From the Editor
(articles and responses are definitely encouraged)

G'day all IIEA'ers

This is the second of our newsletters for 2020. We are encouraging ALL members to submit articles, comments and even some humour that is of interest to the Industrial Engineering profession. **DK**

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From the Federal President

I hope that all IIEA members and their families are safe during the Covid-19 crisis.

Much has been going on in the Federal space. The major accomplishment has been the agreement in principle with Engineers Australia(EA) to hand back to the IIEA, the management of ALL IIEA members to the IIEA by September 30th, 2020. From that time on, ALL IIEA members will be invoiced by the IIEA(not only those on the IIEA database). All prospective new members (including those from EA) will now be assessed by the IIEA as previously.

The IIEA will collaborate with EA on a divisional level(as with WA) to undertake joint events.
The Heads of Agreement(HoA) will also be revised and signed off.

On another front, the IIEA's first national Zoom webinar was hosted by the WA division with 22 participants. Topics included the Tertiary Training of IEs by Assoc Prof Pavel Podsiadlo of Curtin University. The other presentation was by Glynn Davies of Woodside Energy, who spoke on the Impact of Working at Home(WAH) during Covid-19.

Another first will occur on September 12th, when the IIEA host its first AGM whereby ALL IIEA members will be able to attend. Due to Covid-19 and the travel restrictions, the AGM will most probably be undertaken remotely.
In the future AGMs will be open to ALL IIEA members. So there is one positive outcome due to Covid-19. Please look out for updates.

The IIEA has been working closely with Curtin University in assisting with the development and introduction of the BEng Industrial and Systems Engineering degree .

The website(www.iie.com.au) has been updated and will continually be added to thanks to Matteo Vinci.

We have electronic banking and those members who were invoiced by the IIEA have the option of payment by Pay Anyone, cheque and now Credit Card.

A Google Drive has been setup for IIEA documents repository.

Finally with the assistance of videoconferencing, the IIEA is in the preliminary planning stage for hosting an International IE Conference in 2021 Stay Safe.

David Karr(FIIEA, CP Eng)
Federal President – IIEA
15th June, 2020
davidkarr@interspacial.com.au
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From the Divisions
NSW-John Shervington

Who would have expected that our event planning for 2020 to be disrupted by Coronavirus let alone had even heard of COVID-19? However, this pandemic has brought enormous changes to our work and even to our way of life. Social distancing is likely to remain well into the year even while there is now a return to work for most, either in our usual workplace or when continuing to work from home.
On 23 March our first small group meeting for four new members and scheduled for 4th April was suspended due to COVID-19, along with other member activities, into the foreseeable future. However, IIEA, like many work organisations, has embraced Zoom technology not only for its own 3rd Federal Council Meeting on 7th May but also ran a Training Webinar on 14th May for all IIEA members.

NSW Div(ctd)

At the Federal Council Meeting a major unanimous vote by Federal Councillors, including myself, was made in favour of IIEA becoming an independent organisation remaining associated as a society of Engineers Australia and continuing to grow its relationship with Engineers Australia (EA). This was the fruit of ongoing discussion between councillors since our Annual General Meeting in Melbourne last year. Our President, David Karr in WA, will continue negotiating with EA to further this decision with discussions expected to be completed by September 2020.
The Webinar had two main topics: Working from home during COVID-19 – A personal experience, and Tertiary Training of Industrial and Systems Engineers. After opening the Webinar at 5.30pm (Western Standard Time) and 7.30pm (Eastern Standard Time), David Karr introduced the first speaker Associate Professor Pawel Podsiadio from the School of Civil and Mechanical Engineering at Curtin University. Pawel spoke of the new four year Industrial and Systems Engineering Degree at his School. The second speaker, Glynn Davies from Woodside, shared his experience of working from home during COVID-19. There were some twenty participants. Questions from the audience were directed at each of the topic areas and produced interesting answers from the two speakers.
After witnessing the effectiveness of these Zoom meetings, I am preparing - through IIEA – to hold our first Zoom small group meeting mentioned above on Saturday 30th May at 3pm. As social distancing is still a likely requirement for the second small group meeting of the year, scheduled on Saturday 6th June at 3pm, I will also be liaising with our group leader, Mohamed ElShafiery, for it to be a Zoom meeting. For both Zoom meetings members will be offered a Zoom link in order to log in and participate. Stay safe.

