FLASHPOINT

NZ INSTITUTE OF HAZARDOUS SUBSTANCES MANAGEMENT

Autumn 2021

Tiwai Point:

Waste not, want not

USEFUL ORGANISATIONAL CONTACTS

NZ Institute of Hazardous Substances Management
www.nzihsm.org.nz
The official home of professionals committed to the safe management of hazardous substances and dangerous goods. The NZIHSM is a 'not for profit' industry association specialising in improving safety, health and (site) environmental performance, particularly the safe management of hazardous substances in the community.

Responsible Care NZ
Box 5557 Wellington 6145
Responsible Care NZ works with industry partners to implement the hazardous substances legislation.

WorkSafe (MBIE)
www.worksafe.govt.nz
Government agency formed to provide compliance and enforcement of hazardous substances. Responsible for hazardous substances certificates.

EPA
www.epa.govt.nz
The EPA administers the HSNO Act and supplies extensive information on working with hazardous substances.

Ministry for the Environment
www.mfe.govt.nz
The Ministry administers the HSNO Act, and provides policy, publications, technical reports and consultation documents.

HAZANZ
www.hazanz.org.nz
An association of the safety organisations in New Zealand.

Institution of Chemical Engineers
Since 1922 the multi-national IChemE has advanced chemical engineering's contribution for the benefit of society. Its offices include UK, Australia and New Zealand.

Local Government NZ
www.lgnz.co.nz/lg-sector/maps/
Local Authorities have responsibility for policing building controls. Some local authorities are contracted to Department of Labour to provide enforcement of the Hazardous Substances legislation.

President's message

The sky is slowly clearing!

The human battle against Covid is turning and science has developed vaccines to boost our internal defences against the virus.

In spite of winter soon arriving, we will need to maintain our human spirit to prevail. In New Zealand our spirit is currently good and we all hope that this may continue with vaccine for all to assist in our resolution.

We have been lucky to date; one only needs to chat with our friends in other countries to see the ongoing trials where the virus has really taken hold.

In this Autumn edition of *Flashpoint*, our NZIHSM team continues to have a positive feel towards our collective future. One reflection of this is the buoyant nature of the New Zealand employment & property markets, but even so, we still need to consider those other items that form part of our relationship with nature, with some of these detailed in the articles in this magazine such as:

(i) A robot stole my job (the rise of AI)
(ii) Taking care of our waste (The struggle treating waste from Tiwai)
(iii) Hazardous Substance Compliance Certifiers project (We need more helpers)
(iv) Hydrogen as a Fuel?
(v) How humans are treating our home? (including Attenborough's findings)
(vi) The Napier petrol station explosion
(vii) Our covid update

Now that help is on its way from our development of vaccines to boost our immunity against the competition of our fellow life-forms, we can have hope of working along with our fellows for the benefits of us all.

We at the NZ Institute of Hazardous Substance Management extend our best wishes that YOU and ALL yours continue to keep well over this interesting planetary period!

President John Hickey

CONTENTS

Flashpoint

Flashpoint is the official journal of the NZ Institute of Hazardous Substances Management.

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Desperately seeking … somewhere

Rio Tinto is desperately seeking somewhere for over 100,000 tonnes of waste to go, now that the previous industrial customer has closed the plant that absorbed some of the residue.

The SCL (spent cell liners from the pot lines) was used by Holcim in its Westport cement manufacturing plant, but that closed down before the cement trade absorbed any appreciable amount.

Under a plan back in 2010, between 10,000 and 15,000 tonnes were be sent to Europe each year where it would be used as an alternative fuel, replacing coal, for the industrial insulation of ceramics, brick and cement industries. A year-long deal was struck with Holcim Cement to process SCL at the Westport Cement Works where it was to replace some coal in cement kilns. It was hoped it could result in a deal where the cement-makers were to take 3000 tonnes a year.

Crushed SCL acts a fuel replacement. Holcim told Flashpoint that the flouride content lowers the burning temperature required in the concrete manufacturing process (fuel savings), the amount of nitrogen oxide formation is reduced, CO_2 emissions are reduced, cyanide component is completely destroyed due to the high temperature, and no residues remain making it a nuetral product.

This is all well and good, but … while composition of SCL can vary, due to the typcially high content of alkali in SCL, only a limited amount of it can be used in each kiln. As a result, it is not possible for the entire Australian, nor the New Zealand, cement industries to use all the SCL produced they produce.

If Nature conspires against Rio Tinto in the near future with accelerated erosion, it will be under immense pressure to mitigate or avoid a potential ecological disaster with a world-renowned and listed wetland for a neighbour, not to mention Bluff township, internationally-appreciated oyster beds, rare mutton bird habitats, and the whole Stewart Island and Catlins special environmental areas.

As Rio Tinto edges toward withdrawing from the Tiwai Point smelter in four year's time, it is having to weather a storm of protest over the storage of waste from the plant. It reportedly has $298 million budgeted for closure and rehabilitation. The Minister for the Environment is taking a closer interest in the situation

Tiwai Point smelter: the SCL storage pad can be seen as a pale area above the main complex.

The Mataura River in flood raises fears the riverside warehouses storing the ouvea would be inundated causing poison gases to be released.

and Rio Tinto can expect to be under almost constant pressure until and after it shuts Tiwai Point down.

The ouvea waste stored in a disused paper factory in Gore, which Rio Tinto no longer owns, has been in the news for some time with a vocal local protest being pursued.

The Minster got involved and pithily expressed his disappointment at progress as arrangements to remove the ouvea stalled when the removal company went into liquidation.

A major civil defence operation was in the offing last year when the Mataura River flooded and almost made its way inside the old paper mill where the ouvea is stored – it can give off lethal gases when wet.

