UKMA news

The newsletter of the UK Metric Association
Campaigning for a **single** *rational* system of measurement

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Editorial, by John Austin

The AGM and Annual Conference of the UKMA took place on 2 July. As in recent years it was held using Zoom and was well attended. Two of our patrons attended (one in person and one in a recorded interview). Both these speakers as well as the other presentations in the Annual Conference stimulated widespread debate. A summary of the proceedings is included under Association news.

As most readers will be aware, the UKMA, along with many other organisations, is concerned about the impact of government regulations, on measurements in business. As discussed in previous Newsletters, this has been manifested in the REUL Bill, now REUL Act as it received Royal Assent on 30 June. You may recall that the bill was designed to eliminate all EU laws from the statutes except for specific laws which would be exempted at the discretion of ministers. This widely-condemned bill has now been modified and while the bill is a significant improvement on the original version, it is still unclear exactly what the implications for UK measurement units will be. A summary of this Act, as well as the Government unit of measurement survey is described under the UKMA Secretary's report.

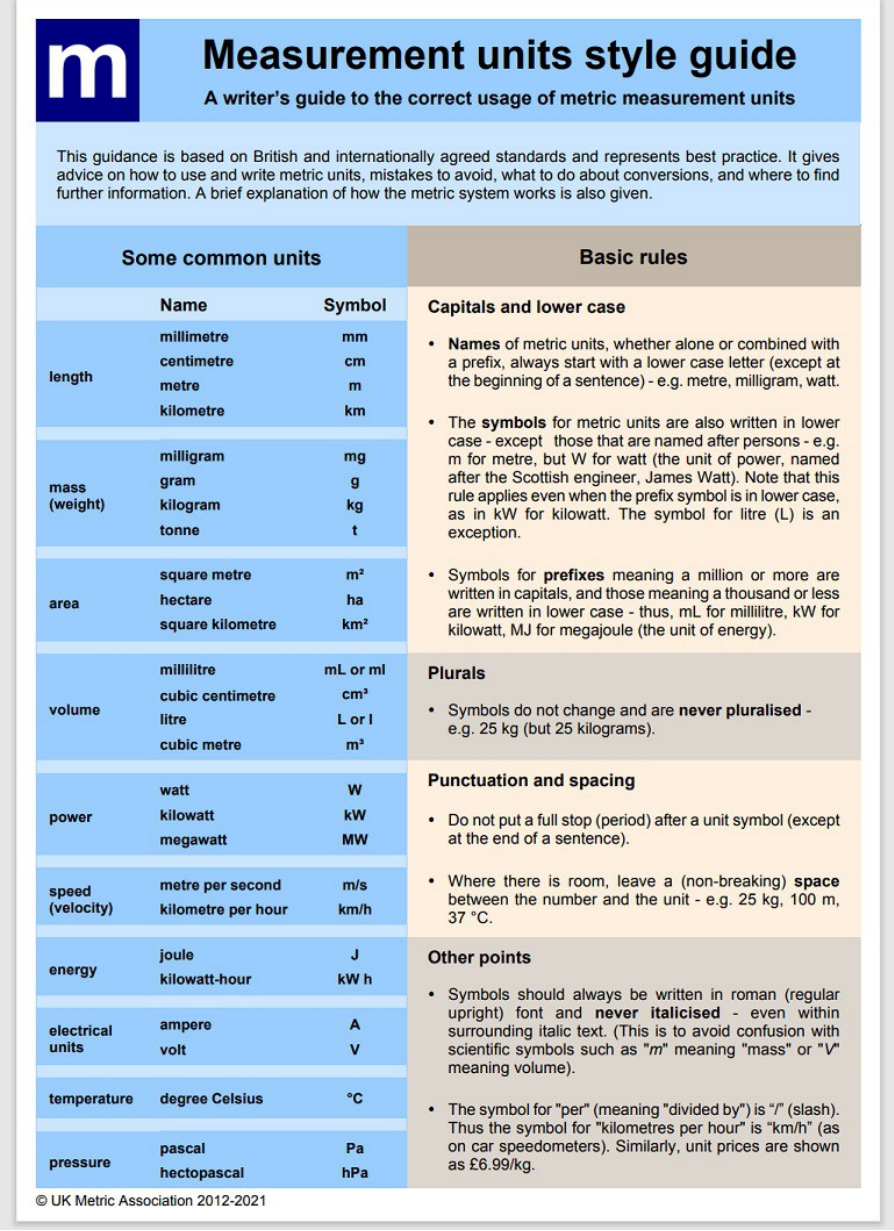
As an organisation, one of our main goal is to provide metric information, which the UKMA does with its websites. Robin Paice, a previous UKMA chair, has been reviewing the style guides published by UKMA to see what their impact has been. It is clear in recent times that journalists are not familiar with these guidelines, or choose to ignore them. Ronnie Cohen wrote follow-on articles suggesting why style guides are not being followed in full. The Metric Views articles are here reproduced in view of their importance in addressing UKMA goals. Extending this theme, I write here about a plumbing website visited which doesn't put demonstrate a clear understanding of imperial and metric units and appears to confuse energy with power. These thoughts are augmented by the usual horror stories of metric and imperial units and signs.

Metric Style Guide – has it had any effect?, by Robin Paice first published in Metricviews

It is now more than 10 years since UKMA published its “Metric Style Guide”, of which I was the editor and principal author. It was aimed particularly at any writers (including professional writers) who occasionally need to use measurement units, but it was hoped that it might also influence the way measurement units are taught both at school and in post-16 education and training.

A possible further objective was that it might lead to an increase in metric usage, especially in the media. A copy of the Guide can be downloaded from this link.

https://ukmetric.files.wordpress.com/2021/03/ukma-style-guide-2021.pdf



Measurement units style guide

A writer's guide to the correct usage of metric measurement units

This guidance is based on British and internationally agreed standards and represents best practice. It gives advice on how to use and write metric units, mistakes to avoid, what to do about conversions, and where to find further information. A brief explanation of how the metric system works is also given.

Some common units

	Name	Symbol
length	millimetre	mm
	centimetre	cm
	metre	m
	kilometre	km
mass (weight)	milligram	mg
	gram	g
	kilogram	kg
	tonne	t
area	square metre	m²
	hectare	ha
	square kilometre	km²
volume	millilitre	mL or ml
	cubic centimetre	cm³
	litre	L or l
	cubic metre	m³
power	watt	W
	kilowatt	kW
	megawatt	MW
speed (velocity)	metre per second	m/s
	kilometre per hour	km/h
energy	joule	J
	kilowatt-hour	kW h
electrical units	ampere	A
	volt	V
temperature	degree Celsius	°C
pressure	pascal	Pa
	hectopascal	hPa

Basic rules

Capitals and lower case

- **Names** of metric units, whether alone or combined with a prefix, always start with a lower case letter (except at the beginning of a sentence) - e.g. metre, milligram, watt.
- The **symbols** for metric units are also written in lower case - except those that are named after persons - e.g. m for metre, but W for watt (the unit of power, named after the Scottish engineer, James Watt). Note that this rule applies even when the prefix symbol is in lower case, as in kW for kilowatt. The symbol for litre (L) is an exception.
- Symbols for **prefixes** meaning a million or more are written in capitals, and those meaning a thousand or less are written in lower case - thus, mL for millilitre, kW for kilowatt, MJ for megajoule (the unit of energy).

