

Article by the President of the International Federation of Municipal Engineering (IFME) on the SARS-Covid-19 pandemic.
Never let a good crisis go to waste.

2020 will go down in history as the year that the global economies closed down due to a global pandemic, the economic impact and how human society changed is yet to be determined. However, one thing is clear, prior to this year, the impact of a global pandemic was merely considered as a worst case scenario but in reality we never really gave it much credence. Well, now we have one and the impact has been devastating.

As I write this article on behalf of IFME it is clear that going into lockdown is far easier than coming out of it. For any prospect of life returning to that previously enjoyed we are all dependent on the medical professions in developing a vaccine or alternatively some medication to manage the more serious consequences of this virus.

In October 2019, IFME members visited China gaining experience and knowledge of how public infrastructure was developed there. As a consequence I produced a press notice for distribution and publishing outlining our many experiences there. We all benefited from seeing this economy in action and witnessing the countries development first hand.

On our return the worlds press was learning of a new virus that had apparently emanated from Wuhan in China about November 2019 and was causing concern in China. I personally checked that cities location in comparison to our journey within China, it was close but we hadn't visited that location, albeit we had passed through the state on the bullet train. Not much risk of infection I concluded and I was home, many miles from China and felt safe and well.

I must admit I gave this story about a new virus little serious consideration, after all there have been previous warnings of viruses coming from that part of the world which we had managed without too much impact on our lives. Specifically Im referring to SARS-Cov in 2003, bird flue in 2007 along with other potentially devastating epidemics such as Zica, Ebola and N1H1 which were managed. I had personal experience in programming action plans for Bird Flu so I was confident the threat would be similarly managed.

In fact if I has been forewarned that a global pandemic was imminent and it would completely change our "business as usual" across the globe Im not sure I would have taken the threat seriously - at that time! The world's a big place and the human race has proven that it is very clever in dealing with issues.

Things started to get serious for me when our next IFME meeting, programmed for Turin, Italy in June 2020 started to come under threat, I was looking forward very much to meeting the many Italian Engineers and professionals and learning of the Municipal works going on there. However I was increasingly aware of the Covid-19 virus spreading in Northern Italy.

As the Italian situation deteriorated and after serious reports of locking down the country I had to take the unprecedented decision to cancel our visit many months in advance. Coordinating and booking arrangements for the event were becoming impossible to arrange due entirely to the epidemic. International flights were being viewed with increasing concern and threats of quarantine on return home was a real concern for many members.

We agreed that we would attempt to undertake the meeting via the internet on the “Zoom” platform. This was a complete change for our member countries and involves coordinating international time zones so we could all attend. This work is ongoing just now and is a first for IFME in its 60 year history. IFME was to celebrate its 60 years anniversary in Italy so the loss of this meeting was a real disappointment to me.

Over the recent 11 years my work has been in relation to strategic and detailed concepts of City development and design in coordination with a range of similar professional bodies. My specific role was the provision and adaptation of Municipal Engineering infrastructure, such as roads, drainage, communications systems and a large range of other issues into modern cities and communities, all purposed for the improvement of economies and community living. Learning from all the IFME countries has been of immense benefit in that role and as President of IFME allows me to highlight benefit key issues and best practice that can be shared globally.

IFME is working with UNESCO in achieving the UN sustainability goals and address Global environmental issues, for example population growth and increasing urbanisation, CO2 emissions and decarbonising transport as well as air quality, water management and reducing waste.

Prior to this pandemic much of our work focused on densification of urban space which provided economic public transport systems, reducing traffic emission, improved air quality as well as reduced demands on green space and integration with drainage management. Ironically I had said that densification worked so long as we don't suffer a global pandemic. The response was predictable, raised eyebrows and knowing looks - as if! Well, now we have one so what are we going to do as a result?

At this stage in May 2020 with many countries locked-down it is difficult to be certain of how we will come out of this Pandemic. One thing is being widely stated is that we won't be the same as before. I'm not too sure just what will change but I can make some predictions based on experience and comments. You can judge them with the benefit of hindsight in the future.

I am confident that as we return to work the progress will be tapered with potentially some retrograde steps, some countries will do better than others for a wide range of reasons such as population density, health and wellbeing of their citizens, with key aspects of communication and adherence to rules.

Working spaces.

It is clear that home working will become much more prevalent in businesses. This is because of the urgent need to adapt businesses during lock-down has overcome historic resistance to such a practice. In the UK surveys by the BBC estimated that 44% of working adults were home working during the lock-down, a substantial increase from 12% previously.

