UKMA news

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

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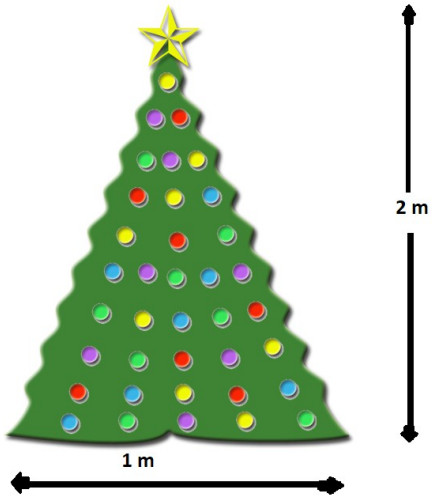
In this Issue

Editorial, by John Austin

This quarter, we have a range of articles of both good and bad metric usage. The public are often exposed to a mixture of units in the weather forecasts, but on page 2 it is explained how these come about, primarily during the communication process. As a major influence in the media, the BBC can sometimes be criticised in a similar light. Indeed, in last quarter's UKMA news, the indefatigable Ronnie Cohen pointed out an inconsistency in the BBC's coverage of a motorcycle world record. He wrote to the BBC pointing this out and the response was interesting and is debated further here, on page 4 in the light of the BBC's measurement policy.

Nonetheless, the BBC has been fulfilling two of its duties to educate and inform by explaining the Covid-19 social distancing rules (p.5). Moreover it has conveyed these ideas entirely in metric and the sizes of everyday objects, thereby avoiding the need to convert back to imperial measurements. In the UK in general, we have certainly struggled to get the metric system properly adopted. The experience of Sri Lanka is compared on page 6 and overall it seems that they face many of the same problems. The newsletter ends with Association news, and in particular Derek Pollard's report on our first Skype AGM and Annual Conference.

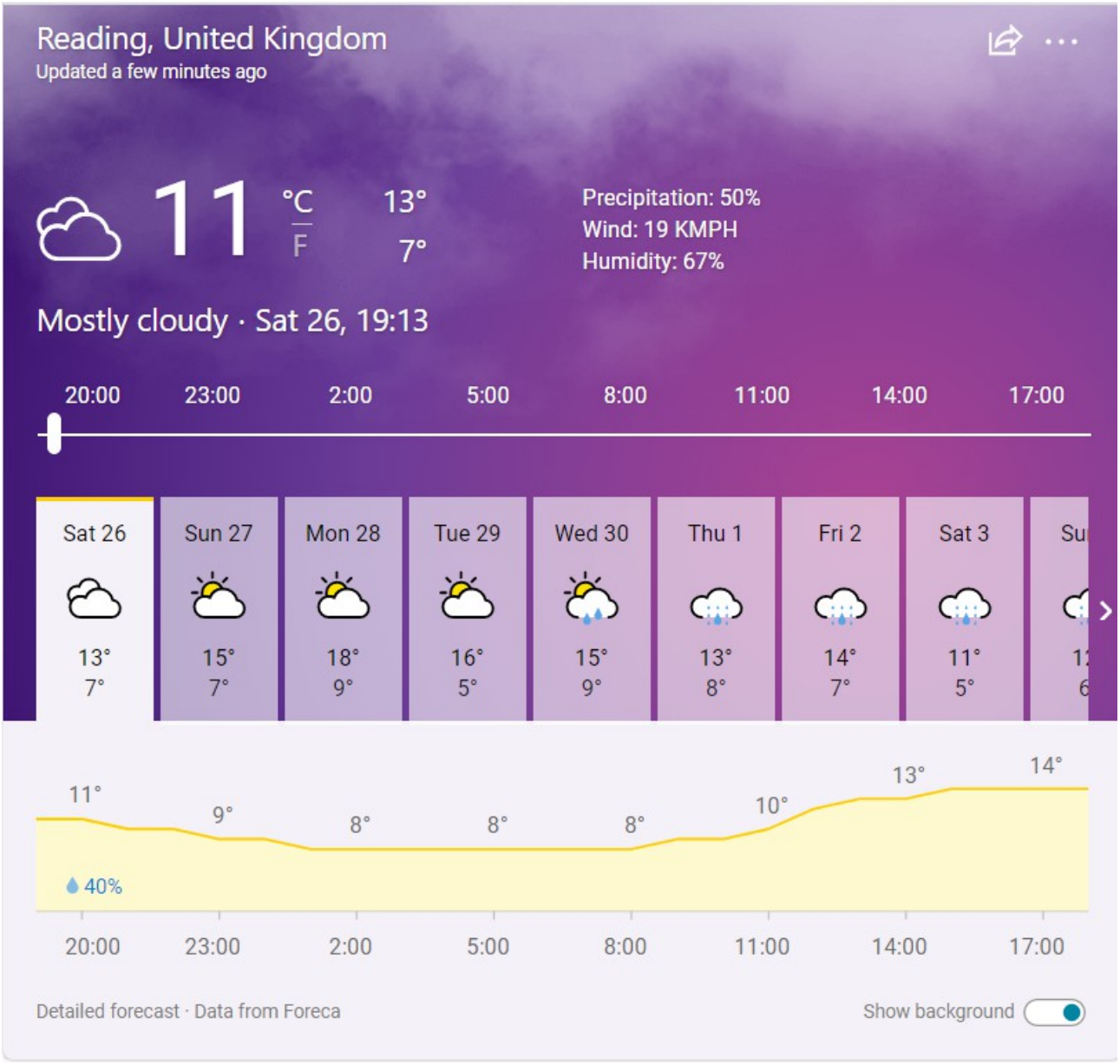
Finally, the Editor and UKMA committee would like to wish all our readers a merry Christmas and Covid-free new year! Stay safe!



