the feature control frame under the hole size. The control symbol is a position call out. From this we know we are trying to control the position. We see it is calling for the least material condition and at this condition we want a positional tolerance of 0.5mm. This is measured in regards to datum A and B. Thus, the hole can't be off datum A or B more than 0.5mm when the hole is 24.1mm in diameter.

So in summing up what if the hole was drilled 23.9mm in diameter. This places the hole on the MMC or Maximum Material Condition. So, what you gain is more freedom in the hole position. To calculate this you do the following:

Bonus Tolerance = Hole Diameter at LMC – Hole Diameter at MMC.

In our example this gives us 0.2mm. Adding this to the original tolerance of 0.5mm you can see we can have a the hole now off position 0.7mm but it still passes as the hole falls within the tolerance envelope required.

Depending on your design this small extra tolerance gained can make your manufacture of parts easier and you know they will still fit and function at the end of the day.

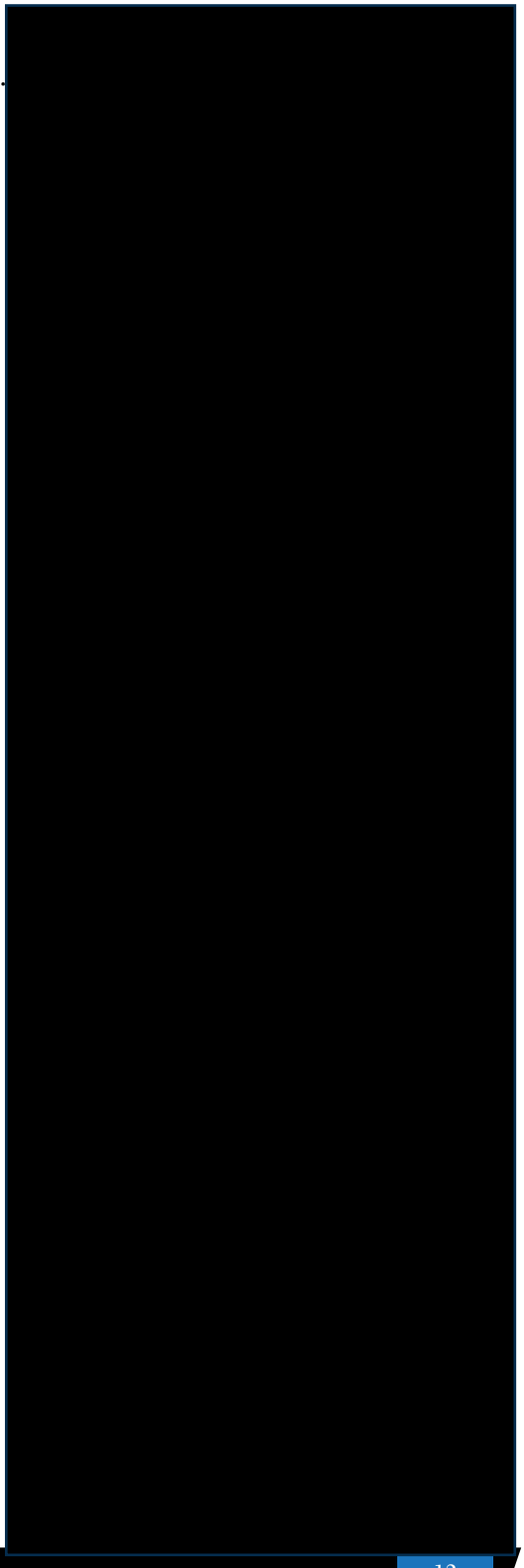
What is GD&T

When you are looking at a drawing or designing a part. Least Material Condition is rarely used. In GD&T it is quite hard to design go-no go gauges for Least material condition. You will more often see Most Material Condition. I hope by explaining the rare form you have a good understanding of how the tolerance zone can affect the position of a feature and even if off position can still be a good part.
In figure 2 if the hole had no GD&T call out the hole could be drilled within 0.1mm however if not drilled exactly 30mm from the edge the part would be deemed scrap. Waste would be high.

Thus GD&T is an important part of the design process and is Critical in making assemblies that fit and can be easily manufactured.

In the next part we will start to go over different symbols and there use on a drawing and hopefully give you insight to start applying GD&T to your own drawings and getting better results.

Cameron Billiau



Sales and Wanted to Buy

For Sale:

Passenger Bogies:

Description: Pair of bogies for a 7 ½" 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

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.