Many employees are finding benefits in this arrangement, no commute to work and saving on the cost of such, more time at home and potentially improved home life and reduced need for after school clubs. Most employees find home working better because they have less interruptions in their work and tend to work into the evening to get bits of work completed that day.

Developments emanating from this practice will be better broadband systems, obviously but possibly improved software systems that undertake tasks better from remote locations.

Home working works well, however I expect that there are period of the week where workers need to return to work places for a range of reasons. Home-working for many is increased from a nominal one day a week working from home to three or four days, some even more, depending on the business. Individuals who are new starts to a company will still need to attend the business for a time until their abilities are increasing to a competent level to permit work from home.

The benefits to society of home working are many but most notable will be the reduction in daily travel. Will this herald the end of the 'rush hour'? Reduced traffic certainly equates to reduced air quality issues and an improved environment.

I would not be surprised that Home working is widely encouraged by Government and some may even try to set it in law or regulation.

Office space is certainly bound to change in the short term. The economic aspects of modern working practices has resulted in reduced working spaces and in increase of "open plan" offices with "hot desking" leading the charge of more economic offices.

"Hot Desking" as it is currently will be confined to history - in my experience this was not a popular working method, mainly because staff tended to arrive increasingly early just to get a desk remotely close to their team members. The health risks of this practice are just too great. Their replacement by sanitised pods where you plug in your personal computing equipment is likely to become a solution to maintain such office practices. It remains to be seen whether this makes a comeback over time but home working may deliver better financial benefits to companies.

"Open plan" offices will need to be reviewed in light of hygiene requirements. I am referring to fully open space with no intervening screens between desks. Personally I found that being "open" to discussions constantly interrupted my work and was of limited benefit. In addition, nearby discussions by other staff members just interrupted my work as well. I don't know many who will regret the loss of this economic innovation, however increased individual screening in the short term is certain as will restrictions on facing other staff members.

The challenge now is to develop software that enables remote casual interactions between work colleagues to compensate for the office interactions that have proven beneficial in the past, for example just bouncing ideas around the teams or departments.

The reconfiguration of office space and the widespread use of home working will result in the redesign of office space, mostly reduce it and as such deliver reduced costs to a company. Just to clarify this statement, many companies over recent years have reduced costs by reducing office space and either selling off building assets or letting leases for such space laps. Home working practices is likely to continue this trend. Regards individuals' costs who take part in home working, I think that the commute balanced against home heating and lighting costs are a reasonable tradeoff.

I know that in the UK many of those working from home will have reduced “in office” days, say 2 days per week. In 2009 I worked from a London office for the Price of Wales but only visited the office from Scotland 2 days per month, that worked well for everybody 11 years ago so I see little reasons that could become a practice adopted more generally now. Maybe there will be an impact on housing demand as some office based workers will move out of dense cities as a result but thats a larger debate than I have time for in this article.

Offices will certainly have to provide increased sanitary provision for all staff and pending a vaccine will become a Health and Safety requirement.

Not all workplaces will be easily adapted. Practical and supervisory posts such as for managing site operatives and the individual trades will requires to be reconfigured to permit more consideration of safe space. Certainly in the short term pending some medical solutions. This planning will have to consider welfare facilities for those working outside and on sites. The need to dry work clothes and wash as well as meal considerations will require increased planning, scheduling of work shifts and increased costs.

I am sure that including face masks and enhanced PPE as a routine in all works to permit operations where people do need to work closely together will be required.

In fact Health, Safety and Welfare aspects of project regulations and contracts will need to be risk assessed and amended, as will enforcement.

Current estimates of cost implications for UK local Authorities in making these changes have been widely made, probably because the crisis is at its worst just now, However in the short term, a reasonable estimate is that an increase of costs by 10% is expected and that as we progress these cost will be reduced into everyday working practice amounting to 1 or 2% overall.

Society concerns

Until medical solutions are found, which may take some time, if ever in the case of vaccines, the confidence of individuals to interact as they did before is not likely to return easily.

This being the case then confidence in using public transport is also likely to diminish. Certainly my experiences of using trains in Scotland during rush hour prior to the pandemic was of packed carriages with no space to move during journeys. This is not likely to be permitted to continue, the public won't use them, so the implications for public transport and their business case is grave.

Indeed, the previous drive to use public transport and not cars has been reversed in the UK already in the interest or restricting virus spread.

Overall, and to manage personal space, a further change to working practices is being considered in the UK, that is a 4 day week. Adopting this practice is yet to be determined but it may have implications on reducing unemployment levels as more staff shift are adopted to meet workloads or more likely just longer working days. Certainly home-working is based on meeting work targets and dates rather than checking hours spent in the office. The challenge will be clarifying and issuing such workloads to staff from managers.