Corrigendum: In my over-enthusiasm in the last Editorial I wrote that the kilogram used to be kept as a metallic sphere. The International Prototype Kilogram (IPK) was of course a *cylinder*-shaped artefact, now replaced with universal standards, namely, the values of the

Planck and Avogadro constants. Thanks to Don Hillger of the US Metric Association for reminding me.

Weather forecasting and the Metric System, by John Austin



The image is of a weather forecast that I obtained by simply using a search engine on the internet. It was for one specific day and the following week from a a few months ago. On the whole it's a useful display and seems to make an effort in using the metric system, although of course the abbreviation KMPH would be suspect even in lower case letters.

Weather forecasting itself has developed enormously over the decades. It is now accomplished using complex numerical models running on supercomputers. Essentially, the equations of motion of the atmosphere are stepped forward gradually in time until the forecast point is reached. For example, for a 24 hour forecast, there may be as many as 48 steps (of 30 minutes each) from the time of the observations to the final forecast time. Nowadays the same computer model is used to predict both weather and climate. So, in the case of the latter, a 100 year climate run is achieved

with the same 48 steps repeated 365 times all repeated 100 times for the century. For a climate run, the simulation is often running on the computer around the clock for many months at a time. These are the very fastest computers available! The equations that are solved are essentially physics-based and quite technical but they are all expresssed in SI units. Some of the equations might be recognised by an A-level physics student. To give you a flavour, one of the simplest equations is the one representing air pressure as a function of temperature, $P = \rho RT$. This is also known as the "gas equation" and A-level physics students may recognise Boyle's law and so on buried in this short equation. Here, P is atmospheric pressure, ρ is air density, R is a constant and T is temperature. Most importantly, the values of the variables are all used by the computer in SI. So the atmospheric pressure is in pascals (Pa or N/m^2) and ρ is in kg/m^3. Of course the temperature is measured in kelvins (K), which is the SI unit. So the computer churns away for a few hours and produces a weather forecast. That forecast is the predicted state of the atmosphere 24 hours say after the observation time. The forecast would still be in SI but the predictions are generally processed for public consumption.