Eventually removal got underway again, at the beginning of March, when about 2900 tonnes were moved, leaving 7100 tonnes it is hoped will be back at the smelter by the end of May. Rio Tinto told *Flashpoint*: "Over 1000 tonnes have been re-moved since the accelerated agreement was reached between the Crown and NZAS. That is in addition to the 2000 tonnes that had already been removed in 2019. We are still on track to meet the target of removing all the material by the end of May (weather dependent)."

The next alarm was the realisation that the SCL waste on a concrete platform a kilometre from the smelter was being rapidly encroached by the sea. Rio Tinto considers it safe although it is constantly monitoring the situation. The size of a couple of football fields, the special concrete pad holds at least 120,000 tonnes waste. Rio Tinto is comfortable that the site is safe. Then came news of another approx 75,000 tonnes stored in buildings nearby!

Then the company's landfill (pictured at left on the point above the refinery) was back in the news with a desk top exercise report ringing alarm bells over sea level rise and the area's vulnerability, which the company's disputes. The landfill contains all manner of waste and is reportedly the size of 250 Olympic swim-ming pools

Rio Tinto has its back to the wall facing not only media scrutiny, but is being harangued by three Ministers: Finance Minister

Grant Robertson, Energy and Resources Minister Megan Woods who said "Rio always knew for the Government the bottom line in any relief around transmission pricing was reaching agreement on an adequate site remediation plan," and "the Government is not prepared to accept 'a toxic wasteland' where aluminium had been made for decades, " while Environment Minister David Parker has displayed his dissatisfaction at the state of affairs on several occasions.

Chinese experts Xia Zhao and Lei Mao consider the waste cell liner the world's most troubled source of environmental pollution for a long time. In a 2018 paper they said: "According to the statistics, for per ton of primary aluminum produced, about 30 to 50 kg of SPL is generated.

Each tonne of pot liner contains about 150 kg of fluoride and 2 kg of cyanide. Current capacity of aluminum production in an electrolytic aluminum factory is 200,000 tons per year which produces about 6000t waste. Over the past 15 years, the output of aluminum has ballooned, reaching 316.72 million tonnes in 2015, and the total output is 9502 million tonnes."

Holcim's New Zealand cement plant.

Executive director of the Tiwai Point plant earlier this month made the assurance Rio Tinto will safely and responsibly close the plant after the Government suspends talks on future clean-up. Stu Hamilton said the smelter recognises its impact and responsibilities will not end

It seems like it will be a long four years for local Rio Tinto management. But can the powers that be (national or regional) actually, physically force Rio Tinto to remediate the site? That's another story.

The rise of AI: A robot stole my job!

During the Covid season there have been reports from offshore of dramatic reductions in some workforces as some multi-national companies have been faced with a dramatic reduction in workload and reduced workforces accordingly.

Some companies have been achieving this by the increased automation of the workforce by replacing people with technical equivalents through adaption of Artificial intelligence (AI).

But what does this mean? For some, the future holds an exciting vision of technology, enhancing our everyday lives and jobs. For others, it's a somewhat bleaker view of an uncertain future, where humans are controlled by mechanical overlords and are unnecessary in keeping the wheels of industry turning!

In the latter camp, who can forget that futuristic film classic 'The Matrix' where humans are actually bred by machine overlord as energy battery sources, until one of the battery humans called Neon awakes and goes about freeing humanity from the overlord of 'Agent Smith' and the machines.

Hopefully life is not so dramatic and humans can continue to be masters of our universe and AI there to help and not hinder our future together.

In the meantime, the Oz ABC network has created another thought-provoking online tool that claims to quantify the possibility of careers being taken over by robots in years to come.

According to their predictions, tech-related professions seem likely to still require the human intervention well into the 21 century and beyond.

However, manual labourers and Production workers, (such

as plant operators) careers are at the highest risk, with a 68% chance that droids will take their jobs or when it comes to cleaners the predictions are that 77% of workers could be replaced by machines.

Accountants, inspectors and regulatory officers may also be reduced, with a prediction that almost 31% will no longer be required, although how a robot is going to attend a site visit and assess the health and safety of a facility has not been defined. Although we do hope that the robots care!!

Technology is changing the nature of 'human' jobs, and most of us have now met the 'online receptionist', input our orders to an online screen, or used the self-checkouts at a supermarket.

However, in some cases jobs may also be created and some researchers from MIT believe that AI will not only replace jobs but create new ones.

Three new categories

Researchers considered three new categories of AI-driven business and technology jobs. They labelled them trainers, explainers, and sustainers.

They consider that humans in these roles will complement the tasks performed by cognitive technology, ensuring that the work of machines is both effective and responsible — that it is fair, transparent, and auditable.

Overall as has been happening internationally especially during the disruption of Covid, some human roles are being replaced by AI and robots who are immune to viruses, but then again who would have believed in an international internet or world wide web only twenty-five years ago.

Technology is changing the human experience but it will be important to ensure that we control technology and NOT technology control us.

Asimov predicts

So perhaps as the science fiction writer Asimov wrote in his 'three laws of robotics' back in 1942, when thinking about the role of the relationship between humans and a future 'self-aware thinking technology' which may have 10 times the cognitive processing capacity of the average brain, that

" A robot may not injure a human being or, through inaction, allow a human being to come to harm.",

perhaps we need such a rule as a basis for our use of superior technology which might not have the same caring capability for these 'weak blood-filled humans'.

Such laws seem to be lacking at present but could be very important if we wish the 'care and concern of our technologies to match humans' to allow us humans to continue to enjoy our freedoms while taking advantage of what may indeed be a superior and faster processing technology!