Plurals

- Symbols do not change and are **never pluralised** - e.g. 25 kg (but 25 kilograms).

Punctuation and spacing

- Do not put a full stop (period) after a unit symbol (except at the end of a sentence).
- Where there is room, leave a (non-breaking) **space** between the number and the unit - e.g. 25 kg, 100 m, 37 °C.

Other points

- Symbols should always be written in roman (regular upright) font and **never italicised** - even within surrounding italic text. (This is to avoid confusion with scientific symbols such as "*m*" meaning "mass" or "*V*" meaning volume).
- The symbol for "per" (meaning "divided by") is "/" (slash). Thus the symbol for "kilometres per hour" is "km/h" (as on car speedometers). Similarly, unit prices are shown as £6.99/kg.

So has it had any effect? Has there been any improvement in the way SI units are written – whether by novelists, English teachers, journalists, website editors, advertisers, tradesmen or the general public? Have metric units become more common?

As far as I know, there have been no published surveys that could answer these questions definitively, so all I can do is give my own personal observations. However, I should point out that, as a Guardian, Economist and FT reader and a Radio 4 listener, my experience is unlikely to be typical.

Newspaper and Broadcaster Style Guides

First of all, I took a look at various newspaper and broadcasters' style guides to see how they now deal with the issue of measurement units. Here are some examples.

The **BBC** is the subject of numerous complaints by UKMA members. Many of these complaints can be traced to the BBC's style guide and/or its failure to monitor and enforce compliance with its guide. The BBC recommends using both metric and imperial units but unfortunately it recommends using imperial first in both US and UK stories (with a metric equivalent in brackets). The BBC guide fails to appreciate the distinction between an abbreviation and a symbol and contradicts the BIPM rule that there should be a gap between number and unit. Infuriatingly, it recommends the clumsy abbreviation sq m rather than the SI symbol m². As the BBC's mission is to "inform, educate and entertain" it is especially disappointing that it sets such a bad example. Complaints to BBC editors are invariably met with a standard response defending the Corporation's policy, which they claim (unconvincingly) is to use the measurement units best understood by their target audience.
https://www.bbc.co.uk/newsstyleguide/numbers/#weightsandmeasures

The **Guardian** newspaper's style guide is (scroll down to "metric system") is one of the best, but it is inconsistent about the gap between number and unit:
https://www.theguardian.com/guardian-observer-style-guide-m#metricsystem

The official **Government** style guide can be found under Government Digital Service at this webpage: https://www.gov.uk/guidance/style-guide/a-to-z-of-gov-uk-style It is very brief but again it contradicts the BIPM rule on leaving a space between number and unit. Indeed, it appears to suggest that there should be two different rules – one for scientists and engineers, and another rule for the general reader. It also fails to appreciate the difference between an abbreviation and a symbol.

The **Economist** Style Guide
https://cdn.static-economist.com/sites/default/files/store/Style_Guide_2015.pdf
is probably the most authoritative and well respected, and the latest edition can be purchased as a printed book. It is well worth reading the introduction to Part 1 "The Essence of Style", and I wish all writers followed it. However, its section on "Measures" in Part 3 (Useful Reference) has a number of flaws:
https://ia903106.us.archive.org/33/items/EconomistBooksTheEconomistStyleGuideTheEconomistPublicAffairs2015/%28Economist%20Books%29%20The%20Economist-Style%20guide-The%20Economist_PublicAffairs%20%282015%29.pdf

In particular it consistently omits the gap between number and unit symbol, and under "Abbreviations" it advocates "kph" rather than the correct "km/h and "cu m" rather than "m³".
So what effect has UKMA's Style Guide had on the media and their own individual style guides? Sadly, I have to conclude that its effect has been negligible or nil. The basic problem is that journalists (both print and broadcasters) believe that they have a special skill in making stories readable for the general public. They do not respect the authority of the International Bureau of Weights and Measures (BIPM) and are unwilling to listen to criticism from non-journalists. They think they know best.

What I found particularly deplorable was the Government website that flatly contradicted the rule that there should be a space between the number and the unit symbol.

More generally, I can't say that I have noticed very much – if any – change in the way measurement units are written in newspapers, websites, advertisements or product descriptions

(but, as I said at the beginning, I have little knowledge of popular newspapers or television programmes).

The teaching of measurement units

It is well known that the teaching of SI units became mandatory in English state schools in 1974. In fact, although not compulsory, it had been taught in some schools for many years before that, and MKS units featured in GCE O-level examination papers in the 1950s. SI units are now incorporated in the National Curriculum, as illustrated in the link to the 2021 version for 10–11 year-olds below (scroll down to "Measurement"):
https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study/national-curriculum-in-england-mathematics-programmes-of-study#upper-key-stage-2—years-5-and-6

What is particularly noticeable is that there is still a requirement to convert to and from imperial units, and nothing is said about the correct **writing** of SI units.

In any case, the National Curriculum is only compulsory for Council-controlled schools, whereas state-funded academies as well as independent schools are exempt.

Suggestions for UKMA's committee

Although the above account is disappointing, I think there are some things that UKMA might be able to do to try to improve the situation.

Firstly, BIPM itself. BIPM was established under international treaty and is widely respected in the scientific community. However, its authority over the writing of measurement units is clearly not accepted by many media outlets (including the BBC and the UK government, as we have seen). I think BIPM needs to do more to promote itself and to persuade the authors of style guides to adopt the international standard. I would therefore suggest that UKMA should write to BIPM, quoting the examples above, and asking them to be more active in promoting the agreed rules.

Secondly, UKMA could repeat the exercise that was undertaken when its own style guide was published in 2021. That is, it could write to key media outlets and authorities (such as those quoted above and including the BBC and the Government Digital Service) commenting on the mistakes and inconsistencies in their own style guides and asking them to amend them and adopt the recommendations of UKMA's Guide. (This would need to be phrased very diplomatically as journalists believe that they are the experts in making scientific or bureaucratic gobbledegook intelligible to the general reader – and they are likely to resent criticism and respond defensively).

Thirdly, it might be possible to tackle the problem at source – the way in which measurement units are taught (or not properly taught) at school, college and university. UKMA could approach relevant authorities, such as the examination boards, professional institutes, subject teaching associations etc requesting them to give greater emphasis to correct usage and writing of SI units.

