AECS
AUTOMOTIVE EQUIPMENT & TRAINING
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Are EVs the way to go?

There is a big upsurge in EVs in NZ and worldwide, but is it the way to go?
We at AECS have seen a massive surge in demand for EV training, so most definitely are the workshop technicians getting ready for the flow of Electric Vehicles (EVs).
Last year we have trained 761 individuals about the ins and outs of EVs to various degrees. Not only how things work but also how to diagnose and how to repair (safely). The feedback has been overwhelming, many attendees sending their colleagues. It has been and still is fun to be part of that wave, but again “is it the way to go?”

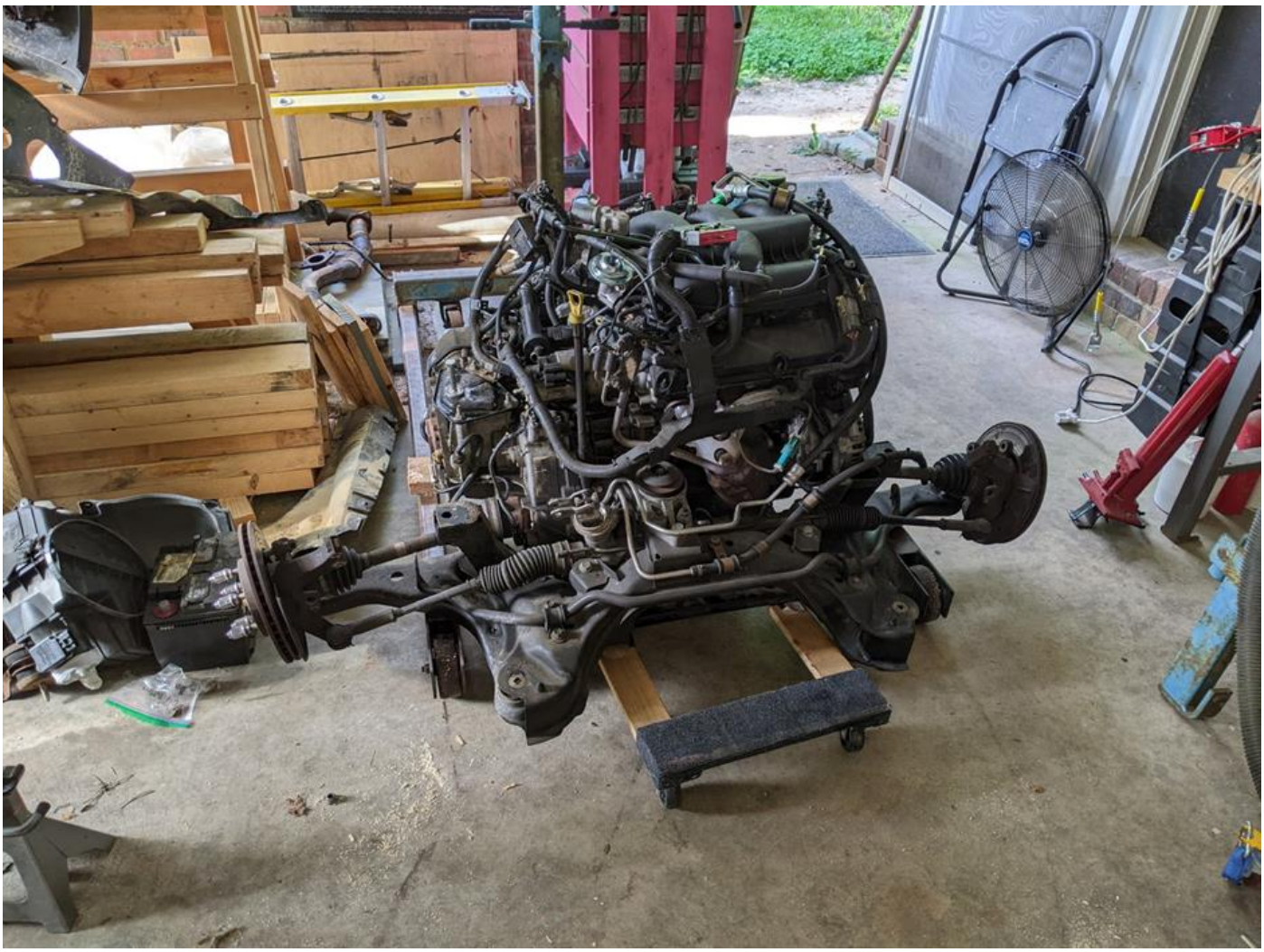
Herd
When everybody is doing it we can’t be wrong can we? Well, that has never been an argument for me personally, and I believe that a lot of Kiwis are with me on that.
Let’s look at a few observations from the technical, design and user perspective. You will discover that I am neither and advocate nor an opponent. I am just trying to make some sense of it all myself. I grew up with carburators and points vehicles.