Yes , ***"We need rules to ensure that Robots and AI can remain kind to Humans".***

Hazardous substances compliance certifiers project

The Hazardous Substances Compliance Certifiers project aims to grow the number of compliance certifiers, to help ensure New Zealanders are not being put at risk by hazardous substances.

For most hazardous substances, an independent check is required to confirm compliance with controls on those substances. A compliance certifier is an independent person authorised to issue compliance certificates.

How will it help?

Currently, there is a significant shortage of compliance certifiers, which has the potential to undermine New Zealand's regime for managing hazardous substance. A clear pathway to attract and train people into this important role would be beneficial.

This project aims to ensure New Zealand's compliance certification scheme is sustainable by building the number of qualified compliance certifiers. Resources developed during this project will also be available for other hazardous substance professionals operating in New Zealand.

Who's involved?

The project is a joint venture between HASANZ, WorkSafe, the Hazardous Substances Professionals NZ (HSPNZ) and the NZ Institute for Hazardous Substances Management (NZIHSM).

Key activities

Training: The project is focused on developing a competency framework, a training model and training materials for compliance certifiers.
Attraction strategy: An attraction strategy is being developed to encourage suitable people into the profession.

This will be targeted at young people starting their careers, other hazardous substances professionals wanting to broaden their scope of expertise, and other health and safety professionals who may want to broaden their expertise to include compliance certification.

Progress so far

Training: The project is focused on developing a competency framework, a training model and training materials for compliance certifiers. We are developing the first year of a training certificate programme with a well-known tertiary institution, more to follow.
Attraction strategy: The team has commenced together videos, career pathways, etc to help.
More help: The team is looking for subject matter experts to help with the development of the specialised areas.

It would be useful if people could contact us if they are willing to help?

For more information contact info@HASANZ.org.nz or office@nzihsm.org.nz

'Friendly' chemicals?

A lot of the friendly household chemicals that are such as help around the home, may be just a little like Brutus and his mates.

THere is growing evidence, according to epidemiologist Shanna Swan is that 'mother's little helpers could be stabbing us in the back through altering our reproductive state.

The reason, Swan explains, may be growing exposure to "endocrine disrupting chemicals" that are found in everything from plastics, flame retardants, electronics, food packaging and pesticides to personal care products and cosmetics.

These substances interfere with normal hormonal function, including testosterone and estrogen. Even in small doses, they pose particular danger to unborn babies and young children whose bodies are growing rapidly. These hormone-warping chemicals, which can enter even the placenta, have the ability to alter the anatomical development of girls and boys, change brain function and impair the immune system.

Her work on falling sperm counts garnered worldwide attention in 2017 – her central finding: from 1973 to 2011, the total sperm count of men in Western countries dropped by 59%. The quality also nose-dived, odd-shaped sperm and fewer strong swimmers capable of fertilising an egg.

Hydrogen as fuel… hazardous thinking?

Recent politicking around the future of the Tiwai Point aluminium smelter lead to the suggestion that it be converted into a hydrogen fuel production facility, based on the substantial quantity of electricity available on the site. "It's a 'no-brainer' said some". But is it?

The concept is that the electrolysis of water liberates hydrogen from its associated oxygen. The process is conducted in a unit called an electrolyser. It all sounds very simple, but the process is only about 70% efficient, and then requires a nationwide infrastructure to distribute the hydrogen; this, a highly flammable substance. Where they exist, natural gas distribution networks could be re-engineered for this purpose.

Hydrogen is hazardous – it is flammable to store, transport and dispense. Certifiers would have to think long and hard before signing off a hydrogen storage facility.

Classic disasters with hydrogen include the 1937 Hindenburg hydrogen-fuelled airship disaster, and the destruction of a hydrogen filling station in Norway in June 2019. Electricity is a lot simpler to distribute and dispense than hydrogen, but is no panacea. The batteries used in EVs are heavy, expensive, have a low range between recharges and a long recharge time. Also, unless recyclable, the safe disposal of defunct fuel cells and batteries from EVs will be an environmental issue.

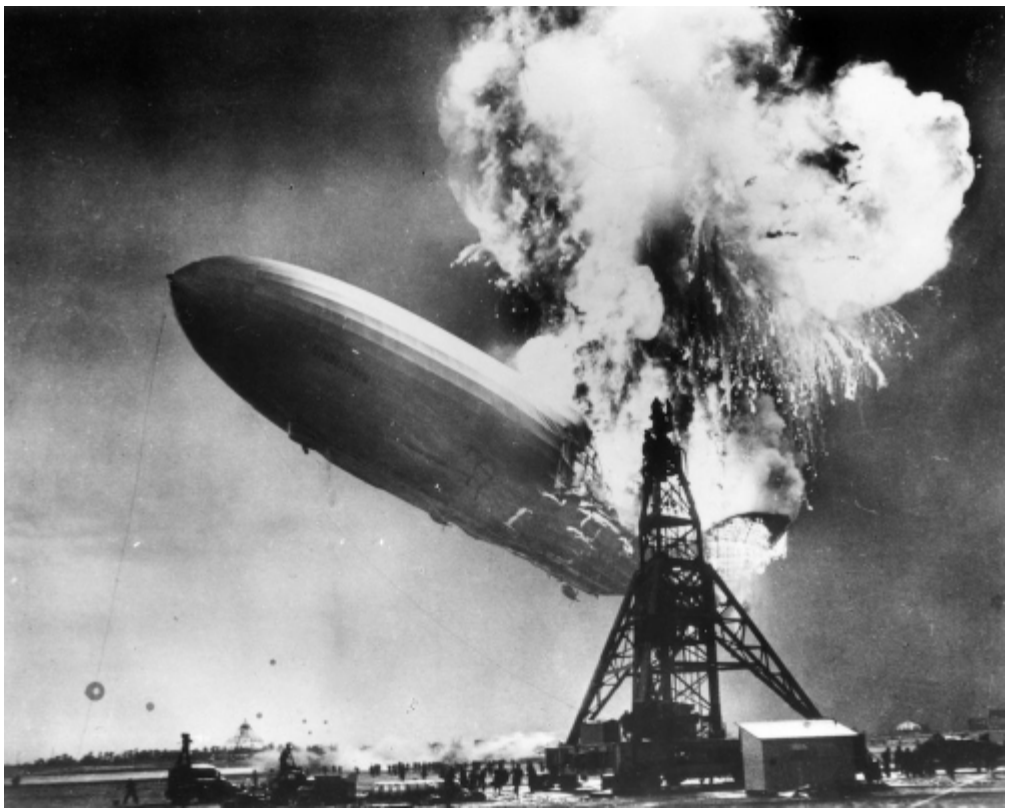
Vehicles use hydrogen in one of two ways.