Ed.: *Robin's article in Metric Views has already stimulated a good discussion in only a short time. Some explanation for the style guide not being followed has been developed by Ronnie Cohen, in the following articles, also published in Metric Views. The wholesale misuse of metric symbols, especially the degree sign is illustrated under "small items", below.*

Too many take the easy way out when writing metric symbols, *by Ronnie Cohen first published in Metricviews*

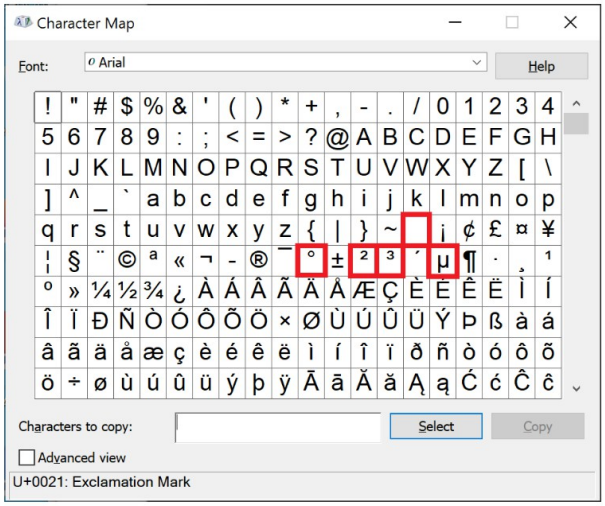
Following the previous article about the limited impact of UKMA's Metric Style Guide and the widespread mistakes in writing metric symbols, we look at one major source of these mistakes. Too many avoid the use of awkward characters that cannot be found on a standard keyboard and end up writing metric symbols incorrectly.

Here are common mistakes that writers make for some common measurements:

Measurement	Common mistake	Correct metric symbol
degrees Celsius	C	°C
micrograms	mcg	µg
grams per square metre	gsm, GSM	g/m²
square metres	sq m, sqm, SQM	m²
square kilometres	sq km, SQ KM	km²
cubic centimetres	cc, CC	cm³
cubic metres	cu m, CU M	m³

The first two metric symbols contain characters that cannot easily be found on a standard keyboard. The other metric symbols in the list can either be written with a standard digit formatted as superscript or as a special character for squared or cubed.

The other common mistake is the failure to leave a space between the number and the metric symbol. Could this be caused by the difficulties of producing a non-breaking space on a standard keyboard? A non-breaking space ensures that the number and metric symbol are not split by a line break, unlike a standard space. These mistakes are commonly found in the media, on signs, in advertising and on product labels.



On Windows PCs and laptops, you can use the Character Map to select and copy characters that do not have their own keys. The Character Map can be accessed from the Start menu. Depending on your version of Windows, you can search for it by typing "character" then choosing Character Map from the results or you can look for it under Accessories or Windows Accessories folder in the Start menu. Here is the Character Map with the °, µ, ², ³ and non-breaking space characters used for metric symbols inside red boxes in the image (left).

The mappings for these characters are shown in the following table:

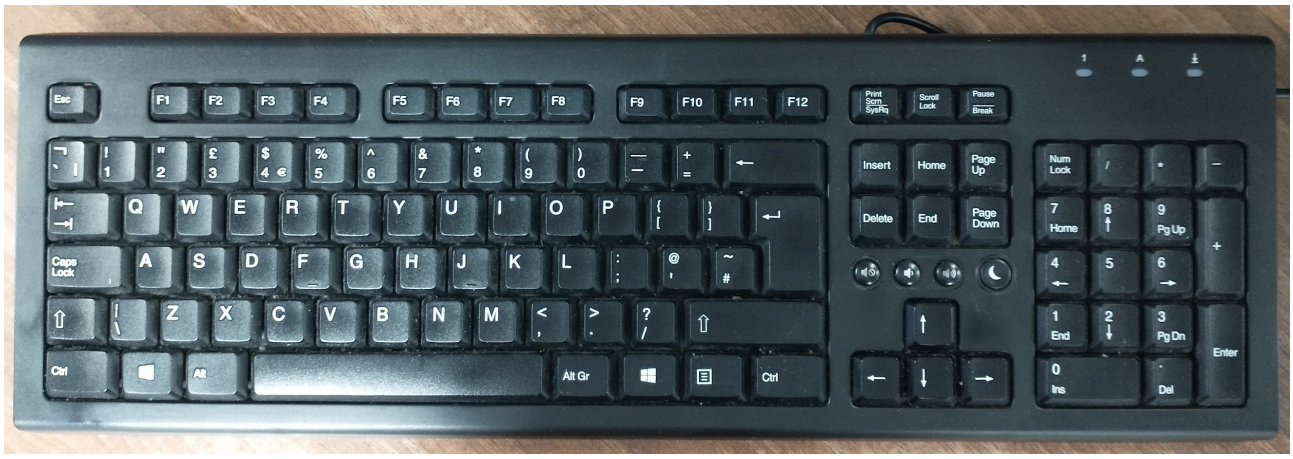
Glyph	Character Description	Unicode Code Point	Keystroke
	No-Break Space	U+00A0	Alt+0160
°	Degree Sign	U+00B0	Alt+0176
²	Superscript Two	U+00B2	Alt+0178
³	Superscript Three	U+00B3	Alt+0179
µ	Micro Sign	U+00B5	Alt+0181

You can select and copy these characters using the Character Map then paste them into your document. Or you can press the Alt key, enter the symbol's 4-digit code on the number keypad then release the Alt key to type the respective character directly into your document.

I suspect that too many writers and journalists find it too hard to produce these characters, so they prefer to take the easy way out and write their own language-dependent abbreviations. This is lazy and metrologically illiterate. The media need to make more effort to write metric symbols correctly. We should make a start to improve matters in our schools. This needs to be taught in schools where correct metric symbol usage should be an essential part of the measurements section of mathematics education. It is clear that more needs to be done to improve the situation.

One proposed solution to improve writing of metric symbols*, by Ronnie Cohen, first published in Metric Views*

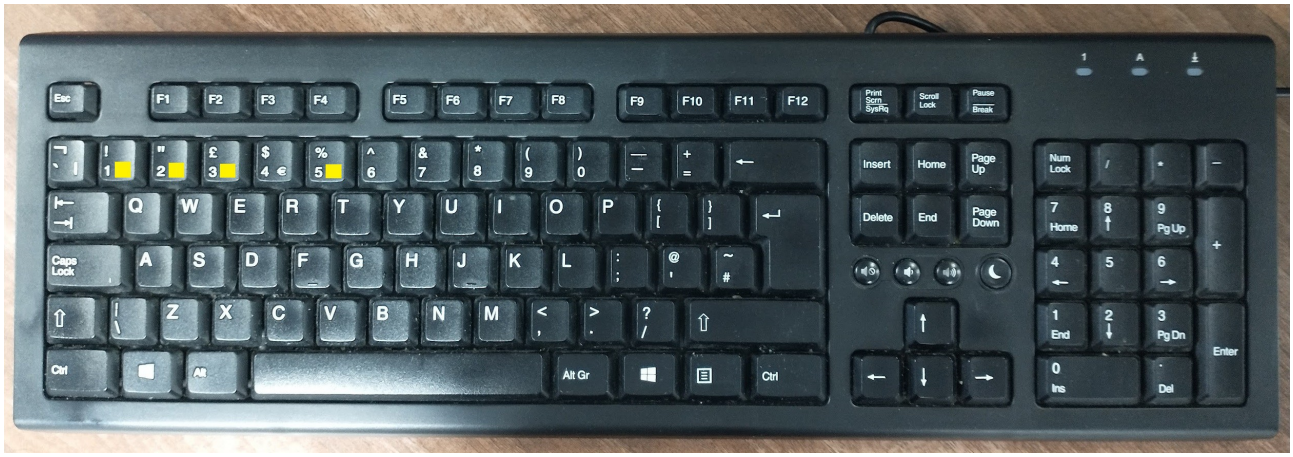
In the third of the series of articles on writing metric symbols, I propose a practical solution to improve the writing of metric symbols. My solution addresses one major source of metric symbol errors that I identified in my previous article.
Many writers avoid the use of characters that have no keys for them on a standard keyboard. When these characters appear in metric symbols, many tend to write their own made-up versions. A standard English-language keyboard looks like this:



