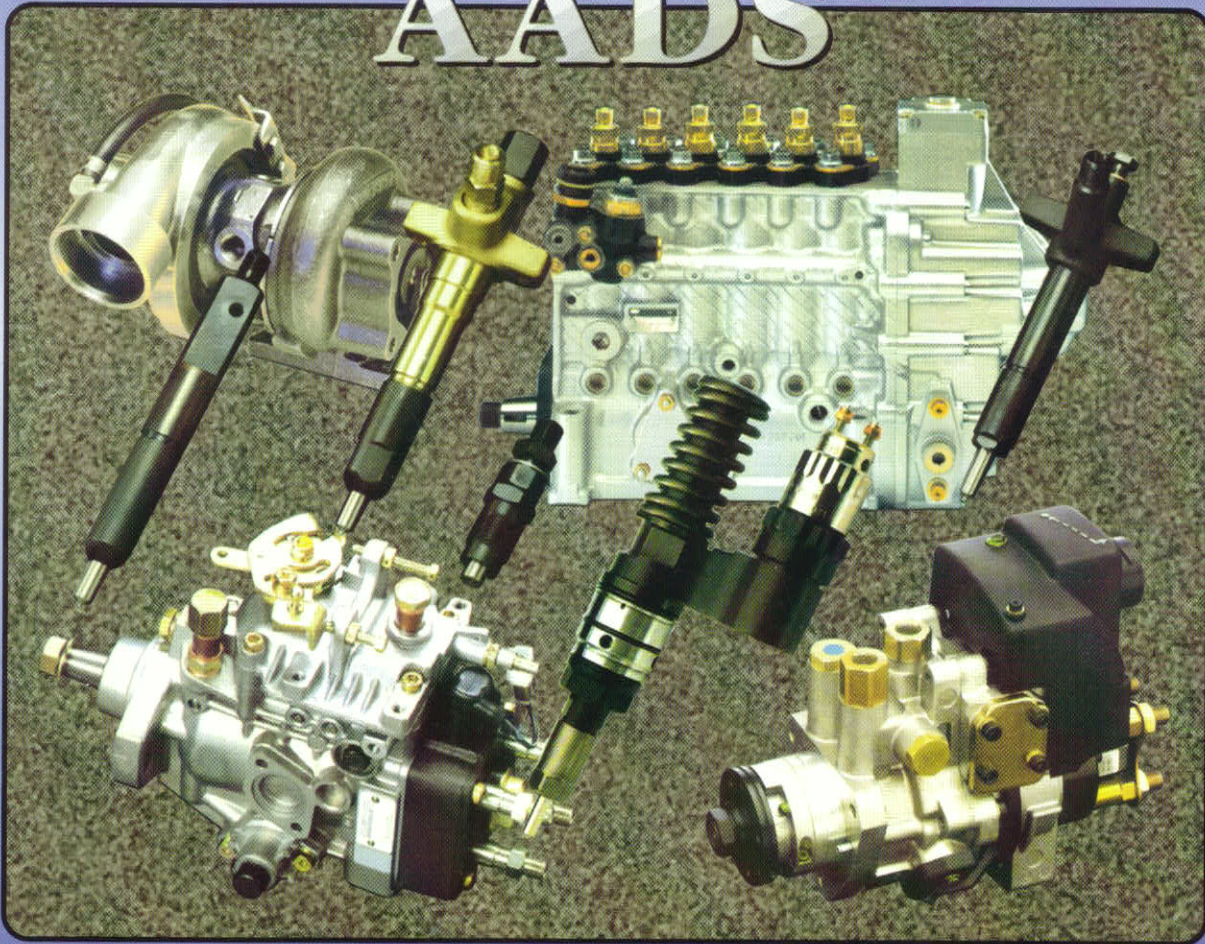


DIESEL TORQUE

AADS



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PRESIDENT'S REPORT

Hi everyone, I hope you have all had a pleasant festive season and are settling well into 2008. The New Year seems to keep coming faster and faster each year.

Once again the Convention is upon us, this year it is being held at **The Crowne Plaza Royal Pines** on the Gold Coast.