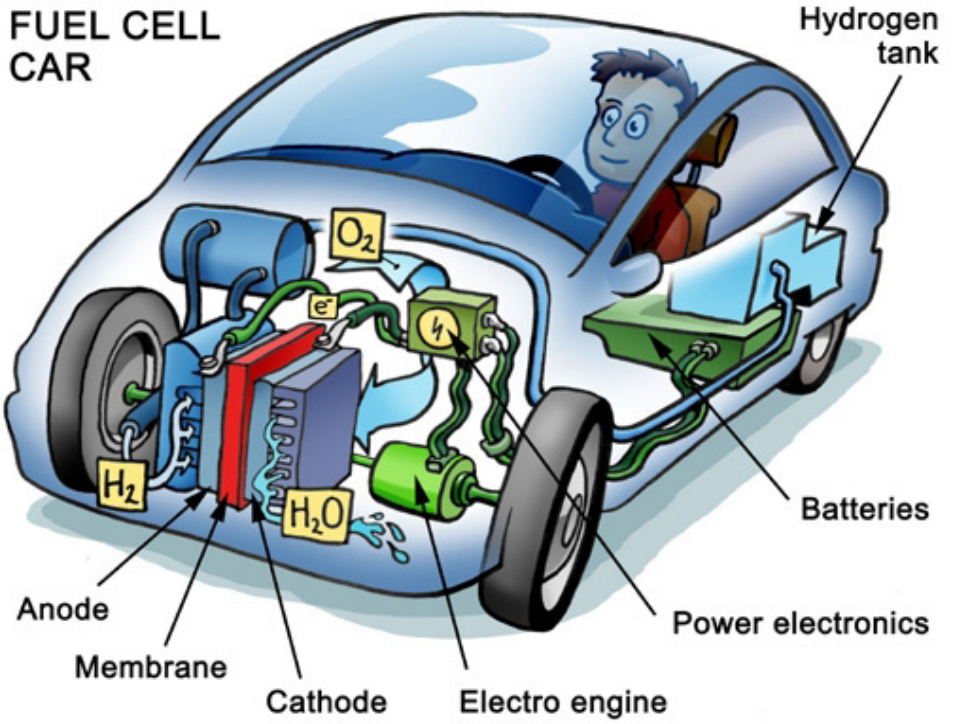
- Some vehicles will be of the direct combustion type much like a gasoline engine, which will require hydrogen either as a compressed gas at 700 bar pressure; or as a liquid (less likely as it is very expensive to liquefy hydrogen down to minus 253deg C, as is done for rocket propulsion).

The very high storage pressure required for hydrogen is necessary as hydrogen has a very low volumetric energy density (about one three hundredth of gasoline).
A disadvantage of direct combustion hydrogen engines is their emissions which include nitrous oxides, which runs contrary to automakers goal of zero emission vehicles.

- The use of fuel cells is an option proposed to get closer to a zero emissions vehicle.
A typical fuel cell works by passing hydrogen through the anode of a fuel cell and oxygen through the cathode. The anode splits the hydrogen into protons, and electrons which are forced through a circuit,

The classic anti-hydrogen photo: the *Hindenburg* explodes while docking in the USA.





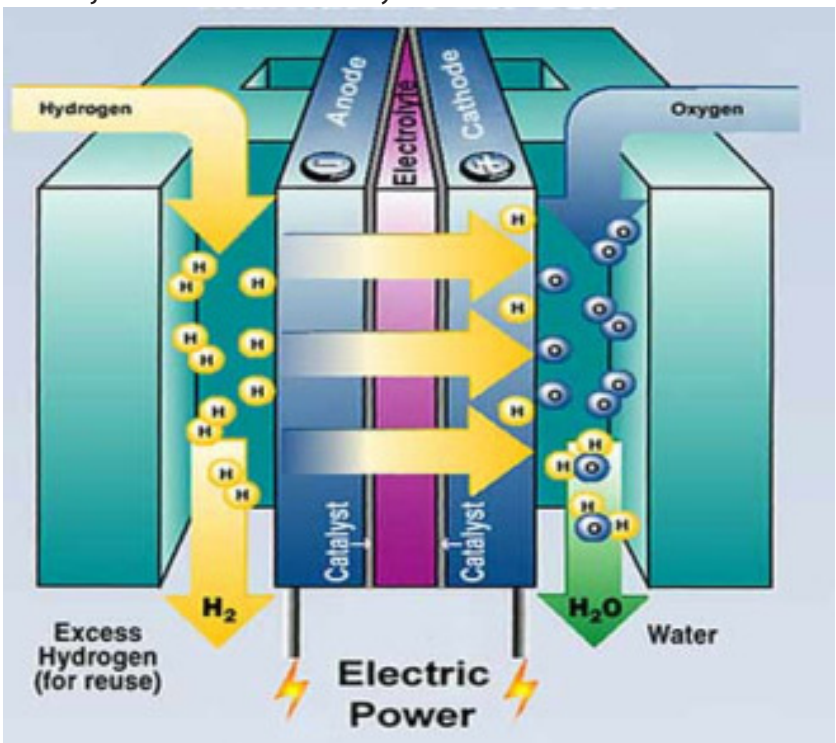
generating an electric current and excess heat. The electricity produced can then power an EV. At the cathode, the protons, electrons, and oxygen combine to produce water molecules as the only emission. As there are no moving parts, fuel cells operate silently and with extremely high reliability. As with direct combustion vehicles, a fuel cell powered car will require portable hydrogen availability ie as a compressed gas.