The temperature forecast would be in kelvins as before, so 273.15 is subtracted to convert to Celsius. Rainfall rates would be in m/s or $kgm^{-2}s^{-1}$, which would be very small numbers even with heavy rain! This could be readily converted to mm/day to become a user-friendly size. Air pressure is in Pa as before, but again to make it a more user-friendly size, hPa are used in public forecasts. Typical atmospheric pressure is in the range 980-1030 hPa. Incidentally this unit was deliberately chosen instead of kPa as the values are numerically identical to pressures in mbar, which was previously shown on weather charts. You may recall that the bar is the old cgs unit which has been superceded by SI. If you go to pump your car tyres up the guage often reads lbs/sq. in, which is of course not a pressure unit at all! You can also set your pressures at 2.2 bars or whatever. So what you are doing is pumping an extra 2 atmospheres of air pressure into your tyres and by knowing the cross section area of your tyres you can work out how much weight can be supported. The other day we had fitted a "low pressure" tap (specified in bars) to a bath. It didn't work properly, and to get our money back, we were asked to calculate the water pressure in bars – an easy calculation in metric – the product of the height to the tank, the water density (1000) and gravity (9.8, or 10 near enough). We then needed to divide by 100,000 to convert to bars. [In SI of course the figure is already in Pa before the final division.]

Another product of the weather forecast is the wind speed. The computer gives this in m/s of course, a unit I'm comfortable with as it is easy to visualise how far the air would move in say 10 seconds. Most weather forecasts to the public, though, give the wind speed in km/h at best or in mph. I would suppose that most people want a comparison with their car-driving speeds and it perhaps indicates how the units shown on our roads impact other unrelated areas such as the weather forecast. Another quantity in weather forecasts is the sea wave height. This is almost invariably given in public forecasts in feet, even though the actual computer forecast would be in metres. I haven't mentioned the use of Fahrenheit as a temperature scale but it is often a choice at the consumer end. It has no proper scientific basis but has maintained its foothold amongst the more conservative of publications. With this mixture of units available: feet for wave height, Fahrenheit for temperature and mph for winds it might seem that the weather forecasts are a little confused. But you can be assured that they don't start out that way. Journalism might be partly to blame, but when challenged the BBC for example claims that it is what the people want. But what is the BBC policy on units? Read the next article to find out.

For a summary of weather forecasting and its historical perspective see
https://en.wikipedia.org/wiki/Weather_forecasting

The Met. Office also has an informative website that goes into detail on many of these issues
https://www.metoffice.gov.uk/weather/learn-about/how-forecasts-are-made

Unfortunately, there seems not to be any explicit mention of measurement units in these accounts.

Official BBC Measurement Policy, *Article by Ronnie Cohen, reproduced from Metric Views*

I recently wrote to the BBC on two occasions about mixing metric and imperial units and about giving imperial conversions for metric units on the BBC News website. The BBC replies reveal its official measurement policy on the use of metric and imperial units.

My first inquiry referred to a 30 second video about a new motorbike handlebar wheelie world speed record that showed the following caption:
“Speed 109.2 mph; Distance: 200 metres”
I pointed out that if you wanted to calculate how long it took to ride 200 metres at 109.2 mph, it would be needlessly awkward and require a conversion from metric to imperial or imperial to metric and that it would be much easier to work out if the speed was given in km/h or even m/s. You can find the BBC video at https://www.bbc.co.uk/news/av/newsbeat-53828187 . I asked the BBC the following questions about the illogical mixing of units in the video:

“As one of your primary functions is education, why do you mix metric and imperial units in this way? Why do you blindly follow convention in using mph? I suspect that you have been influenced by the Department for Transport and the fact that speed limits on British roads are in mph. Shouldn’t you educate the British public about metric speed limits such as km/h and m/s?”