This year, there is certainly an exciting program awaiting you as a result of a lot of hard work from a few hard working people on our local organizing Committee.

Already, bookings are overwhelming. This is a fantastic sign that there is renewed interest in our new-look Convention.

We have an excellent group of speakers who are each specialists in their field to present to us on a variety of topics related to our industry.

Recently, with the help of **Wayne Dunning**, **Oz Vaganiance**, and **Richard Gerner** of Professional Association Management (PAMS) we ran the Victoria/Tasmania branch meeting. Many thanks to Oz who opened up his first-class premises to us and generously provided the food and refreshments for the meeting. It was good to see the friendly interaction between the members as they ate lunch, told a few yarns and had a few drinks. At the meeting, a new committee was elected and my thanks go to **John Lewis** for accepting the position of Chairman and to **Andrew Kollosche** for taking up the position of Treasurer/Secretary. It is

indeed good to see this branch once again with an operating committee.

The twenty or so people present were given a demonstration of a Stanadyne DE fuel pump being tested and a general tour of Oz's facilities. The workshop was extremely well equipped and the cleanliness of it was a credit to Oz and his team. During the meeting three new membership applications were completed. My sincere thanks to all that were involved in making this meeting the success it was.

I am assured we are close to having our long awaited new website running live if not totally complete. (Hopefully by the time you read this).

Recently I signed up to become one amongst the growing band of diesel vehicle owners. During recent weeks while investigating options, I test drove quite a few different makes and models and it is amazing to learn how many fantastic diesel powered vehicles there are available for purchase. I discovered a sign of the explosion in demand for diesel powered vehicles when I was told about the twenty week waiting period to get delivery. It seems many others want them as well even in the current climate of high diesel fuel prices here in Australia.

It is becoming frightfully apparent that the price of diesel fuel is increasing at an alarming rate in Australia. In most parts of the world diesel fuel is cheaper than petrol. It is very hard

price at a faster rate than petrol. The price of diesel has increased so savagely, measures have been taken to provide rebates to users in some industries. It does not seem reasonable to me that a cleaner alternative to petrol should, for whatever reason, have penalties put on it for those who try to reduce harmful emissions in their private vehicles.

There is a national enquiry into fuel prices in Australia and I am sure the time is right to add some pressure to this process. Despite high fuel prices the demand for diesel passenger car ranges are still growing at an ever increasing rate.

This has to be good for our whole industry and as I have said many times before the best is yet to come and I still believe that.

Our new treasurer, **Bruce Moffat** has put a lot of work into our financial matters and has

with the finalisation of the 2007 year. I am now directing his attention to any of you who have not paid their 2007 subscriptions so please, if you are still outstanding, get these paid as soon as possible. Thanks Bruce – your contribution is very much appreciated.

I would like to take this opportunity to thank the Board, the Conference Committee and PAMS for all their help and support through the year.

I would especially like to thank those who have put so much effort into making this Convention become reality.

I hope to see you all at the Convention that looks like being the biggest one yet.

Don Wilkey
President, AADS Inc.



NEW SOUTH WALES BRANCH REPORT

WHAT a great start we have had to 2008. A lot of NSW has received drought-breaking rain, although some areas have had more than they would have liked and others not enough. Some shops have already noticed an increase in repairs due to water contamination, I hope this is not the only work generated from the rain and that the whole agricultural sector springs back into life.

The AECS training that was to run around March has been postponed until later in the year due to scheduling problems, members will be advised of new course dates as soon as possible. The training will consist of the Basic course for those newer techs or apprentices and will be followed by **Herbert Leijen's** new Denso common rail course which will be open to

anybody who has previously completed the basic course.

Following requests from our members who attended the last NSW meeting, **Noel Atkins**, from Advantage Accountants & Business Consultants Pty Limited, has offered to submit a series of articles for Diesel Torque. I urge you to read these informative articles and to pass them on to your employees as these will have content beneficial to both you and your staff.

Our next state meeting will be early July and a notice will be coming out regarding this shortly.

Catch up with you at the Gold coast.

John Jamieson
Chairman, NSW Branch
AADS Inc.