Design
Currently we happen to have 2 EVs, a 2014 Nissan and a 2021 Polestar. If I look at the design of both and the progress that has been made over such a small period of time I am amazed.
Under the bonnet of the Nissan the whole area is full with modules like power distribution module, inverter, converter, AC to DC charger, gearbox, diff, AC/heatpump compressor, 12V battery, and most certainly that area under the bonnet is necessary.
If I look under the bonnet or in the boot of the Polestar, there is space for luggage and plenty of it. Yes it is a bigger car but the whole drive train and control gear is so much more compact, very much like on a late model Tesla we recently pulled apart.

197hp 2021 Tesla Model3 rear axle on subframe

If you consider that this rear axle takes up slightly more space than a rear axle diff on a car with independent rear suspension. If you then start to realise that there are only 2 High Voltage (HV) cables going into this unit, and some low voltage wires to control that motor. Then realise that included in that unit are the traction motor, diff, gearbox, electronic traction control, launch control, stability control and regenerative braking and about 147kW (+/-200hp for us old people), you know that the bonnet space filled with an engine and gearbox is fast becoming too complex and too expensive to build from a factory's perspective.

An Engine and gearbox takes up too much space under the bonnet and has too many connections to make during assembly.



Mazda Tribute V6 3.0L 220hp, front axle on subframe. Picture source internet.

Think about fuel pipes, exhaust pipe, oil cooler, transmission cooler, AC plumbing. Think about all electrical connections to every solenoid, coil, throttle body, transmission solenoid, injector, airmass sensor, etc. think about all the electronic bits and pieces you have seen go wrong over the years.

Think about the combustion process and all the mechanical components fitted to an ICE (Internal Combustion Engine), to make the burning of fuel happen as efficient as possible.

I only have to mention:
- Variable cam timing,
- EGR control (electronic controlled valve, cooler with bypass),
- Fuel mixture control (MPI, direct injection, stratified double injection),
- Emission treatment (2x oxy sensor, Cat, Petrol DPF),
- Acoustic intake system,
- Turbo control (twin, VNT, electronic waste gate)
- Electronic throttle body (and variable valve lift)

Just to name a few systems on the engine only.

Not all of these items are fitted on the Mazda engine in the picture, as this engine is from 2003 which is a simple engine with not too much guff fitted.
Yes, I am familiar with all the items mentioned, I know how they work, how it is controlled, why each is controlled, how to diagnose and even how to repair, I am not scared of that.
But do you agree with me that to know all these systems has taken years of your life in experience to get familiar with? It has for me.

All gone
Look at the drive train of the Tesla picture again. The guff is all gone.

Now take a good long look at the attitude of our young people. Many (certainly not all!) are not prepared to catch up with us that are familiar with all of the old (modern) technology.
We cannot keep servicing and repairing vehicles until we are 95 years old, that is simply not realistic for most. Something has to give! If we are keen to hand over the baton to the next generation we need to have simpler technology, technology that is easier and quicker to learn and master.
Think about it.