On another online BBC article about the Dounreay nuclear site, I wrote about the BBC convention of giving imperial conversions for metric units:

“The UK has had 40 years of metric education. Teaching the metric system has been a requirement since 1974. Despite this, the BBC feels that it must give a conversion in feet.

Here is the sentence used in the story about the Dounreay nuclear site:

‘Built in the 1950s, it plunges 65.4m (214.5ft) below ground.’

The BBC may think that it is being helpful when it gives imperial conversions for metric units. In reality, it just encourages people to ignore the metric and look at the imperial, if that is what is most familiar to them. It undermines metric education in schools. Metres are widely used in the UK. So why does the BBC feel obliged to provide a conversion in feet?

The BBC’s mission is the educate, inform and entertain. If the BBC thinks that metres and other metric units are unfamiliar, it is the BBC’s job to educate and inform the public about the metric system. Please stop giving imperial conversions and encourage your viewers and listeners to become familiar with metric units. We all need a measurement that everyone can use and understand. We don’t need two systems.”

I received the following reply about measurement usage at the BBC in response:

“Although metric is in use in some areas of life in the UK, the country has never switched fully over to the system, which is why we retain miles on our roads and pints in our pubs. The BBC has no overall guidance on this issue but suggests that we consider the likely audience for our output, so we will generally give measurements in imperial with conversions to metric. But we aim to use common sense when providing information. We use kilometres when reporting on metric countries (converted to imperial). Our science coverage generally uses metric, as that is the preferred option

in that discipline. When writing largely for a younger audience, we will use metric. However, while schools have been teaching metric for many years, we must recognise that one-third of the UK population is over 50 and unlikely to have learned the system this way. For us to adopt one system would potentially mean alienating 20 million people who contribute funding to the BBC. We must also recognise that we have a large international readership of our website and consider who will be reading our stories. So a story from the US talks about miles and lbs while one from Europe will refer initially to km and kg. Ultimately the audience, above all other sources, plays a key role in determining the language we use; if they do not understand, we are not doing our job."

The BBC used almost the same standard text in response to my complaint about mixing metres and miles in the motorbike world speed record video. The over-50's have had almost half a century to become familiar with metric units. The BBC has a patronising attitude towards older people by implying that they cannot understand metric units and that they would feel alienated if they only used metric units. Has the BBC done any research to back up their claims about older people? In any case, the BBC has a duty to inform, educate and entertain. They are failing to inform and educate the public about the metric system and are using imperial conversions instead. The BBC admits that the UK's failure to complete metrication influences its own mixed usage of metric and imperial measurement units hence its measurement usage is a reflection of the measurement mess we are in.

You can find the online BBC articles about the Dounreay nuclear site with imperial conversions for metric units at:

•"Dounreay site available for reuse in the year 2333" (https://www.bbc.co.uk/news/uk-scotland-highlands-islands-53848766)

•"'Unrestricted use' of Dounreay nuclear site in 300 years" (https://www.bbc.co.uk/news/uk-scotland-highlands-islands-44302985)

•"Next phase of work Dounreay decommissioning planned" (https://www.bbc.co.uk-scotland-highlands-islands-42445819)

•"Dounreay's shaft to be emptied and demolished" (https://www.bbc.co.uk/news/uk-scotland-highlands-islands-48036793)

Social distancing rules around the UK, *article by Ronnie Cohen reproduced from Metric views*

How far apart should you stay from others? One metre or two metres? That depends on where you live. In Scotland and England, you can practise 'one metre plus social distancing but two metres is recommended wherever possible. In Wales, you are advised to keep two metres apart. In Northern Ireland, the distance is one metre. This is all explained on the following page on the BBC News

website: https://www.bbc.co.uk/news/av/health-52054844 . This page contains a short video that explains these rules and helps viewers to visualise distances of one metre and two metres by using examples of typical real-world objects. The video explains that one metre is approximately any of the following:

a full size acoustic guitar
half the length of a bed
one long adult step

The video explains that two metres is approximately any of the following:

3 steps
a bed
2 shopping trolleys
half a parking space
2 benches
3 seats away on public transport
4 desk chairs in an office

The video explains that when using 'one metre plus', you should wear a mask, not face each other and not stay near each other for too long.