WESTERN AUSTRALIA BRANCH REPORT

IDON'T have a lot to report since the last edition of *Diesel Torque*. The next Western Australian Branch meeting is yet to be advised. **Shirley Pusey**, even though she is now recently retired will still be our Treasurer and will still be supporting the WA Branch.

The Convention looks promising and I would like as many WA delegates as possible to

attend this new look and affordable event.

Gavin Jones
Western Australian
Branch Chair
AADS Inc.



SOUTH AUSTRALIA/NORTHERN TERRITORY BRANCH REPORT

WELCOME to 2008 everyone! The year has started off very busy and the Convention is rapidly approaching. I hear that there will be more exhibits this year than in previous years, which will give delegates an opportunity to view the latest tooling and technology first hand.

I take this opportunity to congratulate **Simon Parrott** from Robert Bosch Australia for coming to his senses and realising that us diesel blokes aren't too bad a bunch to work with. Welcome back Simon and thank you for your support.

I wish **Ken Dodds** and **Cory Baker** all the best in their move to Diesel Distributors and thank **Steve Herman** for his support whilst at All States and wish him well in his new venture. Welcome back to the industry **Chris McFalane**.

In February, Adelaide hosted the **Clipsal 500**, which a few of our members went along to, thanks to **Roger Jaensch** from Robert Bosch. Great weekend, lots of V8 noise, alcohol and grid girls.

In May/June I will be organising a SA/NT Branch meeting and dinner. At this stage we will be looking at a venue south of the state and perhaps incorporating a winery tour of the Coonawarra. I will notify members as details come to hand.

Enjoy the convention.

Graham Rudloff
Branch Chair, SA/NT Branch, AADS Inc.



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VICTORIA/TASMANIA BRANCH REPORT

AFTER a considerable time of non-activity, the Victoria/Tasmania Branch held a successful meeting on Saturday 14th February at AG Diesel in Melbourne. It was great to see a group of about 25 people attend what I considered to be a show of whether we would be able to get the Branch up and running. Again I am confident now that this can be achieved not only by those who attended, but those I spoke to in the weeks previous to the meeting who, although unable to attend on the day, showed their support for the future.

The meeting was opened by national president **Don Wilkey**, with the important aim of electing a committee to run the branch. This was achieved with the election of myself as Chairman and **Andrew Kollosche** from Diesel-Tec as Secretary/Treasurer. Andrew and I will now be looking to the membership to help us achieve a program of events that will interest us all and revive the branch to the status it obviously was a few years ago. You will hear from us in the near future.

As mentioned earlier, our meeting was held at AG Diesel which is owned by **Oz Vaganiance**. We thank Oz and his staff for welcoming us into his business and the freedom with which he allowed us to inspect his workshop and wander around. The meeting was also attended by **Wayne Dunning**, who spoke on behalf of the organising committee



AADS President, Don Wilkey, congratulates John Lewis on his appointment as Chairman of Victoria/Tasmania Branch.

for the upcoming convention. If you are not already doing so, I urge you to try and attend as it will be something different from past conventions. The venue is also a great place for some well deserved R & R for a couple of days. Please let me know if you need a registration form.

Looking forward to seeing or hearing from you in the near future

John Lewis
Chairman, Vic/Tas Branch,
AADS Inc.



QUEENSLAND BRANCH REPORT

HI everyone. The Convention is just around the corner and it will be the best one that we have seen for many years. Here in Queensland we had had our fair share of the rain and many places have experienced floods which have devastated homes and businesses. The good news is that all that rain brings back confidence in the farming sector which starts the economy going and the rest follows on.

I am fortunate to have as my secretary **Ross Fisher** from Turbo Australia and being directly involved with turbo's has given our committee an insight to the turbo industry.

The turbocharger side of the AADS been on hold and stagnant for a long time, without any

interest shown or given by both members or the AADS. The AADS are about to change that by introducing training, examinations and certificates. This is the AADS doing their bit to assist the turbocharger members, however it is a two way street and we require your assistance by attending our meetings and to let us know how we can assist you. We are currently working on a structured training program but not in the short term, but as a long term going concern. Due to overwhelming interest, an exam (basic tradesperson) will be held at this year's annual conference on Saturday (time to be arranged) with a nominal

continued on page 14

WELCOME TO THE GOLD COAST!