John Shervington
NSW Director/Div President MIIEA

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And Now some IE updates-Recent Zoom

Divisional meetings were here held in NSW, Queensland and Victoria and WA.
It was a great opportunity for members to "meet" their divisional presidents as well as the Federal President.

VIC Division Zoom
Mtg 2-16/06/20

WA- for Bob Watson(FIIEA)
The WA Division had planned an onsite visit to the Roy Hill Remote Operations Centre located at Perth Airport. Unfortunately this event had to be rescheduled due to coronavirus virus for a later date which hopefully won't be in the too distant future.

In May the WA Division held the first IIEA webinar with two speakers. Assoc Prof Pavel Podsiadlo of Curtin University presented the Tertiary Training of IEs. Glynn Davies of Woodside Energy, spoke on the Impact of Working at Home(WAH) during Covid-19. An interesting Q&A followed.

A WA Division meeting will be held on June 18th via Zoom.

The next planned event will be another webinar on a topical IE subject

Good luck
For **Bob Watson(FIIEA)**

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WEBINAR TRAINING OF INDUSTRIAL ENGINEERS AT CURTIN UNIVERSITY WEBINAR-14/05/20

At the recent IIEA webinar held on 14th May, the training of **Industrial and Systems Engineering(ISE)** at **Curtin University(CU)** was discussed by Associate Professor Pawel Podsiadlo **Civil and Mechanical Engineering(CME).**

Pawel has been responsible for implementing the new ISE degree. The IIEA has been liasing actively with CU of the presentation and content of this exciting new course. This IE tertiary training program has been long awaited.

CU has 2 streams of ISE training. There is the existing **School of Electrical Engineering, Computing and Mathematical Sciences (EECMS)** MSc in **Industrial Engineering(IE)**
And now there is also the the BSc Eng degree in ISE.
Units include:
Basic 1st Year Engineering Units such as

- Fundamentals of Strength of Materials
- Signals and Systems
- Engineering Graphics
- Engineering Mathematics
- Statistical Data Analysis
- Fundamentals of Mechanical Design
- Manufacturing Processes

As well as specific IE units such as

- Competitive Manufacturing Processes
- Operations Research
- Dynamic Modelling and Control
- Supply Chain Modelling and Optimisation
- Logistics Modelling and Optimisation
- Machine Design
- Network Optimisation
- Engineering Management
- etc

ISE is a great opportunity for graduates to examine modern engineering and management strategies holistically. This is to consider people, finances, equipment, processes, data, impact on the environment as safely as possible optimally.

The presentation is another step in the development of collaboration with Curtin University and the IIEA, in promoting of this degree. Prospects for growth are strong and presents graduates great opportunities in many organisations be they industrial, governmental, professional or academic. The relationship between CU and the IIEA hopefully will grow and the students and graduates will become active members within the IIEA.

In the new reset world post Covid-19, there will be boundless substantial opportunities for ISE graduates to discover prospects for employment leading to creating a superior world.

David Karr-Editor

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How To Implement TPM Autonomous Maintenance In Plant Operations- Chinhak Wong

How To Implement TPM Autonomous Maintenance In Plant Operations

TPM (Total Productive Maintenance) is a plant-wide initiative for changing equipment and workplace conditions to optimal standards. The Japan Institute of Plant Maintenance promoted TPM to the world through a series of TPM Congress events beginning in 1992. At the time, TPM was revealed as the primary Japanese secret of success in quality manufacturing and the world was convinced by the rich organized practices for transforming the capability of manufacturing enterprises.

I was present at the second congress, held in 1993, and became one of the early pioneers in TPM implementation in Singapore and Malaysia, where almost every manufacturing enterprise has since undergone some kind of TPM transformation. So, what exactly is this TPM transformation?