As you can see there is no degree symbol, no non-breaking space, no micro sign (µ), no Superscript Two and no Superscript Three characters. There are distinct Unicode characters for the last two and are different from the "2" and "3" characters that appear on the keyboard.

On the keyboard, the key for the number "4" on the top row of the main set of keys can be used to produce the number "4", the $ sign and the € sign. The latter is produced by pressing the Alt Gr key

and holding it down while pressing the “4” key. I propose that keyboards should be adjusted, with appropriate adjustments to operating systems and software to support frequently used extra characters. These characters can be shown in the yellow squares in the following image:



These extra characters would be produced in the same way as the € sign – by pressing the relevant key while holding down the Alt Gr key. The € sign is typed by pressing the “4” key while holding down the Alt Gr key. A special graphic would be required to show a non-breaking space. Here is one proposed design for the non-breaking space character below, left.

Obviously, it would need to be in colours that differ from the key’s colour. This is just my idea. It is not the only possible design. The non-breaking space character could appear on the “5” key.

I suggest that writers should be able to produce this character when they press the “5” key or the space bar while holding down the Alt Gr key. The non-breaking space differs from a standard space by ensuring that the text on both sides of it are not split by a line break. Non-breaking spaces are used for thousands separators and to separate numbers and metric symbols.

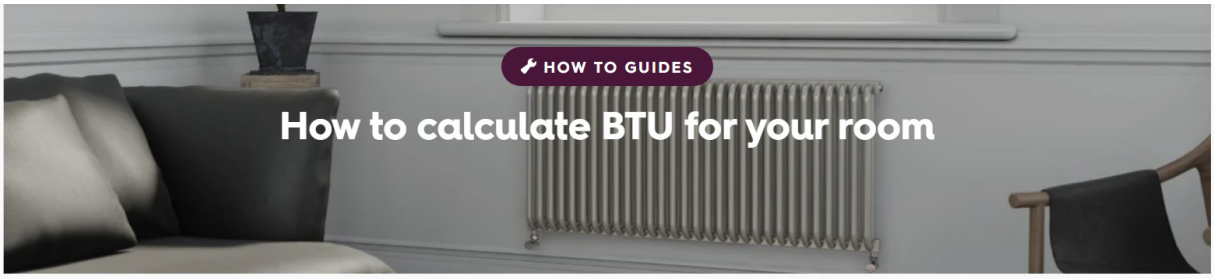
Other commonly used symbols that should also appear on the standard keyboard are:
° (degree symbol); ² (superscript two); ³ (superscript three).

These could appear on the “1”, “2” and “3” keys respectively. Users would type them by pressing the relevant key while holding down the Alt Gr key in the same way that they do for the € (euro) symbol.

The avoidance of characters with no key is a major source of errors when writing metric symbols. They end up being omitted like the degree symbol when writing about temperatures or avoided by the use of language-specific abbreviations. The non-breaking space is frequently omitted altogether for all metric symbols. It is my hope that extra characters on keyboards supported by operating systems and software would lead to a lot more correct usage of metric symbols.

Power and energy in home heating, *by John Austin*

My wife and I have decided to upgrade a couple of our home radiators as after 30 years, they are looking a bit worse for wear. Alda, being the DIY person in the household, focused on the sort of radiators we wanted and we discussed the required heat output. We went to http://www.victoriaplum.com. The website was helpful in suggesting the appropriate *heating rate* (not *BTU* as it is phrased) depending on the size of the room and general insulation characteristics (https://victoriaplum.com/blog/posts/how-to-calculate-BTU-for-your-room).



What was quite confusing, however, was that it indicated the heating in BTU or in watts. The former is of course an energy unit whereas the latter is quite correctly a power unit. Beavering away, I eventually worked out that in the imperial measurements, the site really meant not BTU but BTU/hour, which is of course a proper power unit, directly comparable to watts.

Searching further on their website, I found an explanation for what a BTU is: see below. There was no explanation for watts (fortunately). But their definition of BTU was somewhat loose: the heat required to raise 0.45 kg of water by (and get this) -17 °C. The imperial values were given in brackets (1 lb and 1 °F respectively). So, amusingly the Fahrenheit temperature change of 1 degree has been interpreted as an actual temperature.

Do you know which size radiator or heated towel rail you need for your room? No? Well, in this guide, we'll show you how to calculate your required BTU, even without using a calculator!

When updating your home, one of the trickiest things to consider is your heating. Choosing the perfect radiator or heated towel rail is difficult enough, but knowing whether it is suitable to heat your room is another matter entirely. Luckily, help is at hand, and it comes in the form of three simple letters: BTU.

What is BTU?

If you've only just come across the term, welcome to the club! BTU stands for British Thermal Unit, and is the standard way to work out how much heat output is required to keep your room warm.

If you remember any of your science lessons in school or actually want to know the technical detail, 1 BTU is equal to 1055 joules and is the amount of energy needed to heat 0.45kg (1lb) of water by -17°C (1°F). Make sense?

Please, folk, don't pay too much attention to this. Despite the penultimate sentence it actually doesn't make sense! From the VictoriaPlum website. The jaunty anti-intellectual flavour is jarring to me. I am reminded by Martin Vlietstra that BTU is not the only unit sloppily used but I leave that to the interested historian!

Also, of course the BTU is based on the primary unit of the pound which is 0.4536 kg approximately, whereas one would have been led to believe that the definition of the BTU used slightly less water. In any case this is questionable for high precision work as the energy changes according to the temperature of the water. Wikipedia (British thermal unit - Wikipedia) notes that there are several different BTUs which vary between 1054.35 and 1059.67 J, which is of course not large (0.5%) but it does add to the confusion. I've been retired many years and was educated entirely in metric from age 11. The irony is that the author of the webpage who is almost certainly younger than me, likely knew less about BTUs than I do. All of this confusion as well as a needless definition of the BTU could have been avoided by just sticking with the metric. Most people by now know what 1000 W of heating feels like in general terms. If you don't, make yourself useful and do the vacuum cleaning for a few minutes! This may be 750 W or as much as 1300 W if you have an old one like mine. Our radiator in the end generated 1585 W. What could be simpler than knowing that?