HERE'S where you'll discover how all Australian's would love to live – with miles of surf beach, lush green rain forest, world class golfing greens and world famous theme parks – with every kind of accommodation, from exclusive 5-star hotels to sunny beachside apartments. Spoilt for choice? That's a Gold Coast Holiday.

Why not combine a work trip away to the AADS Convention 2008 with a holiday to follow, and there's no better place to do it than the Gold Coast.

We have plenty to offer for all ages, for the little ones and the braver older ones – theme parks include Warner Bros Movie World, Wet And Wild Water Park, Sea World, Dream World and the latest addition White Water World. I recommend this one for the little ones.

These parks are all within 30 minutes drive north of Surfers Paradise and there is also the option to catch the bus to the parks, which I can tell you now from experience is a good option as it can be really tiring, especially if you have kids dragging you from ride to ride.

The Outback Spectacular next to Movie World is a live show and display of the outback life of Australia including rodeo style horse riding and whip cracking – good old country way of living.

There is a park of a different kind just south of town on the way to the airport – about 30 minute drive – the Currumbin Wildlife Sanctuary, if you haven't seen enough animals and wild life after the Convention.

If you are up for a round of golf, you can play at the Royal Pines Golf Course (Venue for the Convention), Emerald Lakes, The Glades, Robina Woods, Sanctuary Cove, Arundel Hills and Southport Golf Club.

Make the most of the many water activities available such jet boating, parasailing, jet ski hire, fishing charters, and bull shark safaris in the canals. Yes, we do have sharks – DON'T SWIM IN THE CANALS. There's also River and Broadwater Cruises from 1 hour cruises to evening cruises including dinner and entertainment. The cruises out to Tipplers and McLaren's landing on South Stradbroke Island are great trips. The Tall Ships Company and Blue Fire run these. You can enjoy a great breakfast out on Straddie and a few beers. This a popular place for the locals to park their boats for the weekend.

Take a bird's-eye view of the coast in one of the many helicopter flights or in a historic Tiger Moth doing loop the loops or maybe, up at Jacob's Well, jump out of a plane (with a parachute of course).

For the party-hard people there are more than enough night-life venues. I suggest start off with some warm-up drinks and a spectacular view at night from 320 metres high at the top of Q1 the Sky Bar after 8 Friday and Saturday, then onto many of the clubs on offer. Remember to include Melba's – one of Australia's longest running night clubs, There's the Minus 5 Bar – yes it's a bar made from ice and it's cold – Bedrooms, Ruby Tramp, Cocktails And Dreams, Shooters, The Avenue, Howl At the Moon and those special clubs such as Hollywoods, not to mention Cheerleaders and the Boardroom where the ladies are welcome there too!

If you just want to hang out at a pub there is Waxy's, Billy's Beach House and The Clock Tower Hotel. Many of the surf clubs are popular for live entertainment. Many that are mentioned are all in Surfers Paradise but you can either head south about 10 minutes by cab to Broadbeach where the Jupiter's Casino is, Broadbeach tavern, many more clubs, bars and pubs, or head just 10 minutes north to Main Beach and you have Tooley's, Mano's, and the place to be seen if you like is Shuks Bar and Restaurant. I've seen Mick Doohan there often.

It's so easy to find a good venue – just ask the cabby.

It's not just all about partying hard you can relax and enjoy many good restaurants and dining around town – the Marina Mirage has many restaurants along the outside decking overlooking the big yachts like Sak's, Omero's Brothers and Mirage's own seafood buffet ... yes it's hard to pass up the opportunity to enjoy seafood on the coast. Go to the end of Versace and you will find the Trawlers where you can buy fresh prawns direct from the fishermen. It's well worth it – or stop in at Pete's one our best Fish & Chip shops in town.

Something different is the Theatre Restaurant Show at Dracula's in Broadbeach, I highly recommend it having being there just recently – by far the best live show of its kind I have seen for a long time they also have a haunted house in the middle of Surfers Paradise.