However, attractive as the above concepts may seem, looking at the system in its totality – from electricity supply, hydrogen production efficiency and its end consumption – and the logic starts to fall apart.

The proposal relies on electricity for its existence. Unless renewable electricity energy sources are available (wind, solar, hydro), the proposal will just replace vehicle tail pipe emissions with power station emissions; whether the electricity is required to produce hydrogen, or for charging EV batteries.

Also as noted above, the electrolyser hydrogen production process is only about 70% efficient. The fuel cell then takes this hydrogen and converts it back into electricity to make the energy usable. The excess heat generated in the fuel cell reduces its efficiency to around 70%. The cumulative efficiency of the combined electrolyser/fuel cell combination is hence only around 49%.

All this just to convert electricity
All this just to convert electricity



into hydrogen then back to electricity; the initial electricity for which could be fed directly into re-chargeable EV batteries!

Beyond road transport, many trains systems world-wide are already electrified; long-distance shipping remains challenging and costly to decarbonise; and long-distance aviation is hard to decarbonise, given kerosene is extremely light and energy dense.

Alternative fuel options have been available for as long as the world has relied on fossil fuels for industrial energy and transportation. That fossil fuels have predominated is akin to the process of natural selection.

Fuels that are cost-effective and simple to produce, transport, and dispense have prevailed, and will probably continue to do so. It seems unlikely that certifiers are will be asked to inspect hydrogen storage and distribution systems in the immediate future.

– Dave Lascelles

Why simple accounting has robbed the Planet

In the recent past we humans have learned to settle down and till the pastures and gardens to grow food and products for ourselves to live on, rather than needing to chase it around the plains in our animal's traditional role as hunter-gatherer.

Amazingly our ability to grow our own food has freed up much time for us to invent and create other products that allow us to sustain an easier lifestyle such as houses, shelters, fire and energy, transportation and even medicine to protect us against any ills that the planet may send our way.

What is more, that most of us humans have learnt to live and work together, and specialise to our strengths, to create even more products such as roads, houses, cars, communications, blankets, energy supplies and 'fast foods' to make most of our lives easier by far.

This fantastic development and has allowed the human species to extend its lifespan over the past few hundred years from an average age of 40 to regularly achieving 80 – yes, over twice that amount.

But, of course, once we were specialising and creating these wonderful products for other humans to consume meant that we needed to find a way of swapping our products, so that all of our neighbouring humans could benefit from our creations and we benefit from theirs. We needed a method to assign a value to our products so that somehow the time and resources that contributed to a product could somehow be realised so that a 'fair swap' could be achieved to make it worth our while to make more involved products that could be swapped or exchanged for simpler products and allow a fair barter system to be established.

Our barter or monetary value system meant that it was worth spending some time and effort into making a house that could be swapped for more than a bunch of grapes.

Worth our while

But to make it 'worth our while' to grow or develop these products, humankind needed a method to assess the value or 'account for' the value of all of our products so that more complex, or time and resource consuming products had added value and could be produced, confident in the knowledge that these efforts would be rewarded by more of the basic or lesser value products being available as a swap for our efforts when we offered these to other humans in or human market.

Yes, we needed to 'account' for value of products, and thus the very human resource allocation system known as accounting was born. Accounting is a very human system for valuing and allocating resources based on what we know about the human cost of production for a product and the demand for a product by other humans in our known 'swapping places' or markets.

It is likely that a modern accounting system was born in Venice in 1494 with a publication on bookkeeping by a Christian Monk called Luca Pacioli (pictured below)

who apparently also taught Leonardo da Vinci mathematics. He suggested a system where different products could be recorded and valued which ascribed a value to products and allowed them to be 'accounted for'.

This accounting system allowed for co-operative swapping to occur and indeed developed swapping 'market theory' and economics were also born. Later bookkeepers, who by this time had become accountants and economists, considered not

only value, or cost of products, but also looked at the swapping markets for products and how humans perceived supply and demand for products could affect their value and indeed allow for a whole society and political method of human cooperation to be established based on a confidence in a system of supply and demand based on value.

Then around 1740, Scottish economist Adam Smith looked into The Wealth of Nations and had an 'invisible hand' in there,somewhere.