Small items
Wholesale energy units, John Austin

Chris, in correspondence with Ronnie Cohen, points out that the Guardian financial pages quote energy prices in two different units and is confused, not surprisingly. *Nicholas Kerr* is also baffled about these issues. As it turns out wholesale gas prices are quoted in price per therm (100 000 BTU), while electricity is priced per MWh. Never the twain shall meet! If you really want to know whether gas is cheaper than electricity (it is by a large margin) you have to do the arithmetic using 1 BTU = 1055 J. There will also be a currency change depending on the source of the energy. The financial markets are like that. I plan to write about the financial markets in the next issue of the Newsletter. It's not pretty.

What was the “Metric Martyr” Steve Thoburn really prosecuted for?, Alex McDowell

Here is my latest Youtube video: https://www.youtube.com/watch?v=sXsmzhcsgrM
Many think that the "Metric Martyrs" were prosecuted for selling in pounds and ounces, but this video explains that this was not the case. Steve Thoburn was prosecuted for using an illegal set of scales; other "Metric Martyrs" were prosecuted for failing to display in metric. Pricing in imperial was NEVER illegal - despite what the press may say - and, hence, no-one has ever been prosecuted for doing so! Retailers are still free to price in pounds and ounces, as long as they also price in metric, the imperial pricing is not more prominent than the metric pricing, and the scales use metric units.

Some howlers in the media and on signs

This is an example of a pack of kitchen foil available from a UK supermarket which seems to be illegally marked: the product comes from the USA and the imperial measurements are larger in size than the metric which is so small in size it seems to be an afterthought. The entertaining thing is that to calculate the area in square feet is a real pain because of the 12 inches to the foot while the largely ignored metric calculation is straightforward. *Image: Ronnie Cohen.*

Here are some signs found on and on approaching a bridge in Cricklewood (images supplied by Ronnie Cohen). On the left the sign is just in feet and inches. Current signs need to be dual marked but the bizarre thing is that those responsible for the sign only need to replace signs by dual measurements when they have "worn out", leaving a lot open to interpretation. Why we need feet and inches on these signs, I don't know. Incidentally, 15' 6" is 4.724 m, so metric users might

have 2 cm less headroom than the imperialists. In actual fact this is due to different rounding errors in feet and inches (3") and metric (10 cm) . As Ronnie says, none of this make any sense so why do we put up with it?

Here we have an example of where the myriad of signs and measurements may have led to a bridge accident. Look at this image: there are numerous signs with numerous measurements made worse by the accompanying conversions into imperial. A bus driver tried to go under the bridge which has a 3.8 m clearance. I would like to have said that the clearance was "clearly" marked as 3.8 m. The article doesn't mention the height of the bus, but the driver should have known, as these measurements are usually given prominently in the bus, probably in millimetres. It was probably about 4 m tall and as a result the top of the bus sheared off during the aborted attempt. Perhaps the driver was confused by the imperial measurements. The accident occurred in Glasgow, and was serious enough to require ten people to be taken to hospital. I sincerely hope that there is an enquiry into this accident, which occurred in May. Was the poor signage a factor or was the driver ignorant of the size of the bus? *https://www.msn.com/en-gb/news/uknews/three-in-hospital-after-bus-loses-roof-from-hitting-railway-bridge/ar-AA1btS9k?ocid=hpmsn&cvid=ccfac631191a4dedb4e1fe5567717792&ei=8*

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Here comes the mini-heatwave! Mercury set to rise to 30C in hottest weekend of the year

GET ready to slap on sunscreen and reach for a cool drink this weekend as Britain bakes in up to 30C heat.

A yellow health alert has been put in place for what is forecast to be the hottest weekend of the year – with the mercury rising higher than in Ibiza and Madrid.

The UK Health Security Agency warned those in the affected areas of London, the Midlands, east and southern England to check on vulnerable or elderly relatives.

Dr Agostinho Sousa, of the UKHSA, said the weekend would bring 'our first sustained period of hot weather' of the year so far. He added: 'It's important everyone ensures they keep hydrated and cool. Forecasted temperatures will primarily impact those over the age of 65 or those with pre-existing health conditions such as respiratory and cardiovascular diseases.'

Beach weather: Torbay in Devon PA

Temperatures are set to increase from today before reaching up to 30C on Saturday ahead of stormy conditions, the Met Office predicts.

Deputy chief meteorologist Dan Harris said: 'Coupled with the rise in temperatures is an increase in the likelihood of some potentially heavy and thundery showers.'

He said Spain's Storm Oscar would not impact the UK, though would help to drive a warm plume of air into southern areas.

In some parts, temperatures will not dip below 16C, compared with about 3C at the start of the week.

The hottest UK temperature so far this year was 25.1C in Porthmadog, Wales, on May 30.

Here is an example (as if it were needed!) of the incorrect use of metric symbols, the theme of the early part of this Newsletter. This was a high temperature warning in June and we can expect more warnings of extreme temperatures in the UK or globally for the next few months. 30 coulombs is not a temperature at all, but there we are. The BBC has abandoned the degree sign entirely and the space between the number and the unit is not honoured. Other media outlets have followed suit. We may have lost the degree sign battle.

Image: Ronnie Cohen from the Metro newspaper.

Sadly, purveyors of storage space usually ignore the metric system entirely and often have their own particular code. In this example (image courtesy of Ronnie Cohen) storage containers are available as either 10 ft or 20 ft, with the other dimensions that of an HGV (https://en.wikipedia.org/wiki/ISO_668). Skips are often described in yards, which is one cubic yard!

And from the BBC, this is truly annoying: James Webb telescope image dazzles on science birthday - BBC News "The entire image is about half a light-year across, or 4.7tn km". I suppose

the BBC is using 1 tn km = $1x10^{15}$ m, or 1 Pm, but I had to think about it for a few seconds. The BBC breaks multiple rules (no space between number and unit, two abbreviations before the SI unit).

It's not all doom and gloom, though. Here is a sign (photographed by Ronnie Cohen in late June in Greenwich) reminding the patrons to keep 2 m apart. Signs like this appeared in numerous places during the Covid pandemic and everybody seemed to understand them. The signs are still present outside various shops, takeaways and restaurants. *Reductio ad absurdum*, perhaps we need a few more crises to turn Britain fully metric at the current rate of progress.

Association News

AGM

The Annual General Meeting of UKMA was held on 2 July using the online conference facility Zoom. The meeting was well attended and was followed by the Annual Conference. Minutes are available on request from the UKMA secretary and the main part of the reports from the principal officers are given here.

Chairperson's Report to July 2023, *Peter Burke*

A special anniversary.