If you want to get away from the hustle and bustle of the very lively Gold Coast it's not far to travel to the Hinterland where the coast meets the bush. Mt Tamborine and surroundings like Canungra and Beechmont deliver a great feel of the rainforests, bushland, rivers, waterfalls, lakes, dams and plenty of bush walking, wine tasting, arts and crafts and terrific views from the hills overlooking the Gold Coast skyline.

*Clinton Brett
Manager, Diesel Centre Gold Coast Pty. Ltd.*



2008 ANNUAL CONVENTION

"THE GOLDEN AGE OF THE TURBOCHARGED DIESEL IS NOW"

3-6 APRIL 2008 CROWNE PLAZA ROYAL PINES RESORT
GOLD COAST QUEENSLAND

CONFERENCE PROGRAMME - REVISED 23 FEB 08

Wednesday 2nd April 2008

1700 - 1900 Registration Desk open

Thursday 3rd April 2008

0600 - 1600 Dipaco Fishing Trip - Pre booking essential

0900 - 1900 Registration Desk open

Thursday 3rd April 2008

1000 Exhibition Booth setup begins

Friday 4th April 2008

0700 - 1000 Exhibition Booth completion

0730 - 1230 Hartridge Pump Room Tour - Pre booking essential

0800 - 1230 Denso Golf - Advise at time of Registration if playing

0800 Registration Desk Open

1000 - 1700 Exhibition open

1030 - 1230 MTQ Thrill Seekers - Pre booking essential

1300 - 1330 Bp Australia - Gary Whitfield

1330 - 1400 Auto Soft Automotive Business Software - Steven Ryan

1400 - 1430 MYHR HR Solutions - Jenni Carr

1430 - 1500 Financial Planning - Kate Kimmorley

1500 - 1530 Mortgage Force Australia - Daniel Fitzpatrick

1600 - 1700 Denso Service Dealer meeting

1900 Diesel Distributors Welcome Function

Saturday 5th April 2008

Turbocharger Session

0845 - 0900 Denco Diesel & Turbo - Paul Taylor

0900 - 0925 Honeywell Garrett - Graeme Louk

0925 - 1000 Holset Turbo Technology - Barry Haigh

1000 - 1015 Redat - Ron Roach

1010 - 1400 Alltech Diesel & Turbocharger Partners Program -

A modern French cooking class with lunch - Pre booking essential

1015 - 1030 Morning Tea

Diesel Fuel Injection Manufacturers Session

1030 - 1050 Continental (formerly Siemens) - Wayne Baskerville and Andrew Moutsios

1050 - 1120 Denso - Robert Burns

1120 - 1150 Robert Bosch

1150 - 1220 Delphi Diesel - Dave Farmer

1220 - 1320 All States Diesel Lunch

Diagnostics Equipment

1320 - 1340 Automotive Service Solutions - Tony Zoccolli

1340 - 1410 Denso - Zoran Trifunovski

1410 - 1440 Robert Bosch

1440 - 1510 Delphi Diesel - Dave Farmer

1400 - 1700 Ventura Diesel Kids Club - Pre booking essential

1510 - 1525 Afternoon Tea

1525 - 1640 Turbocharger Examinations - Pre booking essential

Diesel Fuel Injection Test Equipment

1525 - 1550 Hartridge - Peter Smallwood and Keith Payne

1550 - 1615 Delphi Diesel - Dave Farmer

1615 - 1640 Robert Bosch

1645 - 1800 Robert Bosch Service dealer Meeting

1900 Robert Bosch Formal Dinner

Sunday 6th April 2008

0830 AGM

0915 Seminar on Exhaust after treatment, Bio-Diesel, Ultra Low Sulphur Diesel & Diesel-Gas - Alistair Hill.

1030 Morning Tea

1100 Delphi Diesel Awards, Presentations and lunch

1300 Conclusion and Booth breakdown begins.

1330 - 1500 Stanadyne Service Dealer Meeting



Inflation & Interest Rates – How to Manage

Provided by Noel Atkins, a Principal of Advantage Accountants & Business Consultants Pty Limited

AUSTRALIA is entering a period of fiscal and economic change that will be a challenge to all those persons working, who have a debt, who run a business, employ workers buying a home, or trying to get ahead.