In countless news articles on the BBC News website, a measurement in metres is typically followed by a conversion of feet in brackets. Here, the BBC is educating the public about metric units and helping viewers to visualise distances in metres. It is encouraging that they have not resorted to giving imperial conversions in this video and helped viewers to become familiar with metres. It is unusual and rare to find the BBC helping the public to become familiar with metric units but we see it here. On this occasion, the BBC deserves to be praised so I say to the BBC "Well done".

Fifty Years of the Metric system in Sri Lanka, *article by John Austin and Asela Atukorala*

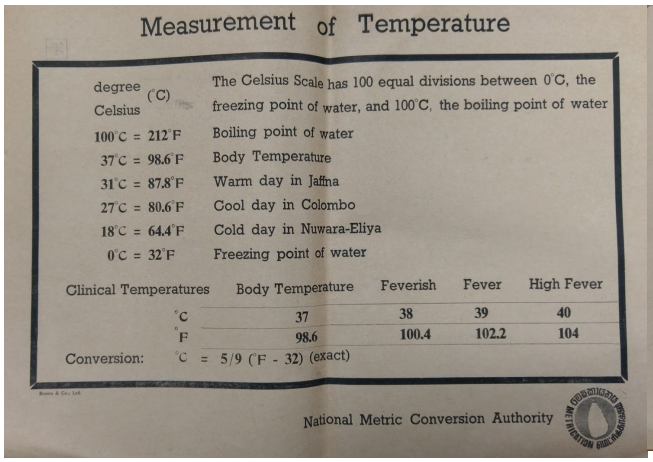
Like many former British colonies, Sri Lanka decided to transfer to the metric system at about the same time as the UK did. This year they celebrated the 50th anniversary of its use. Here, we report on their progress towards metrication and compare briefly with the British experience. Details of Sri Lanka's progress can be found on the S blog, a blog devoted to Sri Lankan issues (https://aselaatukorala.blogspot.com/2020/11/sri-lanka-50-years-of-metric.html).

The trilingual logo of the National Metric

Prior to its adoption, there was limited use of the metric system in Sri Lanka (known as Ceylon prior to 1972). As a British colony the former units were largely imperial but with some metric units used mainly from the old cgs system. For example the tea growing industry used grams and the medical sector used grams per litre for blood samples.

Conversion Authority SLNA 143/61

Once the decision to transfer to metric had been made at government level, a committee, The National Metric Board Conversion Authority, was convened to execute the task. Representatives were drawn from government ministries, academia, industry and commerce. The procedure adopted was to have two sets of units, metric and imperial, running concurrently in a particular sector until that sector was completely converted to metric. Then the imperial units were to be deleted.



Measurement of Temperature

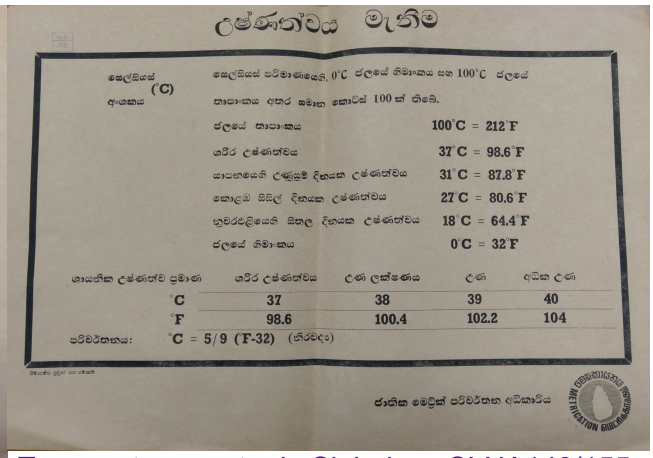
degree Celsius (°C)	The Celsius Scale has 100 equal divisions between 0°C, the freezing point of water, and 100°C, the boiling point of water
100°C = 212°F	Boiling point of water
37°C = 98.6°F	Body Temperature
31°C = 87.8°F	Warm day in Jaffna
27°C = 80.6°F	Cool day in Colombo
18°C = 64.4°F	Cold day in Nuwara-Eliya
0°C = 32°F	Freezing point of water