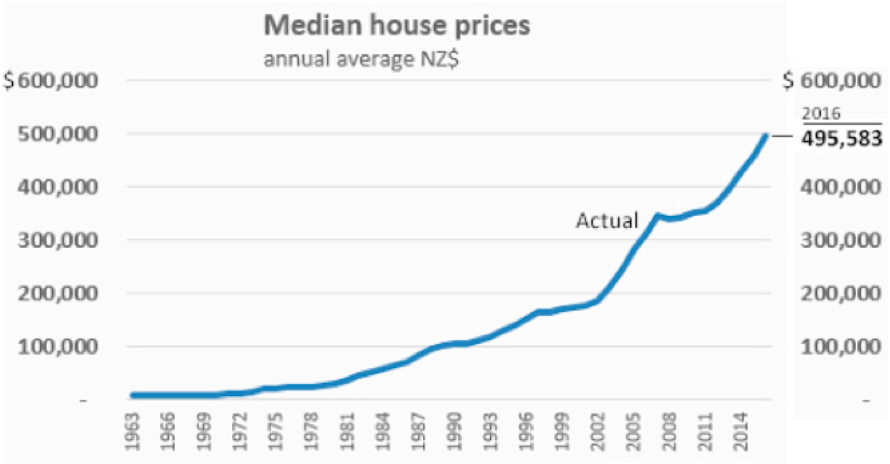
It could be argued that a benefit of this co-operative 'market-based' system also freed humans to consider other individual values. But, as with all processes, there are pluses and minuses, and the accounting systems are full of these. Take, for example, the average price of labour in 1980 vs 2020 for wages and houses?

Could one argue that it now takes more labour to build a house in 2020 vs 1980 ?
Based on some data prepared using the Statistics NZ for median house prices which were then adjusted using the RBNZ Inflation Calculator to derive 'real' 2016 prices in a 2017 article by David Chaston, indicates that in 1980 where 'real' median home value in NZ was $132,247 for a house built in 1980 whereas in 2015 the real median home value for the same house in NZ was $457,929.

This would suggest that in 45 years the 'same' house was now worth almost 3.5 times or 3500% as much and almost seven times as much by 2020. But this not as new a house as it was when built in 1980, but now the 'same house' with no additional work is now valued at seven times as much. How can this be as there has been no more work added? Such are the vagaries of supply and demand in the human monetary value models?

The monetary problem for nature

The monetary system problem for nature in that our measures of wealth—GDP and profits—only count nature when it's destroyed, transformed into things like jeans, houses, smartphones. Living nature—trees, honeybees, oceans, the atmosphere—counts for nothing. We have inadvertently programmed our economies to ruin the earth and perhaps the mechanism which actively works to destroy the planet is our accounting system.



We still use the medieval accounting system that Luca Pacioli codified in 1494. It worked well to measure the capital of merchants, the output of factories, the economic growth of nations after the Second World War, but it is now showing its limitations in the 21st century where our single planet is almost full.

Our planet is now bursting with people and we've been polluting, burning, extracting and cutting down vast swathes of nature for centuries with little regard for the environmental consequences. In 1968, a few months before he was assassinated, Robert Kennedy pointed this out.

Speaking about the GNP of the United States, Kennedy identified the many 'bads' that are counted as national wealth—highway carnage, pollution, the destruction of forests and "the loss of our natural wonder in chaotic sprawl".

Natural capital

Perhaps it is time to investigate how the way we measure and account for nature shapes the way we treat it and time to consider those environmental consequences.

Some accountants are doing just that: taking account of nature by redefining it as 'natural capital'—or the world's stocks of natural assets which include geology, soil, air, water and all living things". In 2012, the United Nations gave natural capital equal status to GDP in national accounts and 40 financial institutions signed the Natural Capital Declaration to add it to business accounts.

Perhaps valuing nature as 'natural capital' helps solve the challenge of making nature count, because it puts a monetary value on nature and so makes us pay for destroying it, which should discourage us from doing so. However, this approach also brings its own dangers. By putting a price on nature, it extends the market further into nature's realm and risks its becoming financialised and privatisatised.

The idea of pricing nature may also have its problems, as the recent flood of 'low value carbon credits' indicated, as our only apparent common measure of value, of right or wrong action, is the rule of money.

Perhaps another argument is that trees and other natural entities and the environment should be given legal rights—and thus overturns long-held perceptions enshrined in western legal codes that nature is property to be possessed, governed and used by man for man.

The noted environmentalist David Attenborough recently published a book *Life on our Planet* where he raises the limited resources of our beautiful planet Earth. He points out that there is only 'one Earth' and that we humans have almost over-dominated and risk destroying much of what we enjoy of Earth in a series of statistics:

1954
world population 2.7 billion, carbon in atmosphere 310 ppm, remaining wilderness 64%.

2020
world population 7.8 billion, carbon in atmosphere 415 ppm, remaining wilderness 35%.

'Planet abuse' in the form of unchecked deliberate wildfires in the Amazon, clearing land for farming.

That is only 50 years later, in less than 1/10000 of our Earth's existence, we humans have 2.88 times the human population, 34% increase in atmospheric carbon and halved the remaining wilderness.

Our lovely Earth is being accidently destroyed by our 'blind assault on the planet' and as part of our accidental destruction Attenborough has provided some statistics:

From 1954 to 2020:
- almost all large oceanic fish have been removed and 30% of fish stocks are at critical levels;
- plastic waste has invaded the ocean and >90% of seabirds have plastic in their stomachs;
- globally we have reduced the size of animal populations by over 80%;
- the world's rainforests, as lungs of the planet, have been reduced by half, often for farming;
- some pesticides, nitrates and over-added chemicals are becoming hazardous substances to Earth;
- 70% of the mass of birds on the planet are domesticated, so we can eat them;
- 96% of the mass of all mammals on Earth is made of human bodies and those that we eat, we account for 33%, domestic animals (cows, pigs, etc) 60% and wild animals only 4%.

Yes, we humans are truly dominant of our somewhat limited planet, we regard Earth as our planet run by humankind for humankind. Attenborough suggests that: 'The truly wild world, that non-human world has gone. We have overrun the Earth."

He says that the latest scientific understanding suggests that "the living world is on course to tip and collapse with increasing speed so that many of the Earth's environmental services that have been provided for free – could begin to falter or fail entirely.'