It has been in excess of 10 years since we have been faced with an environment that says we have almost full employment by western economy standards, have a high growth economy, and rising interest rates and inflationary pressures all rolled into one ...

This is especially so for those aged 28 years and under, as they have never experienced a time where the cost of loans can blow out due to interest rises, inflationary pressures make the cost of living increase beyond the level of increase in wage or business income.

When you factor in now the increase in the cost of ordinary every day expenses, such as rent, fuel, health, education, electricity, food and general household costs, almost everyone will tell you it is getting more difficult to manage your hard earned dollar.

Australia is recognised as a high consumer nation. We love our credit cards, love our consumables such as plasma TVs, electronics, 2nd cars all on finance plans etc.

As a result we are one of the countries in the world with the highest level of consumer debt in the form of credit cards, personal loans and other consumer debt.

Most of this debt is expensive (sometimes in excess of 19% pa interest rates).

Current predictions are for continued increases in interest rates, cost of living, and an expected wage push which is expected to fuel inflation, thus creating a vicious cycle.

So how do we manage?

We can look at this both from a business and personal level.

On a personal level families need to be realistic as to what they can afford.

Consider the following:

- Very few families sit down and do a family budget on a weekly, monthly or annual basis. Quite often the male perception of household costs or female needs, are quite different, and vice versa. A good trick is to do these independent of each other and compare the result – it can be quite startling!!

This requires communication and compromise.

- Prioritise issues, such as movie going vs getting a video; eating out or buying good healthy food to

cook. Sometimes having a home get together with friends can be financially better and more socially rewarding.

- Limiting your credit card to what you can repay each month, thus avoiding excessive interest non payment.

- Having only one credit card with a small limit for emergencies.

- Having a debit card only on your account so that you cannot draw credit.

- Taking one car instead of two, and coordinating trips (short or long term) to reduce fuel costs.

- Reviewing your telephone /mobile telephone use; or ensuring children & teenagers have mobile phone prepaid cards or limits on monthly credit.

- Review your home loan and loan package payments to ensure you have the best you can get. While you may wish to pay extra it may be better to pay the minimum if it means you can reduce other more expensive debt. Or if you are paying extra, ensure you have a redraw facility for emergencies.

- Taking holidays or getaways that you can really afford. Holidays should be budgeted for as is the case for other things.

- Look at where you buy your personal items, such as cosmetics, clothing – it pays to shop around!!

- For young people seeking property, ensure you are working within your budget when considering loans – remember wealth is usually built over time, and may require a number of property moves (as you will find your parents did) to eventually get what you need or to cater for a growing family.

Patience and discipline is a virtue!!

- If possible develop a savings plan – lending institutions like nothing better for you to show that you can be financially disciplined to save rather than spend to create a history. This can be done by direct debits to investments or saving plans.

The above is not exhaustive and should be discussed with your professional advisor to review your financial position

For people in business or investors, consider the following:

- Is negative gearing working for you? Negative gearing means you are paying out more than what you are receiving, generally with the hope of getting a capital gain in the future. This can be a dangerous practice if your cash flow does not support it, and interest rates are rising. While you may get a tax saving, you are still losing.

Do the sums and 5–7 year projections (your tax advisor can do this for you).

People can negative gear into property, shares or managed funds. All markets have their upturns and downturns, so ensure you get the right advice for what you want and for the time periods you want to invest. There is nothing worse than having to borrow more because you cannot sell your investment property, or being forced to sell it on a falling market. Many more people now prefer more liquid investments such as listed property trusts (the good ones!) listed shares and securities and managed funds – these allow you to cash in a portion or invest in small amounts you can afford.

■ For investment or business loans, have them reviewed by your professional advisor. It may pay you to fix part of the loan as a fixed interest-only loan or fixed interest and principal loan, thus reducing the cost of potential interest rate rises. It also gives you certainty of future costs.