Clinical Temperatures	Body Temperature	Feverish	Fever	High Fever
°C	37	38	39	40
°F	98.6	100.4	102.2	104

Conversion: °C = 5/9 (°F - 32) (exact)

National Metric Conversion Authority

Temperature poster in English SLNA143/157.



උෂ්ණත්වය මැනීම

සෙල්සියස් (°C) අංශකය	සෙල්සියස් පරිමාණයෙහි, 0°C ජලයේ හිමාංකය සහ 100°C ජලයේ නාපාංකය අතර සමාන කොටස් 100 ක් තිබේ.
ජලයේ නාපාංකය	100°C = 212°F
ශරීර උෂ්ණත්වය	37°C = 98.6°F
යාපනයෙහි උණුසුම් දිනයක උෂ්ණත්වය	31°C = 87.8°F
කොළඹ සිසිල් දිනයක උෂ්ණත්වය	27°C = 80.6°F
නුවරඑළියෙහි ඕනල දිනයක උෂ්ණත්වය	18°C = 64.4°F
ජලයේ හිමාංකය	0°C = 32°F

වෛද්‍යමය උෂ්ණත්ව ප්‍රමාණ	ශරීර උෂ්ණත්වය	උණ ලක්ෂණය	උණ	අධික උණ
°C	37	38	39	40
°F	98.6	100.4	102.2	104

පරිවර්තනය: °C = 5/9 (F-32) (හිරුවඳ)

ජාතික මෙට්‍රික් පරිවර්තන අධිකාරිය

Temperature poster in Sinhalese SLNA143/155.

The transfer to metric took place over a period of just over 10 years. During the process the public were given general information such as the temperature posters shown above. Note how the noteworthy temperatures were given in whole Celsius values, further encouraging use of the scale.

In another article on the S blog, https://aselaatukorala.blogspot.com/2020/11/sri-lanka-50-years-of-metric-late.html , Asela Atukorala reports on recent progress towards metric usage. Despite significant progress, imperial units continue to have an influence.

Following the disbandment of the National Metric Board the 1980s was a period of confusion with many people still thinking in imperial measurements. Some cars had the new kilometre odometers while mile odometers still existed on others. Despite the changeover having occurred earlier, it was not until 1995 that a government act was brought into existence to specify the units that measurements were to be made. Nonetheless, imperial measurements are still commonplace with heights of buildings usually expressed in metres but mountain heights and heights above sea level in feet. Energy and power are not properly related in some cases with btu and horsepower common.

Some of the confusion that still exists in Sri Lanka today is caused by the media which continues to use imperial units such as feet and inches and imperial area measurements. This encourages Sri Lankans to continue sometimes in old units. For the younger generations, educated in metric, this is counterproductive. Government work is largely in metric but with some legislation in imperial in a few cases. Because of the widespread use of feet and inches these cases can sometimes lead to confusion. For example in the construction industry doors are sometimes sold incorrectly with width and height measurements in imperial but widths in millimetres.

In Britain the media are also contributing to unit muddles and the younger generations are thinking in a mixture of units which don't relate, such as miles per gallon for fuel economy, but fuel purchased in litres. Another example but regarding health, is the Body Mass Index, which is a

metric measure (kg/m^2) but height and weight are often quoted in feet and stones even by the younger generations.
On the whole, Sri Lanka is in a similar situation as the UK as far as metrication is concerned so still has some way to go!