In the Japanese context, there are several pillars of TPM activities that are necessary for TPM implementation. The most important pillars are:

1. Autonomous Maintenance by equipment operators and technicians
2. Focused Improvement by equipment technicians and engineers
3. Planned Maintenance by maintenance technicians and engineers

Most large processing plants suffer from operational neglect and a maintenance crew's ability to cope with the ad-hoc calls to resolve equipment and plant failures and therefore are unable to take care of equipment condition or make improvements to them. Many plants have signed up with external contractors to repair and maintain their plants, but this is mainly for equipment overhaul, repair and plant facility maintenance.

Thus, it is necessary for operators and technicians to come together to make plans to take care of their own equipment in order to implement Autonomous Maintenance.

Autonomous Maintenance can be implemented in 7 stages:

Stage 1:   Initial Cleaning
Stage 2:   Equipment Restoration
Stage 3:   Corrective Action Development
Stage 4:   Technical Equipment Analysis
Stage 5:   Self-Maintenance and Condition Monitoring
Stage 6:   Process Quality Improvement
Stage 7:   Lean Autonomous Maintenance

In a typical large processing plant operation, it takes at least 5 years to realize all the 7 stages of implementation. In fact, most manufacturing operations find it difficult to move up to Stage 3 and Stage 4 as they require significant commitment from management to provide support for the

necessary coordination, administration and scheduling of resources and operators for engaging in TPM activities in addition to manning the equipment for production.

In a recent TPM installation at a large bio products processing plant about 50 football fields in size in Malaysia, it took a year for operators to progress from Stage 1 to Stage 2.

For **Stage 1**: Initial Cleaning, it has to be specified clearly what is meant by Initial Cleaning. If standard guidelines are not provided, operators will not understand the performance measurement change and they will conduct initial cleaning based on their own understanding. As operators will always do less rather than more, the intended condition change of contamination removal was not achieved until about 6 months later.

Stage 2: Equipment Restoration requires even more commitment from both management and operators. This is because every piece of equipment and facility supply line has to be identified and their functions known. Only then can operators restore equipment to "What It Must Be" condition. This stage is usually a big hurdle to overcome, involving the stopping of all leaks, application of visual controls, replacement of all broken parts, etc.

Stages 3, 4, 5, 6 and 7 are progressive stages in Autonomous Maintenance implementation. Many multinational manufacturing enterprises have proceeded up to Stage 3. Few move beyond Stage 4 as the required amount of technical training in equipment breakdown analysis and troubleshooting increases significantly.

So what is the issue then? Can all 7 Stages of Autonomous Maintenance be achieved solely by operators? Or is it necessary for operators to be involved in all the 7 stages as recommended by JIPM?

In implementing Autonomous Maintenance, which is at the heart of TPM Implementation all over the world, the Japanese model is not followed completely. Due to employees' high turnover rate. Autonomous Maintenance of equipment can still be achieved by team effort by:
a) Operators - Responsible for Stages 1, 2 and 3
b) Technicians - Responsible for Stages 4 and 5
c) Engineers - Responsible for Stages 6 and 7

This way, TPM Autonomous Maintenance in Plant Operations can still be implemented with all 7 stages. This however, will involve the Operators, Maintenance Technicians/ Engineers, and Equipment/Industrial Engineers to assist the higher Stages of the implementation. Using this approach, the time frame for achieving success can be reduced from 5 years to 3 years for achieving all the 7 Stages of Successful Autonomous Maintenance

Chinhak Wong Member, IIE (Australia)
Certified Instructor (Japan Institute of Plant Maintenance)
TPM Consultant (Asia Pacific Research Centre)

MASTER OF INDUSTRIAL ENGINEERING DEGREE- UNIVERSITY OF MELBOURNE-

In my previous role as a senior manager at Boeing I had firsthand experience with the difficulty of recruiting industrial engineers in Australia over the years. So it gives me great pride to be leading a small team at The University of Melbourne to launch a Master of Industrial Engineering course in 2021. Development of the new course is in response to industry demand and our course development has been developed under the oversight of a very active and engaged Industry Advisory Group chaired by Anna Reid, General Manager of Operations and Supply Chain at Kinrise with further representation from Asahi Beverages, BAeSystems, Boeing, DST, ExxonMobil, Ford, IBM and Mars.
The Master of Industrial Engineering is a two-year coursework degree with a mix of traditional and new subjects covering digital manufacturing, data analysis, sustainable engineering and life cycle approaches. The concept is to reinforce theoretical learning with hands on practice – so a structure of knowledge development, hands on experience and industrial grounding. The outcome will be highly employable graduates who are job ready.