■ Stick to established proven investments that have a track record. A good example of risky investments is the flurry of private property trusts and mortgage funds, (as opposed to listed property trusts and mortgage funds) – generally these have more risk and higher interest rate returns – a means of inducing investors-many of the spectacular collapses are in this sector.

■ Diversify your asset base if you are an investor so that you can ride out the ups and downs in the market and economic cycle, reduce your risk levels and of course sleep at night.

■ Being a speculative investor or trader – whether in property or shares is for those with surplus funds not your hard earned dollars. Try and avoid this approach – build your wealth so it sticks.

■ The tax breaks associated with superannuation are very good at present, especially for those nearing retirement – with the opportunity to develop tax free income streams in retirement. For younger people it can be a means of compulsory saving and tax savings that provide great benefits later on.

■ Look at insuring your income stream and family wealth via income protection insurance and term life insurance. There is nothing worse than being

forced to sell an asset or your family suffering financially due to an unfortunate event, when it all could have been avoided. It can be a cheap alternative.

■ Have your business reviewed at least annually before year end to ensure you have the best possible tax planning, and a flexible business plan that gives you options in the current changing environment.

■ See if you have a proper management and reporting processes in your business that will give you the information for you to make the decisions you need to make early. These resources will allow you to review marketing expenditure and sales trends, your levels of operating expenditure, budget to actual comparisons that allow you to make early decisions to change where necessary, review pricing structures, and employment productivity. In a tight economic situation it is important to review both operating costs and capital costs to ensure your assets are working as best as possible for you.

For example the repair costs on some machinery and downtime resulting may mean it is better economically to finance new equipment that increases output and profitability.

■ Divide your goals into short and long term goals, and work within your cash flow, allowing room for contingencies. This requires honesty and a realistic assessment of your current position.

In the current environment cash flow is king. It determines your ability to meet day to day needs, ability to borrow and meet repayments, and your ability to save or invest for the future, and enjoy a balanced lifestyle. This applies both personally and in business. Planning ahead can be socially and financially satisfying, and assist in reducing financial stress. The result? Hopefully giving you a longer and happier life with your friends!

The above commentary was provided by Noel Atkins FCA - a Principal of Advantage Accountants & Business Consultants Pty Ltd, as a general comment only.

All readers are advised to seek their own professional advice before relying on the above commentary which may not suit all readers.

DENSO TECHNICAL TRAINER

An opportunity exists to join the **DENSO** group, a major international supplier of automotive parts located in Croydon, Victoria. As the **Technical Trainer** within our Service team, you will be responsible for designing and delivering training courses to our clients and customers.

Having a strong focus on Diesel products, the ideal candidate will have a trade qualification and experience/knowledge with Diesel products. If you are interested in sharing your skills with others, please contact **Rebecca Fairweather** on (03) 9721 3407 or forward your resumé to

rebecca.fairweather@denso.com.au

MTQ Engine Systems Australia continues its strong support of AADS in 2008. This year's Convention on the Gold Coast is set to bring you the latest information and technology for the Turbocharged Diesel Engine. Our National MTQ Team will be on hand to show you the many reasons why:



"The Golden Age of the Turbocharged Diesel is Now"

MTQ Engine Systems will reinforce our commitment to the Diesel and Turbo Service Industry by displaying products from all Major Brands that we are proud to distribute.



BOSCH



BorgWarner Turbo Systems

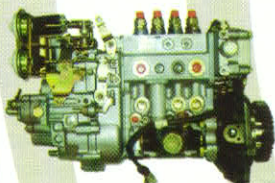


SIEMENS

- o DTS Turbo Upgrades, Intercooler Kits, and Exhaust Upgrades
- o Sonic Performance
- o Diesel Fuel Injection System Components
- o Turbochargers and Internal Components
- o Bosch Test Equipment



Siemens/Continental Common Rail, you will be able to catch up with Wayne Baskerville this year to get the true insight of the Common Rail Program.



To kick start the weekend, so you can absorb all you can, come out into the sunshine and be part of the all new 'MTQ Thrill Seekers'. Friday's activities will take you across the ocean at exhilarating speeds or to new heights to enjoy panoramic views, this might not be for the faint hearted, but for the thrill seeking adventurer make sure you don't miss out!