Home-working will reduce the use of individual transport, some UK estimates at 20% reduction, in traffic levels but the need to decarbonise transport still is a major issue for the environment.

The change may be easier now as we have all experienced cleaner air, quieter roads and birdsong and we like it.

Global economies are still likely to be influenced by oil production, the Belt and Road projects in central Asia is fundamentally connected to this economy but public pressure is likely going to drive new technologies as international scientists learn to work together on a common theme, such as experienced with Covid-19 vaccine research. My concern is that as time passes then politics and individual ambitions to seek wealth may reduce the urgency and international cooperation currently enjoyed. Today, as China comes out of lockdown, there has been a notable increase in its air pollution from fossil fuel burning to produce energy.

One problem that many countries have experienced is the fragility of “just in time” supply chains and the need to maintain supplies. The problems experienced in getting PPE to our medical and home care staff has been both enlightening and frightening. We have learned that it may be a false economy to rely on such systems and that materials are better if they are of a more durable quality.

The recent need to procure certain goods such as PPE has been difficult to purchase rapidly. The need to adapt and make changes rapidly in sourcing and receiving delivery of badly needed supplies is clearly a weakness in our current systems of work.

Therefore, Procurement systems could be reassessed. Our IFME experience in China, where we interrogated the contractual process, gave me a thought that there are lessons to be learnt here for when we need to react at pace. In certain circumstances we need to obtain known goods rapidly and to challenging timescales. The Chinese know the market costs of items through constraint review and market testing, similar to systems I used in tendering for minor contracts previously, but used in this case on major projects. The main objectives then become achieving the completion date, Health and Safety and quality of work.

Using this as a basis for offering contracts at a stated cost permits rapid appointment and construction. I'm not naive enough not to understand the issues associated with this process but some associated basis may be found that fits our western laws so rapid procurement can be agreed. Indeed, the UK Government has implied just such a change to reduce delivery times for major projects. Building a new hospital in 2 weeks when compared to taking 20 years to build a new road highlights a serious process problem.

Urban development issues

One major consideration everybody will think about at some time during this pandemic is about how we live and what's best to counteract the worst effects particularly if this happens again. No longer can we ignore such a pandemic threat to society and our communities.

As a species and with increasing populations we need to maintain dense living in urban centres, the alternative is to damage the countryside while meeting our needs at the cost of nature. We have increasing awareness of the damage we have been doing to the planet which is no longer acceptable to most of us. Therefore how do we balance dense living yet permit social distancing and maintain mental health if such a lockdown occurs in the future, plus learn to live with nature.

Many masterplanned development may need to be reassessed with this in mind. The question will be asked of both developers and Architects to better design homes that consider pandemic conditions. Multi level housing that incorporates open space has been designed previously but there is an additional cost. Including private parking to enable electric vehicle charging needs to be included as well as economic and sustainable buildings. A challenge for developers whilst maintaining affordable housing costs.

How will our cities evolve following this pandemic?

I have outlined some issues above so is it reasonable to anticipate reduced traffic levels and reduced public transport as we leave lockdown?

Public Transport was always suited to larger urban areas but for the vast majority of space in my country, public transport was of limited benefit. Over 90% of Scotland is rural in nature so car use is required. Home-working may encourage more rural living or at least further away from city centres.

I know that the drive to encourage active travel through promoting cycling and walking is already being adopted by the UK government through large funding grants to local authorities as the pandemic passes. But that has limited impact on those working more than 3 miles or so from their work.

The drive to deliver walking and cycling is welcome but there are practical issues related to this ambition. In countries that are notable for high cycling levels such as the Netherlands and Denmark prioritise cycling over walking. However, pedestrian movement is still considered the main method of movement in the UK Cycling in these countries constitute commuter travel as well as leisure, in the UK a high proportion of cycling is considered more as a work out, so there is a problem with varying speeds of cycles.

It is not safe practice to mix cycling and walking therefore segregation has to be part of this initiative. Unfortunately many British streets are historic and have limited width so providing safe space for vehicles, cycle lanes and pedestrians is a challenge for designers and not so easily provided. Recent UK Street design guidance such as "Manual For Streets" advocates even narrower streets, in an effort to reduce traffic speeds, and in its present format is not helping the need to accommodate more and varied lanes of transport modes.

It is likely that to achieve greater active travel levels, UK Street design within cities will require sharing such transport methods across a number of streets and taking a more strategic view rather than treating individual streets. For example allocating parallel streets for either vehicles or cycleways, not trying to mix them. Providing cycle routes along rural roads is an equal challenge requiring increased land allocation to accommodate the additional width required. Achieving these ambitions require substantial skills and costs but the UK government seems determined to deliver this change.