This year UK Metric Association came of age. It was founded in 2002, although there had been a gestation of several years. It is therefore 21 this year. I have had the honour of being chair for the past year, and I'm pleased to be part of such a dedicated and enthusiastic team.

Our year runs from July to July. It started with the 2022 AGM, held virtually due to Covid. We had the good fortune of being joined by James Vincent, author of the brilliant and award-winning book *Beyond Measure* and he was able to give us fascinating insights into the history of weights and measures. The year ended with another annual meeting, again via zoom, in which we had the opportunity to hear from two of our patrons, Jim Al-Khalili and Gavin Esler. Details are in this newsletter.

Patrons

The role of a patron is to act as a public face for the organisation, somebody people can look to and who can give us a sense of gravitas.

We have renewed our links with our two longest standing patrons, Lord Neil Kinnock and Lord Dick Taverne. Both have said they are interested in continuing in that role. Just over a year ago we recruited our two newer patrons, Jim and Gavin. Both have been a huge asset and have worked to get our message out into the community.

We believe we have about the right number of patrons, but this does not mean we will rule out ever adding to them. In particular it might be good to attract patrons from the worlds of sport and entertainment, as this is likely to improve our profile among young people

The political background

It is difficult to forget the fact that we are now working against the background of Brexit. In spite of repeated attempts by the diminishing band of Brexit supporters to argue the contrary, it is clear that Brexit is far from 'done', indeed it is work in progress and is very significantly impacting all of our

lives, in most cases negatively so. While UKMA is neutral in terms of party politics, and does not have an official position on Brexit, it remains undeniable that it has not made our task easier. There are many in the Conservative Party in particular who speak as if all things European are in some way toxic, and many of them take the view that metrication is a purely EU enterprise, therefore to be resisted. At every level these attitudes are frankly wrong. Indeed metrication was, as we were reminded of this year's annual meeting, a British invention.

Neither of the two main parties have shown much interest in following through on the metrication process to which the UK government committed itself in 1965. Insofar as we have had Parliamentary support it has come as often as not from Liberal Democrat MPs and Lords. For Conservatives and Labour politicians there is a belief that supporting us would be a vote loser. That this attitude still prevails, and may even be based on opinion poll evidence, is very sad.

One of our political missions must be to get the message out there to the public at large that speaking about metrication should not be a conversation stopper, rather that it has huge potential for practical benefit, and if the politicians will not lead on this then they must be led.

Challenges and opportunities.

A very important challenge for us is the educational one: despite the fact that metric units are the primary units taught at school, and have been since 1974, there is a remarkable reluctance to abandon Imperial. This despite the fact that many users of Imperial, if not indeed the majority, lack basic knowledge of how the units relate to each other. Unfortunately for a vocal minority in Parliament, and above all for the popular press, it is all too easy to manipulate the public into believing that facts do not matter and that there is any case whatever for retaining the traditional units.

We have learned through Brexit, among other things, how difficult it is to prevail in public argument by the use of facts and figures. Emotional appeals are much more powerful, and for many people their persistent adherence to imperial units is based on something as simple as that most of the units have only one syllable. We must learn from those on the other side of the argument, in particular about how to get a message out in a way that is memorable and impactful, for example their use of catchy three words slogans.

It is perfectly reasonable to see opportunities along with the challenges. One of the mantras of the pro Brexit movement has been the notion of "global Britain". If that expression has any meaning at all, then surely it means seeking some degree of convergence in policy, not only with your neighbours, but with virtually every other country in the world except for the USA. The fact that the Commonwealth has largely gone metric, for example, is probably unknown to most of the advocates of the isolationist policy known paradoxically as "global Britain". We are the ones who can show what 'global' really means.

The "metric consultation"

This has been dealt with extensively in our secretary's report and I will therefore not cover this ground in detail again. The consultation closed in August of last year and the written report is still awaited. It is rumoured that something like 100,000 responses have come in, and the way in which the consultation has been phrased made analysis difficult, as well of course as making any conclusions highly suspect. We could also surmise that this is not something which most people in the civil service, or indeed of the current prime minister, necessarily consider to be a priority. Further details are in the secretary's report. Not unnaturally, this has been a topic of discussion within our group, including at the annual meeting.

The retained EU Law (Revocation and Reform) Bill (now Act)

Once again, this is described in greater details in the secretary‘s report.

We have been working closely with the Chartered Standards Institute and other organisations to try to ensure that common sense prevails. As part of this I represented the UK Metric Association at an online briefing to the House of Lords. We were addressing a select few, including former Cabinet Secretary Robin Butler. On balance we felt that our thoughts were received sympathetically and there was an opportunity to have some proper dialogue. The bill has since become law. It has been stripped of a few of its more egregious clauses.. Nonetheless it does retain provisions that treat so-called retained EU law differently from anything else on the statute book, and give ministers power to amend or repeal such laws without reference to Parliament. Sadly the public in the UK are not well informed on these matters, and it feels as if we need to work to link in people’s minds the effects and potential effects of the bill with difficulties individuals may well be reporting in their day-to-day life.

Media

Most of our activity these days is on social media. Martin Ward edits our website, John Austin sends out a very comprehensive and eye-catching newsletter several times a year, and Ronnie Cohen is active in producing our blog “metric views“. We also have very active Twitter and Facebook accounts.

In terms of mainstream media, I have written to the usual BBC outlets (Today, Newsnight, Jeremy Vine etc). My hope has been that they may give us airtime to respond whenever the consultation exercise outcome is published. On behalf of UKMA I have had a letter published in the Observer and I have twice been on BBC local channels to talk about metrication.

Thanks

Special thanks are due to Ronnie Cohen, for acting as our secretary and for his regular online publications on our subject, through the website “*Metric Views*’ (https://metricviews.uk). Ronnie has been one of the mainstays of our organisation.

Secretary's Report (highlights), *Ronnie Cohen*

In addition to the comments below, the Secretary's full report included details of UKMA publications and websites (listed below). Martin Ward and John Austin are thanked for preparing the Websites and Newsletters respectively.

The general political situation

The most significant developments during the year related to a possible return to imperial-only measures for certain activities and the rollback of much metrication legislation as part of a bonfire of EU regulations in the Retained EU Law (Revocation and Reform) Bill.

The UK Government “Choice of measurement units: marking and sales” consultation was published on 3 June 2022. This included a pro-imperial consultation document and a survey with limited options that did not include options to say “No” to imperial units or express support for further metrication. Anyone who wanted to express such views were forced to respond by email or use the free text boxes.

This consultation closed on 26 August 2022 and received over a hundred thousand responses. The Government has still not published a final response to the consultation. The Government says

that a final government response to the consultation will be published in due course but does not say when that might be. It is an open question whether the Government wants to quietly abandon it. By forcing opponents to open text to express their opposition to the return of imperial units, the Government has clearly made a rod for its own back. Open text does not always fit neatly into specific categories and is hard to analyse so it is no surprise that it is taking so long to analyse the large number of responses.