Entry to this postgraduate degree will be through the Melbourne model undergraduate degree (eg. BSc or BDes) with an engineering systems major or with a 4 year BE.

The course is progressing through the University approvals process and we look forward to welcoming the initial cohort of students in February 2021.

Associate Professor Jo Staines
Enterprise Fellow Dept of Mechanical Engineering School of Electrical, Mechanical and Infrastructure Engineering, UoM

OPPORTUNITIES FOR IEs POST COVID-19
DAVID KARR

2020 will go down in history, when the third planet from the sun, namely our earth, was changed forever. Never in recorded history has an entire world's economy been impacted so overwhelmingly and so rapidly.

Entire industries have almost ground to a halt or actually ceased to exist. This includes aviation, tourism, sport etc etc. Other industries such as hospitality, retail and transport as well as many others were also impacted to a large extent.

Financial systems were decimated, such as the world economy as well as financial markets.

The methodology used by countries and organisations, to deal with the impact of the pandemic, varied, with some being successful and others dismal failures.
Some of the reasons behind the various outcomes, was due to luck or having "emergency" plans in place for a major very unexpected catastrophe.

With the playing field now being rearranged, we as **Industrial Engineers(IE)** need to take stock, and to re-evaluate the vast opportunities that will transpire before us.

The days of organisations operating in whole or partial isolation have been swept away. Organisations within the same, similar or dissimilar business endeavours will now compete and collaborate within the same space. The Norwegians call it clustering, but a new term could be used "COLLABORPETING".

Consensus decision making will become more prevalent whether this be in commercial organisations, government or government corporations and utilities. This will have a very positive result, in that organisations will focus more on the requirements(need) of their customers, rather solely on the profit(greed) motif.

This was seen in the medical industry where diverse companies collaborated while even competing for a common goal. Examples include the manufacture of ventilators by diverse companies such as car manufacturers, additive equipment(3D) manufacturers, getting together. Of course there is also the medical research facilities around the world, collaborpeting.

The most obvious transformation was the relocation of tens of millions of people **working at** a common **workplace**(office, factory, mine etc etc)**(WAW)** to **working at home(WAH).**

Engineers, doctors, mine equipment operators and many more, were suddenly instructed to work from home, remote from the normal workplace.
It should be noted that this phenomenon of WAH had begun over 20 years ago, due to the introduction internet. This change in work practice was swiftly implemented, with almost little fanfare.

The residence became the workplace. Work hours changed and work conditions were modified. Doctors started to undertake appointments remotely either by Zoom or mobile phone. Of course the doctors residence not became the "medical centre" having to undertake many of the functions of the traditional medical practice. The issue of what equipment and procedures need to be followed, is also an issue.

Doctors are now undertaking teleappointments. The days of F2F medical appointment or check ups could be radically altered. With the ubiquitous mobile phones, medical applications can be utilised to assess patients. This could even lead to self diagnosis in many cases.

Of course if this phenomenon of WAH continues, there will be great opportunity for many various product and service providers. These will include:

- Laptop suppliers
- Software developers and suppliers
- Fast internet service providers
- Home office furniture suppliers
- Home office counsellors
- Workplace safety officers
- Insurance companies
- Home office renovators
- Exercise equipment suppliers
- Home delivery services for nondigital items food, equipment, documents
- Etc etc

We have now ZOOMED into the digital age with video conferencing being the new norm. Organisations are leveraging off their employees now, who have been on call for longer periods than normal. There is evidence, that in some cases, large productivity gains have been made due to the more structured employee interaction due to the use of videoconferencing on a much larger scale.

The playing field has now been reset in a major direction. WAH will become more the norm as mentioned. Major opportunities will become prevalent. Whole industries are being transformed.
These include retail(online shopping), hospitality(eating out will be on special occasions), commuting to work(this will be reduced to a large extent).

Other non core traditional remote working industries will be autonomised further. This includes the mining industry which has been at the forefront of this technology. The medical industry has trialled for years remote operations. Now with the risk of infection, robotised medical procedures will become more common.