This is unsustainable and comparing the Earth to a clean

laboratory Petri dish where a few bacteria are introduced, these then grow fast and exponentially but when these hit the finite edge or limit of the environment the system is not 'sustainable' and the colony crashes as quickly as it rose with insufficient food and a hot and toxic environment.

We hope that this doesn't happen to our beautiful planet but we have become so dominant that we may need to rapidly all act sustainably to ensure that our planet is sustained for all of life's enjoyment.

Attenborough argues that we need to let nature 'go wild again' to regain this sustainability that we are in grave danger of losing.

Not above nature

But how do we protect the planet from over-colonisation? We urgently need to realise that we are not above nature, with nature as a capacious store of resources freely and infinitely available for us to turn into stuff, while also acting as a huge garbage tip in the great beyond.

There is no free infinite store.

There is no great beyond.

Both are the finite planet beneath our feet.

Free lunches are limited, we need to include ALL the planet in our accounting, and urgently develop sustainable methods to protect our planet and only through this will we truly protect ourselves and planet.

If you can smell it …

Normally you would imagine the waft of petrol fumes in a confined space such as a car would tell you something … primarily, not to light a cigarette.

Well, someone did and is lucky to be alive, never mind that he destroyed the forecourt of a Napier petrol station and a couple of cars into the bargain.

The saving grace in the whole situation is that the station's defences worked exactly as intended, shutting down fuel supplies, and safety curtains, etc, were deployed. This al-lowed the fire service to confine itself to the forecourt. However, the insurance bill will be considerable.

Coincidentally, the local volunteer brigade has recently practised at the petrol station. The real thing, however, was a situation in which the heat could be felt 200 m away.

Detective Inspector Rob Jones said the people connected to the fire, other customers, and BP em-ployees were extremely lucky. The entire service station forecourt was alight within minutes and it is nothing short of a miracle that nobody was injured or killed.

"The positive actions of the BP staff at the time to respond quickly to an exceptionally dangerous situation made a significant difference to the outcome. We also want to acknowledge the quick and professional response by FENZ to manage the risks associated with this major incident and ensure the fire was contained within the large forecourt area."

Uncle Archie

Kia ora HS Practitioners!
2021 is a year of promise. Throughout 2020 we were all in the shadow of the Covid19 virus, but perhaps some light is poking through the clouds ahead of us.

The chemical cure?
In spite of some early enthusiasm there was no obvious chemical to hit the bug and miss the human host. Yes, one noted authority suggested injecting bleach, which was met with some bug derision while working wonders on his wig!

Virus effects?
The virus has rapidly spread around the planet in 12 months with now over 110 million having been Covid positive, millions sickened and over 2.5 million dead. Yes, nature is tough!

Virus vaccine?
Globally doctors have been in search of the chemical and natural cures, with significant returns to date. Over three vaccines have been developed in rapidly progressed medical trials. Medical experts are using our knowledge of nature to defend us all against natures trials, and with anticipated effective rates of over 85% early results are promising.

Virus vagaries
One issue that is of concern with all small bacteria and viruses is that with billions of bug offspring there are bound to be mutations and some UK and South African variants have already made the headlines. Even so the vaccines are being rolled out which are likely to trim the virus effect provid-ed nearly all humans can receive this!

Whig's world?

An interesting effect from recent events, is that arguably even the most powerful democratic politician on the planet can be instantly removed from internet communication. No matter your thoughts on this, it does beg the question as to whether our democratic processes are actually in control of our society?

Virus world
Like many of Earth's life forms, viruses are all around us. The most likely source of the current Covid virus was the horseshoe bat found in southern China. Viruses don't transmit very well unless they can get into another cell such as a human cell, as was in the first outbreak just over a year ago.

The problem is that once in, viruses can replicate at up to a million per day, don't need much food and can mutate rapidly and transmit from human-to-human spreading disease. This transmission can be accelerated when human air travel is considered, which is a nuisance to us slower and larger life forms.

New Zealand world
So far New Zealand has been lucky using isolation to minimise covid transmission, and accompanying sickness. With a little more luck we may all be vaccine immunised before the virus takes too much hold. Spare a thought for our UK cousins who have Brexit and the Bug to contend with. And like the Flu virus before, we may need to adapt our vaccines and get regular injections to stay ahead!

A New Zealand blowout
An Auckland lockdown hotel recently had a virus breakout where the breathing hepa air ventilation was considered safe but the virus had spread from the lavatory air extraction system. A case for Gloves, Masks and Diapers?

The Big Bang theory
On a forecourt at a Napier service station recently the hazardous substance regulation's logic of isolating the three fire contributors "Air, Fuel and Ignition sources" was cruelly demonstrated when a local genius used his lighter to see if his petrol containers were full! Fortunately, no-one died but the results were somewhat dramatic!

If you want to send your comment, you can send it to archie@NZIHSM.org.nz.
The ideas expressed in this column are not necessarily the views of the NZIHSM or *Flashpoint* and in some cases the NZIHSM frankly does not approve!

Covid – help is on its way!

In April 2020 we considered the turbulence of 2020 with eruptions, firestorms, floods, droughts and then along comes the toxic bug Covid19.

In April 2020 we discussed the four typical Control methods of:

(i) ***Develop immunity against them***

We find a vaccine to protect humans by developing our internal antibodies so that our immune system can stop the virus overtaking our body.

(ii) ***Chemical treatment***

Find a chemical which can kill the bug without killing us. This has been slow in coming with the suggested bleach being only useful for the hair.

(iii) ***Isolation or Prevention***

We need to prevent the bug from getting near to our bodies through the use of self isolation to keep unaffected humans away from the virus and Personal protective equipment (PPE) and hygiene methods where we cannot isolate

(iv) ***Testing***

To have effective isolation we must locate ALL of the bug and isolate it ALL to stop its spread, this is where comprehensive testing is important.