The REUL Bill threatened to abolish around 4000 EU-derived laws in its original form. This included several items of weights and measures legislation. Nobody had any idea which laws would be removed completely, what would replace them and which ones would be retained. It faced strong oppositions from many powerful stakeholders, including businesses, trade unions, environmental groups, lawyers and trading standards organisations. Since then, it has been replaced with a list of almost 600 specific laws with a departmental breakdown. Each one is listed with its purpose and reason for revocation. The Bill is now going through its final stages in Parliament. *[Peter Burke: It has now become law.]*

Other developments during the year included the deprecation of the US survey foot on 31 Dec 2022 and a YouGov survey in April 2023 about attitudes to metrication in road transport. It showed strong opposition to the metrication of road signs. Its breakdown showed that the strongest opposition came from respondents who opposed to the UK's EU membership or supported the most anti-EU parties.

The Committee will continue to monitor events, and welcomes input from members, through social media, directly by email or at the Conference.

Media

The UKMA Chair and Secretary are ready to respond to media requests for comments and interviews about the possible return to imperial measures. The media is likely to solicit UKMA's response when the Government makes its final response to its imperial units consultation.

Treasurer's Report

Most of UKMA's income was derived from member subscriptions and donations, which totalled £742 (£597 in the previous financial year).Together with waived expenses, total income was £765.88 (£621.60). Spending on general running costs remains very low, with no costly projects undertaken in the year.

The only expenses incurred were website hosting and domain name registration at £165.56 (£158.36), and waived expenses for drive storage, leaving total running costs of £189.44 (£182.96). As a result the Association's bank balance at the end of the financial year stands at £7 390.18, compared with £6 813.74 at the start of the year. UKMA therefore has a slightly increased balance. Finally, my thanks to Stella Farrar for auditing the accounts.

At the AGM it was agreed to maintain subscriptions at the current rate for the year 2023/24. These rates are:

1 year, standard rate: £15	Annual standing order rate: £10
1 year concession: £5	Life membership: £150

The simplest way to pay is by standing order to our bank account, allowing members to take advantage of the special £10 membership rate. Or if you prefer to send a cheque you can do so.

The bank account details and Treasurer's address remain as in recent years, but if you need these, or have any other queries about subscriptions, please email the Committee at ukmetric@gmail.com.

UKMA Committee for 2023-24

Of the committee positions available, there were no new nominations and so the committee remains the same as in the previous year. There is still a further vacancy for one more committee member and anyone interested in applying should contact the Secretary. Contact details of the current committee may be found here: https://ukma.org.uk/about/contact/

UKMA Officers

Chairman	Peter Burke
Secretary	Ronnie Cohen

Press Secretary
Alex McDowell

UKMA Patrons
Lord Traverne, Prof. Jim Al-Khalili, Gavin Esler, Lord Kinnock

The 2023 Annual Conference, *notes by John Austin*

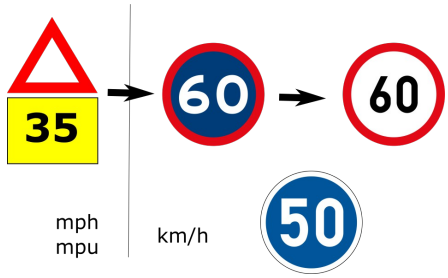
The conference followed on from the AGM. With many speakers timetabled the material was very stimulating and led to active discussions. A unique feature of this year's Conference was the presentations of two of our Patrons, one recorded from earlier and the other in person.

In his short talk, ***Jim Al-Khalili*** revealed some of the views on measurements of the students that he teaches in his work as a University of Surrey physics professor. Few of them actually knew what a yard was. His suggestion was that we all tend to use units of measurements as a concept. For example many of us know our waist size for the purchase of clothes although of course the numbers are in inches. As we know, imperial units such as the inch or foot no longer have an independent definition. Some of our units such as those relating to time and angle are still based on the ancient sexagesimal system. However, he pointed out that none of his work would be possible in a non-decimal system, such as imperial, so the metric system is used in science. Jim also suggested that although the exact definition of SI units is technical, it would be beneficial if schoolchildren had a general experience of the sizes of the units. This could be accomplished by having a metre rule for example in classrooms. Jim received many questions which, sadly, needed to be curtailed to keep the programme on track. Celia Lyon asked about Jim's experience, as sometimes presenter, with the BBC. As we know the BBC often run roughshod over unit symbols and conventions but Jim pointed out that he interacted with scientifically educated individuals and it was typically their editors that introduced SI symbol and convention errors. I asked a question about the SI definition of the second and Jim agreed that this could come up for future revision if technology improved further.

Our second patron, ***Gavin Esler***, appeared as a pre-recorded discussion with UKMA chairperson ***Peter Burke***. Gavin mentioned that he had a new book coming out in September “Britain is better than this”. His general thesis is that modern Britain has a great deal of talent which we often underrate. For example, one of our Universities (my *alma mater* Cambridge) has received more Nobel prizes than all other *countries* except the UK itself and the USA. Our problem as a country perhaps stems from what Gavin calls “weaponised nostalgia”. We know what he means by this and

it is personified by UKMA *bête noire*, Jacob Rees-Mogg. Of course, if we are to tap into the skills of the British people, we need to use the metric system. Gavin was perhaps exaggerating when he said that he was offended to think that the past was as good as some of its adherents make us believe. Nonetheless an idea to encourage the British people to use the metric system was to describe it as a *modernisation* of Britain. And so it is, even if we are a bit behind....
Martin Vlietstra described the history of metrication in South Africa where he has lived for much of his life. Compared to the British experience this has been a much more straightforward and effective transformation.

South African Speed Limit Signs



South Africa used to use British pounds shillings and pence for its currency but converted to Rand in 1961. By choosing 10 shillings = 1 Rand and hence £1 = 2 Rand, currency decimalisation was straightforward and then only required giving up pence and defining 1 shilling = 10c. The metrication board was a branch of the S. African Bureau of Standards. Metrication was a once-only process with no dual units, unlike in the UK. The use of metric weights was helped by the emphasis of buying commodities by money rather than weight so units were not important. Road signs were changed at the same time as metrication. So, a brief timeline was: 1961: decimal coinage introduced; 1967: metrication board set up; 1977: metrication board was wound up. By 1977 the job of the board was done.

Terry Simpson showed examples of the work that he is doing on British Standards documentation. These standards describe the way that industry needs to operate and sections of it revolve around the use of measurements. It is important that the documentation is compliant with SI unit standards and symbols. Currently, Terry is the only person at UKMA engaged in this work and he dearly needs help. From the presentation that Terry gave, I would think that the ideal persons would be those firstly familiar with the details of SI symbols. There is more to this than meets the eye as you will have understood from the articles by Robin Paice and Ronnie Cohen in Metric Views, reproduced in this Newsletter. A second quality would be, let's say, being a stickler for details! There is a general request for help under “Can you help” at the end of the Newsletter which has been there for several issues now. So, please help Terry!