Unpersonned devices will become more common much quicker. The introduction of autonomous vehicles, which was pre Covid-19 about 15 to 20 years away, is most probably now closer to 10 to 15 years away.

There of course needs to be a major recognition that all these modifications to the workplace need to seriously consider the social and mental impacts on the workforce. Whole new industries in remote counselling will be established. WAH will create social issues that may not have been seen before. This will then spawn the requirement for new health issue skills. Also in the IE space there will be opportunities for optimising of the HOME WORKSPACE. Also the relationship between employer and remote employee.

Other areas to be considered with WAH include home workplace safety(HWS). Does the home office have to meet safety criteria such as lighting, temperature, trip hazards, ergonomic office furniture. And of course the other home risks such as children and pets at home as well as the food consumed etc. Another issue would be insurance. Who is

responsible if there is an incident in the home while WAH.

With the impact of Covid-19, people maybe more reluctant if only initially, to work in close proximity to other people.

Thus there will need to be a whole plethora of WAH regulations that need to be in place. As well as who audits the home work site etc etc.

There is of course the issue of how is the WAH staff are going to be monitored. Is this with constant Zoom meetings, output or even camera surveillance or…..

Evidence is now starting to appear that some industries such as mining are extremely well advanced in remote location work activities. Other workplaces like government departments may or may not so well advanced for WAH. This could be due to the nature of the organisation.

The nature of the home workplace will introduce completely new social dynamics. This will impact on the relationship between workmates, housemates and the family structure.
If both partners of the family work from home, or even the offspring who may now be studying from home, how will this new norm be managed.

A great advantage of WAH could for many lead to a situation where people are able to lead a better and more balanced Work and Home life. WAH allows in many cases for flexible work hours and of course less "can I leave early tomorrow to go to…". The workday of 8 hours(½ hour break) added to at least an hour or 2 for commuting, could be reduced to 7½ hours.

There will be major impacts on transportation and road systems. With less people commuting, the needs for road and transport upgrades for now could be reduced. Another benefit is the environment, with less pollution from vehicles. (an anecdote is that some cities in India and China were cleaned up by the shutdown, that people could actually see the city and surrounding areas they were living in for the first time in many decades)

Business air travel could be reduced dramatically, but on the other hand leisure air travel could increase significantly assuming social distancing issues are resolved.

Home delivery has seen a major increase in demand. This will only continue to expand especially in the retail, hospitality and supermarkets.

Also some companies are now implementing a four day week(4DW). Some companies have been operating with "hot desking" when employees are WAW. There is evidence that the 4DW even has major productivity gains. Five days are now being condensed into four days. In many cases without any negative impacts. Some companies may require on site "work" from time to time to relate to their employees etc.

Will WAH now be such that the "workplace" not only includes the "office" but attending conferences online which could extend over several time zones.

Does WAH also mean that the 24 hour work day becomes the norm. This is especially prevalent with large international companies. Thus employees WAH, could be expected to attend meetings in different time zones at call.

There will be more available time for families to be together as well as well as relaxation. Industries in the leisure, hobby and DIY will benefit immensely.

WAH could now allow people to work from remote locations in Australia. Extending this even further, workers could be employed internationally , and work for companies located in other countries. This could lead to employment opportunities for people around the world. Thus Silicone Valley can now come to the world.

Education has seen massive transformation in remote learning. Students in many cases can study courses remotely and even different countries. There are cases where a local university even made up kits which were dispatched for engineering students. These students then undertook remotely their assigned practicals on their own "overseen" by lecturers WAH.
This is going to have a major impact on higher learning institutions that rely on overseas students. Also the local economy will be impacted negatively, as remote students do not need accommodation, food, transportation entertainment etc etc.

This now introduces many other issues such as working conditions(remote call centres are a case in point). Do companies now "exploit" even more the opportunities to employ "foreign workers". Thus working conditions and pay scales could be much lower than in Australia. India now "supplies" many engineers to Australia. Many of these "overseas employees" have never been to Australia, but they are working for Australian companies.

Thus remote call centres, online shopping, engineering and even medical services could be expanded , to employ many remote WAH workers across international boundaries.
This raises many ethical, safety, academic and social questions.