The New Zealand Government and health authorities, accepting that a vaccine or known chemical was not readily available, rapidly adopted the isolation strategy at a far faster rate than many other countries.

So what do the numbers tell us one year after we first reviewed this isolation strategy.

How are we going?

This bug has now caused 2,600,000 deaths in 14 months, from 119 million infections worldwide as shown above and it has continued to spread throughout most of the human world.

This infection rate is significant although in many ways due to the Earth's government's science understanding the infection rates are less than the estimated 500 million from the 1919 Spanish flu epidemic and much less than the estimated 50 million deaths world-wide from this particularly nasty bug.

Yes, this time humans are AHEAD, but only just !

While this lockdown has significantly affected our human desire to be travellers and masters of the world for at least a few years, our combined isolation strategies have in the main worked. This has worked particularly well in New Zealand due to a strong initial isolation lockdown strategy we have achieved <1 death/100,000 population where compared to a global average of 153 deaths/100,000 population and because of the initial strong reaction have to date needed less lockdowns than many other countries and we can be thankful for this.

Help is on its way !

Thankfully the human masters' of science have developed vaccines, and help to break the isolation strategy and after a year help is on its way!

However, to be fully effective, as much of the human race will need to receive the vaccine as soon as possible to lower the risk of vaccine-resistant mutants appearing amongst the billions of bug offspring from non-protected humans.

This could well take at least another year but means that we should all be able to live in line with nature to see another day?

– ***John Hickey***
Chemical engineer/Certifier

Convid-19 Virus Pandemic
Results of Highest case countries from April 2020 to March 2021

Location	Confirmed cases	Deaths	Recovered Cases	% death/cases	Deaths per 100,000 popn	Case fatality rate
Worldwide	**119,335,338**	**2,644,090**	**67,561,626**	**2%**	**153.0**	2.22%
United States	29,506,986	535,758		2%	162.0	1.82%
Brazil	11,363,380	275,105	10,000,980	2%	131.0	2.42%
India	11,308,846	158,306	10,953,303	1%	12.0	1.40%
Russia	4,380,525	91,695	3,985,897	2%	62.0	2.09%
United Kingdom	4,241,677	125,168	500,102	3%	189.0	2.95%
France	3,963,165	89,565	-	2%	135.0	2.26%
Spain	3,183,704	72,258	-	2%	155.0	2.27%
Italy	3,175,807	101,564	2,564,926	3%	168.0	3.20%
Turkey	2,835,989	29,290	2,659,093	1%	36.0	1.03%
China	90,027	4,636	85,209	5%	0.3	5.15%
New Zealand	2,043	26	1,945	**1%**	0.5	1.27%

India not learning lessons

Thousands of industrial chemical incidents, big and small, happen every year in India.

Quite how many industrial accidents occur in India annually is unknown, as many go unreported, according to *The Guardian* newspaper. Government statistics – which show 54,000 killed or injured in factory accidents between 2014 and 2016 – are thought to only represent a fraction of all casualties.

Campaigners claim the true figure is up to 15 times greater, and India is not learning from its record.

One problem is that few workers or their relatives are aware of their rights or have the resources to seek legal redress. Many are migrant workers from distant rural communities, a higher proportion are women, a significant number come from the most disadvantaged communities, and so are vulnerable to physical or other threats. Employers often pay compensation privately to ensure a bereaved family's silence.

Though a profusion of laws exist to protect workers in India, few are enforced. Inspections are rare, and some officials are easily compromised. Last year a fire caused by a short circuit killed 43 people and injured 60 in a workshop in Delhi. The building had been repeatedly inspected by local officials but no alarms were raised despite its evidently poor condition. Police said they would investigate alleged corruption.

Similarly, owners often escape sanction. The criminal justice system in India is slow, and scarce police resources are unlikely to be focused on the investigation of industrial accidents. Local political rivalries, or tensions between state-level and national-level governments can also complicate the search for justice. Pursuing multinationals or foreign owners is expensive, complicated, time-consuming and fraught with uncertainty.

In the case of Bhopal (the world's worst industrial accident), the then chairman of the company, a US citizen, refused to return to India to face charges, and Union Carbide paid only $470m (£282m) in 1989 to the Indian government in an out-of-court settlement. In 2010 a court sentenced eight Indians to two years in jail.

Finally, there is the profound problem of political will. Campaigners point to the example of traffic accidents. There are between 150,000 and 300,000 road deaths a year in India. Most of the casualties are poor people, with pedestrians and cyclists prominent among victims. Political decision-makers are significantly more likely to be among those being driven in large, safe cars on the chaotic roads than among those suffering most from the potholes, poor discipline and driving skills, or badly maintained vehicles.

The same is true of air pollution, which causes more than two million deaths each year, according to some estimates.

Residents collapsed in the streets and in their homes after gas leakage from an Indian polymer plant last year.

NZ Institute of Hazardous Substances Management (Inc)

MEMBERSHIP APPLICATION FORM

1. **Name**: ……..
   First Name Surname

2. **Employment:**
   Business/Employer's Name: …….

   Position and Contact Details:

   Position Held: ……..

   Qualifications: ……..

   Experience in HS:
   ……

   ……

   ……

3. **Preferred mailing address: ……**

   Telephone Contacts: (Bus)…….

   Residential: …….

   Mobile: …….

   Email: ……. Web: …….

4. I have previously been a member of the Institute: Yes…… No ……..
   If No, I am applying to be a

   Member: ☐ Associate member: ☐

5. Return to: PO Box 10-385, The Terrace, Wellington
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