Alex McDowell gave a presentation on the origins of the metric system, although some of these details have been given in a previous Newsletter. He suggested to a French coworker that the British clergyman and philosopher John Wilkins (1614-1672) invented the metric system, but she was not amused. Although the metric system was originally implemented by the French in the late 1790s, it was pointed out by Martin Vlietstra that Wilkins' concepts might well have been communicated to Gabriel Mouton (who is often credited with having invented the metric system) by Wilkins' colleague John Locke when he was in Lyon in the 1670s.

Wilkins' system was decimal-based, without relying on prototypes. For example, he used the second pendulum with a 5-6° swing to define the length scale. With some simple maths you can show that the period of a pendulum (for small swings) is $2\pi\sqrt{(l/g)}$, where l is the length, g is the acceleration due to gravity. The period is actually 2 seconds (a double swing) and for modern units, the length would vary by a few mm due to the changing gravity from equator to pole. The second pendulum would vary between 0.991 m and 0.996 m, very close to the modern metre. Wilkins' unit of volume was derived from the length and the mass from the length using water so would be close to 1 kg in modern units. The French latitude survey took place in 1792-1798 with the first practical realisation of the metre in 1799.

Denis McMahon presented material on minimum stopping distances in the highway code. The correct physics would imply that this distance has a linear function of speed ("thinking distance") plus a quadratic term ("braking"). In the 1978 highway code the numbers at different speeds can be represented by
$s = v^2/20 + v$
s is the distance in feet and v is the speed in mph. For example at 30 mph, the first term is 900/20 = 45 ft, so the minimum stopping distance is 45 + 30 = 75 ft.
A question, then, is how should this be converted to metric? It is unfortunate that speeds are still in mph, so the units would be a bit mixed up, but little can be done to avoid that. Another point is whether ABS brakes can reduce the minimum distance. In fact they can't, because the deceleration depends on friction at the tyre-road interface. However, ABS brakes help by stopping the wheels from locking. Maximum deceleration occurs when there is traction between road and tyre and if the wheels lock then the friction on the road lowers as the car skids.

The latest highway code gives the stopping distance in metres, but the numbers are not as readily memorable as the old highway code. Denis has reviewed the data and come up with the following for the stopping distance:
$s = 1.5(v/10)^2 + 0.3v$
Again, the first term is the braking distance and the second term is the thinking distance. Now, s is in metres when v is in km/h.

In the ensuing discussion, the "2 second rule" and other *ad hoc* rules, were discussed. These rules are not as accurate as the recommendations as they lack the quadratic term, so the linear term is increased to compensate. These rules work better at low speeds. ***Markus Kuhn*** provided the European experience that the 2 second rule was commonplace in many countries.

Ronnie Cohen had previously presented (in his report as UKMA Secretary) much of his intended material on the imperial unit consultation and the REUL bill. He emphasised that under the REUL bill, there was general opposition from stakeholders but that a number of weights and measures regulations could still be affected. So far 600 EU regulations have been eliminated, but none of these refer to weights and measures.

Recent articles posted on Metric Views

You may have missed the following articles posted on Metric Views, https://metricviews.uk, since the last newsletter. The number of comments are indicates as of 1 July.

"One proposed solution to improved writing of metric symbols". Posted on 30 June. 4 comments.

"Too many take the easy way out when writing metric symbols". Posted on 25 June. 4 comments.

"Metric style guide – has it has any effect?". Posted on 22 June. 7 comments

"The conflict between measurement choice and accuracy". Posted on 18 June. 11 comments.

"Amended REUL bill is a big improvement over the original bill". Posted on 14 June. 2 comments.

"The central role of the metric system in the UK National Measurement System". Posted on 11 June. 4 comments.

"Indestructible metric standards". Posted on 8 June. 8 comments.

“Limitations of body-based measurements”. Posted on 5 June. 7 comments.

“Pippa Musgrave's messages to Boris Johnson are still relevant to the imperialists in power”. Posted on 2 June. 5 comments.

“BIPM and OIML issued joint press release and Director's message to mark World Metrology Day”. Posted on 31 May.

“Who will fight the anti-metric newspapers for the cause of metrication?”. Posted on 29 May. 3 comments.

“Why do highway authorities take so long to replace worn-out signs?”. Posted on 29 May. 15 comments.

“PHSO whitewashes my BEIS complaint about imperial units consultation”. Posted on 23 May. 4 comments.

“Why count in tens rather than twelves?”. Posted on 18 May. 2 comments.

“Beer glass sizes in Australia”. Posted on 16 May. 6 comments.

“Third of a pint, anyone?” Posted on 13 May. 10 comments.

“Ovo Energy's units mix-up tripled couple's energy bill”. Posted on 10 May. 4 comments.

“The metric system's contribution to computing”. Posted on 8 May. 2 comments.

“Tenths of a mile on UK odometers relate to nothing on British roads”. Posted on 5 May. 10 comments.

“Metric speed limits in Myanmar and Liberia”. Posted on 2 May. 4 comments.

“Parallels with the Brexiteers – winning against the odds”. Posted on 29 April. 15 comments.

“Government retreats on REUL bill”. Posted on 26 April. 7 comments.

“Questions Government must answer about imperial units consultation”. Posted on 23 April. 1 comment.

“PHSO initial response to my complaint about BEIS”. Posted on 20 April. 3 Comments.
“Metric measurements in airports rules”. Posted on 17 April. 2 comments.

“London City Airport recently scrapped 100 ml liquid rule, which still applies in airports worldwide”. Posted on 14 April.

Recent YouGov survey on attitudes to metrication of road transport. Posted on 10 April. 5 comments.

“Why the metric martyrs were wrong”. Posted on 4 April. 6 comments.

Draft articles for Metric Views are welcome and should be e-mailed to: secretary@metric.org.uk

UKMA websites

UKMA began as an internet forum, and the internet is our principal vehicle for carrying our message to the public.

We now have:
The main UKMA web site, https://ukma.org.uk.
A factual web site, https://thinkmetric.uk.
A blog, https://metricviews.uk.
A Twitter page, https://twitter.com/UKMetric.
A YouTube channel, https://www.youtube.com/user/UKMetric.
and a Facebook page, https://www.Facebook.com/UKMetric.

These are available to all, not just members.

Can you help?

The Committee is looking for volunteers who may be able to help in the following areas:

- Responding to technical consultations by ISO and BSI.
- Preparing web-friendly versions of UKMA News for PCs, i-pads, i-phones and android devices such as tablets and mobile phones.
- Reviewing printed media for stories to link to our Twitter and Facebook pages.
- Assisting with the production of material for uploading to YouTube.

If you think you may be able to help, please contact secretary@metric.org.uk.

About this newsletter

UKMA News is published by the UK Metric Association, the object of which is to promote the full adoption of the International System of Units (SI), commonly known as ‘the metric system’, as the legal and default system of weights and measures throughout society in the United Kingdom.
Your feedback and comments on UKMA News or on the UK’s stalled metric upgrade are welcome. To submit, or if you no longer wish to receive UKMA News, please email secretary@metric.org.uk.