Social discourse and relationships will alter due to WAH. People will become more community based as their coffee breaks, meals, shopping etc, will be more locally based as the need to relocate to work elsewhere reduces.

To sum up, the workplace for many will now be altered for ever. Technology has be forced to adapt to the impact ofCovid-19. Thus companies, schools, retail and individuals will now need to live in the new post Covid-19 norm for better or worse, but hopefully for the better.

And who knows what impact autonomous vehicles be they for delivery unpersonned aerial vehicles(UAVs) or even autonomous transport vehicles will have. The post Covid-19 era is surely going to be challenging and expose organisations and individuals to vast opportunities. Australia's supply chains will need to be revised dramatically(all eggs in one basket syndrome), vastly increased local value adding(additive manufacturing etc), fuel supplies and even who are our trading partners are to be.

The post Covid-19 period is ideal for those who are brave, agile and innovative enough, to take risks(calculated). This will lead to the creation of new technologies and organisation will do an "Apple" and create the markets for their pioneering products and services prior to the need being there. Of course all of these new innovations need to be delivered as safely as possible with as minimal impact on the environment.

David Karr(FIIEA, CP Eng)
IIEA Newsletter Editor

IIEA Member Exposé-Matteo Vinci
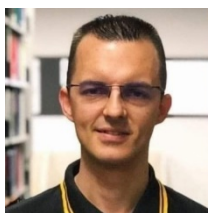
Born/Raised: Perth, Western Australia
I have always had an interest in complex systems and problems, they bring with them a certain appreciation and curiosity for the work that went into them. However, I have always liked efficiency and simplicity.

I'm fortunate to have grown up during the 80's, being able to see technology working as moving, physical things, truly understanding the connections between elements. I always enjoyed pulling things apart and then trying to piece them back together, usually finding that I had parts left over which then really didn't seem necessary in the first place.

I left High School to take on studies at TAFE in Electronics Engineering and have worked for organisations such as Telstra and the Public Transport Authority in both general technical support roles and hands-on maintenance.

Through my early days of joining Engineers Australia, I met David Karr at an event and was introduced into the world of Industrial Engineering which I had rarely come across before mentioned anywhere else.

Since then I have ventured back to University studies, however I see the urgent need for technical skills in society, we need those skills now, not in 4 years time. So it looks like TAFE is going to be at the forefront again.

Since that time I have collaborated with David Karr on many initiatives and recently put my hand up to become the Webmaster for the IIEA. I believe that there are solutions to all the problems we face in this world, It's just a matter of people stepping up to speak out against the culture of creating complexity and distil things back to their basic parts. I want to see a world where we make things as simple as possible, so that anyone with some reasonable competency can operate things, fix things, improve things.

For some other personal insights, I enjoy Golf and Tennis, some of our best solutions to societies problems come from courtside conversations. I have also taken on board the role of President with the Inventors Association of WA and look forward to promoting more local innovations as we need, to coin a phrase, Make Australia Make Again.

In addition I have significant interests in Human Factors, Safety and Aerospace.

Thank you for having me on board the institute and may we all enjoy a prosperous future, boldly going forward on the shoulders of giants before us who were brave enough to ask, why?

I can be found online at:
http://linktr.ee/matteovinci

Matteo Vinci-Webmaster IIEAWA Committee

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WORKING AT HOME WEBINAR-14/05/20

Glynn Davies of Woodside Energy presented an interesting in site into the challenges and benefits of working at home during Covid-19

The impact on family life, adjusting to be in close quarters all the time and even the effect on the family pets was discussed.

Working with co-workers from home has led to new working practices. Coffee in the morning now is a 15 minute gab fest before work starts.

Meetings via zoom are now more focused and this has led to a more productive working environment.

Whether post Covid-19 working from home will continue at the level seen initially, is hard to tell at this stage. Definitely there will be more people working from home in the future.

Editor

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We are always looking for interesting articles on our Members.-Ed

Humour the Best IE Productivity Booster

light bulb joke

How many software engineers does it take to change a light bulb?

None. That's a hardware issue.

Did you hear about the mathematician who's afraid of negative numbers?

He'll stop at nothing to avoid them.