There are a number of issues I can identify as issues that may change as a result of this pandemic.

The adoption of dormitory housing developments long ways from work places should be curtailed. Masterplanning should link housing to employment locations to reduce travel times.

The need to review housing demand and related commercial provision along with shopping demand all needs to be far improved, better joined up and delivered.

Having said that, the need for car based transport will remain but the international need to decarbonise transport also remains.

What is clear too me is that the future of Battery Electric Vehicles (BEV's) is very limited. My reasons for making such a statement is based on the following facts:- In June 2019 a group of scientist led by Professor Richard Herrington, the Natural History Museum's head of earths sciences warned the UK government that to replace all cars on British roads with BEVs (battery electric vehicles), UK demand for batteries would require :

- Almost twice the worlds currently yearly supply of Cobalt.
- The total amount of Neodymium produced globally every year.
- Three quarters of the worlds annual supply lithium
- At least half the worlds copper supply

On this evidence, BEV for all vehicles is not a realistic option but may form part of a solution for a proportion of all UK car traffic. Note, International material demand will far exceed the UK demand.

In addition, the question of recycling BEV batteries after their 8 years life expectancy has never been made clear to me therefore I assume recycling such batteries is limited if not possible at all putting further strains on the worlds resources.

Hydrogen fuel cell vehicles (HFCV's) are a much more practical solution but a lack of hydrogen refuelling network limits their use to date. The solution is straightforward but may require governmental support to deliver such a network. The current practice of using fossil fuel to produce some 90% of Hydrogen needs to be shifted to renewables. This may be an opportune time for some countries that can harness such renewable power to provide liquid Hydrogen for distribution globally.

Equally, the need to reduce waste and incorporate simple repairs thus extending equipment lifespans is something that those trapped in lockdown can appreciate. The wartime challenge of "make do and mend" was repeated many times during the lockdown as replacement was more difficult due to shopping restrictions. This resulted in a call to reduce our "throw away" society, not least as most recycling centres are closed and we needed the space.

The reduction of waste both in material and effort is a key aspect of improving our environment and global responsibilities. Currently some hardware can be upgraded through software updates extending use, something that can be engineered. Certainly, the benefits of remote working is well aligned with such upgrade capabilities.

One thing is clear that the pandemic has probably helped the change process for all the reasons above.

The Cpvid-19 pandemic has given those of us who were locked down a glimpse into what aspects of a changed society can look like and surprisingly many like it. Quieter roads and cities, improved air quality and the public commented on improved and closer communities.

For the international communities, the actual experience of a global pandemic has been an experience that few will forget. It remains to be seen just what aspects of life will change. It's not clear to me yet what will change, if in fact anything will change over time. The lockdown commenced and Politics was put to one side as cross parties joined in providing clear and honest information but as the lockdown has relaxed politics came increasingly into play.

But out of this adversity comes a range of opportunities to exert changes that previously would have been politically very difficult to make. Lockdown changed all that!

However, just as we look forward to a time where we can return to life as we knew it again its worth considering just what we have learnt from this crisis.

There is a need, in my opinion ,that we create an environment to examine how we live under a pandemic threat. Bringing together professionals and skills from construction, medicine, supermarkets and others in collaboration. e.g. Understanding air flows from coughs, how humans behave in confined spaces and extend this to cities may provide solutions for the future designs.

Most of that knowledge exists, just bringing it together is a challenge just now. This would be a real benefit from this crisis.

It is likely that we may have to live with this virus for many years to come, so:-

How do we stop this from happening again?

Stopping viruses jumping into humans from animals is critical, we have known this for many years. The World Health Organisation (WHO) today is aware of "disease X" - an unknown pathogen, one of many which are still a further threat to our populations.

Since 1970 the world population has doubled and our drive for even more space to live is an issue for us now. Land use change in conjunction with high populations and wildlife combinations creates a major health risk. Expanding our lifestyles into forested and natural areas encourages such virus jumps across the globe. Monitoring this in conjunction with such organisations as WHO can reduce such risks as our knowledge increases. Much of this ambition actually fits well with the UN's sustainable goals. Gaining strength from coordinating our combined knowledges is a key defence to our civilisations.

We should at least be thankful that our modern medicines and knowledge has limited the impact of SARS- Covid-19, its mortality rate is estimated at about 1%, The Black Death took between 25 to 75% of Europe's population in the middle ages.

We have woken up to the actual impacts of a global pandemics, we need to refocus our practices so we are better in addressing the next one.

John Thomson

President

The International Federation of Municipal Engineering (IFME) May 2020.