Petrol head
I am a staunch fuel burner, I love Diesel and petrol vehicles and have several of them, from single cylinder to 12 cylinders. I 100% enjoy driving them oil burners and believe that the climate will be right and adapt to the amount of Carbon that once was in our atmosphere before the big bang anyway. I also do not believe that we should be miserable in our lives and pretty much do what we enjoy and what suits us best.
However driving the 408hp Polestar (EV) is actually an exciting and special experience. An experience I hear also from other brands' high performance EV models.

Drivers View Polestar. Pls look at the 370KM range on a 91% SOC battery

Charging
Let's be straight up, charging on long trips is a pain. If the charger works and if there is no queue you will be waiting for a considerable time on a fast charger to get some range into the battery again. It is not cheap either.

Yes the Polestar for example can handle 175KW worth of charging power, but charge stations that can provide such power are VERY rare. Most fast charge station can deliver on a good day only 50KW. Even the 50KW is not nice for your battery, we spend a lot of time in the EV3-1 training explaining what effects fast charging and hard driving has on a battery.

Hydrogen
It is my opinion that all the charging problems are a thing of the past when we transition to Hydrogen Fuel cell vehicles. They are an EV with a small battery. The vehicle runs essentially directly from the fuel cell where Hydrogen is combined with Oxygen releasing electrons. The only times the battery is used is when you release the accelerator or when you depress it as the fuel cell takes time to adjust to changing circumstances.
Yes it will be full again under the bonnet, but down sizing takes time.

Toyota Mirai H2 Fuel cell vehicle under the bonnet with covers removed.

When hydrogen is injected and air is supercharged into the fuel cell, the electricity needs to go somewhere even if you decide not to use it when you take your foot of the accelerator

2022 Mirai traction Battery sticker.

Please note the 1.2 kWh capacity.
Compare that with for example the 85kWh battery on the Polestar.

Heavy and expensive

The Hydrogen fuel cell vehicle has no need for the very heavy and VERY expensive large battery, it instead needs the fuel cell, some pumps and hydrogen tanks that do not wear, but expire.

The filling up of a tank of hydrogen takes around 5 minutes for 600km range, when the car is hooked up to a proper hydrogen filling station.

Mirai tank flap with the tank expiry date. Please note that the max tank pressure is 875Bar which is medium load common rail diesel rail pressure.

Conclusion

- Don't shy away from new technology, embrace what you can't change.
- The future is not here yet, you are not obsolete in the next few years to come.
- The new generation will find a place in the industry, it is not all hopeless.
- Enjoy the old and the new.

For *AECS* ltd
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Merger affecting training

You may be aware that MITO and the Polytechs have merged as a result of government policy.

This has the following consequence:
AECS has been delivering the NZQA accredited EV/Hybrid training for MITO as a result of a partnership we built in 2018. This partnership has now come to a friendly end.

All trainees that come in through the old MITO channels will be guided towards the Polytech EV training as a direct result of the merger.

Make sure you get what you expect!

It is important to know that the Polytech training seminars and the ***AECS*** training seminars are two completely different products.

Without down playing the value of the Polytech training, ***AECS*** has been and still is making training content, based on research and practical problems from field experience and our engineering background.

If you have been to one of our training seminars, enjoyed it, and would like to learn more with ***AECS***, do not expect the AECS training if you book through the MITO channels, instead from now on please book through us direct.

So what is different?

We are still delivering our highly practical and energetic seminars throughout the country, with one difference:
You will not get an NZQA diploma at the end of it, but as per normal the highly recognised ***AECS*** certificate.

Scroll through our training calendar, or even integrate it with your own calendar https://aecs.net/trainingdates/

Enrolling (or just to have a chat) is easy:

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We hope to see you soon!

Kind regards,

Herbert Leijen