Brief comments

Our regular contributor, Ronnie Cohen has been seeing some signs, good and less so, at his local NHS hospital. The bridge clearance sign (above) is reassuringly entirely in metric while a sign (left) which appears on the floor of the same hospital has introduced mixed units. After all the success of the introduction of the 2m social distancing rule (conveyed almost entirely in metric during the early stage of the Covid-19 pandemic) we are now seeing a confused message emerging with mixed units.

Following on from the point that Ronnie raised in Metric Views and the Newsletter last quarter, concerning the legal requirements on the new e-scooters, their legal confusion continues. The full report is communicated in Metric Views. Briefly, Ronnie wrote a letter to his MP complaining about the regulations conveyed in multiple units.

His MP In turn wrote to the Department of Transport who responded with a lot of decimal places on the numbers but very little appreciation as far as I (Ed.) can tell. On the one hand, the Department agreed (to many decimal places) that 25 km/h for the e-scooter design speed limit was greater than the road speed limit of 15.5 mph, but then dismissed the difference in what appeared to me to be a somewhat contradictory conclusion. Please read Ronnie's interpretation of this state of affairs on Metric Views.

UKMA Officers

Secretary: Derek Pollard

The post of Chair(man) remains vacant.

AGM and Annual Conference, *report by Derek Pollard*

The AGM and Conference took place on 26 July 2020, using Skype. Fourteen members participated.

The Committee recommended no change in the rates of subscription and this was agreed.

Ronnie Cohen opened the Conference by lamenting the lack of public concern about the current muddle of measures used in the UK. With Covid 19 and Brexit dominating the news, the issue rarely received attention. Ronnie believed this presented more opportunities than threats, but suggested the narrative needed to be challenged. Seven members contributed to the discussion, many drawing attention to inconsistencies in public attitudes.

Raphael Sofair suggested that the conversion of road traffic signs met the government's criteria for 'shovel-ready' schemes to help to reverse the slump in the economy caused by Covid. Five members contributed to the ensuing discussion.

Tony Wilson then outlined recent progress on road traffic signs. He noted that the 2 m Covid social distancing signs had been accepted without fuss, and he pointed out that new regulations requiring replacement height , width and length restriction signs to show dual measurements should result in around half of all such signs displaying metric within 10 years. This prompted a lively discussion in which six members participated.

The past year had seen major upgrades of our web sites. Martin Ward outlined progress and also discussed the use of social media.

Tony, who had chaired the Conference, then sought views on its virtual format. There was general agreement that it had been a success, despite teething troubles, and several members suggested that it might be worthwhile to repeat the event part way through the coming year.

The Conference concluded with a members' forum, during which five issues were raised.

A more detailed report on the Conference is available from the secretary, secretary@metric.org.uk .

Recent articles posted on Metric Views

You may have missed the following articles posted on Metric Views, http://metricviews.org.uk , since the last newsletter:

"Progress on metrication of the British rail network". Posted on 14 December 2020. 1 comment.
"Official thinking behind e-scooter speed limit". Posted on 2 December 2020. 5 comments.
"Government's blank check for HS2". Posted on 27 November 2020. 5 comments.
"Light measurements". Posted on 19 November. 8 comments.
"Social distancing rules around the UK" (reproduced in this edition of UKMA News). Posted on 29 October. 1 comment.
"Where are metric units legal on British roads?". Posted on 8 October. 8 comments.
"Official BBC measurement policy" (reproduced in this edition of UKMA News) . Posted on 1 October. 23 comments.
"Our awkward vehicle specifications". Posted on 11 September. 15 comments.

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

Where to find UKMA on the internet

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.org.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.

"A very British mess"

This report, published by UKMA in 2004, looked at the UK's measurement muddle. The Foreword was written by the late Lord Howe, then UKMA's Patron, and the report was drafted by a group of Committee members. The 62-page report includes chapters on "How did we get into this mess?" and how we can get out of it, with many illustrations in full colour. Hard copies of the report are still available, price £2.00 including p&p. Please email the Secretary if you would like a copy.

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