MIQ

ENGINE SYSTEMS AUSTRALIA

WE HOPE TO SEE YOU THERE!



Ph: 1800 282 530 www.mtqes.com.au

The Value of **TRAINING** *“In Hard Economic Times”*

AS a former shop owner and technician for over 30 years, I have seen the effects of hard economic times on the automotive repair industry. A depressed and uncertain economic situation has unfortunate effects on many businesses. In our business, we can not only do well, but watch our business grow in hard times.

A properly prepared shop can actually thrive in hard economic times. We do not have to be economists to know that in our society, which is dependent on the automobile, we need to drive to work. A bad economy has no effect on this fact. What is affected is the ability and willingness to go out and buy big ticket items like new cars. This means that the present car will be retained longer. More repairs and maintenance will be required and are essential to the ability to get to work. This can mean more business for the shop. A shop that is not prepared may experience very difficult times.

One thing we are always watching is our overhead expense. This takes on additional significance in hard times. We might want put off that big equipment or tool purchase and try to do more with less. This can be wise but we must be careful here. As a technician or a shop owner, when you buy a tool it can be an expense or an investment. It can be a good tool or a not so good tool. We all know how to tell the difference. The good tool makes you money. In hard times we just have to be more choosy and try to buy only good tools. A tool can work perfectly and do exactly what it is supposed to do but, if it does not make you money, it is not a good tool. Investing in good tools is even more important in hard times.

The same principles can be applied to technical training. However, in this case, trying to do more with less is not a good choice. In hard times, it is even more important to invest in training that makes

you money. Your customers will be keeping their cars longer and you will be seeing more failures. This means more opportunity to you, if you have the expertise in house to diagnose accurately and efficiently. If you are prepared for that drivability problem, you can keep that customer in your shop and maybe get that gravy brake job too. Once you send them down the road because you can't handle it, you risk losing that extra business and maybe that customer too. Customers like one stop shopping when it comes to their cars. Once they establish trust in you, they will prefer to have you handle all their service concerns. You worked hard to earn that trust. Good diagnostic training can prepare you to keep that customer in your shop.

That tool that was not as useful as you had hoped just sits and gets dusty. That tool was an expense. That training you sent your techs to that was not as useful as you had hoped was an expense. So, the issue becomes how to tell in advance what tool or what training will be “good”. Unfortunately, we do not have ‘Consumer Reports’ for tools and training. To acquire this information, we must network. Ask around and use organizations like ASA to find out what works. Don't put too much weight on what that tool salesman has to say but find out what others thought of that tool. Find out what others thought of the training.

Good tools and training are really the same thing. You cannot survive without both. They are even more important in hard economic times. We just have to be more careful with our choices so that we can have more investments than expenses. Good Training doesn't cost money; it makes money.

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Autonerdz.com
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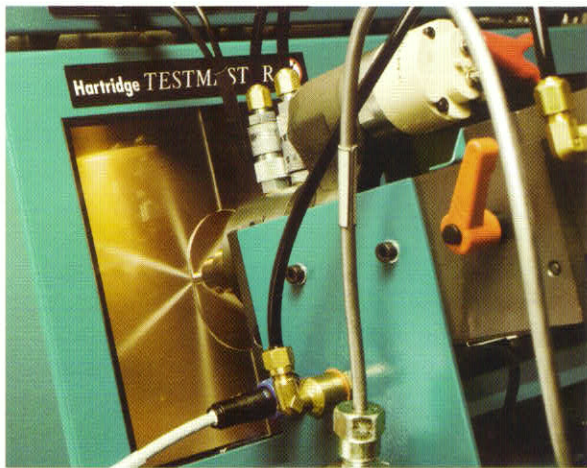
Testing the future of Diesel

Convention Exhibitor Promotion

hartridge

THINGS are moving at quite a pace in Hartridge these days. Since the management buy out in 2004, the business has grown significantly with the workforce literally having doubled. This growth has mainly taken place in engineering to support rapid investment in R&D – spend for this currently exceeds 7% of turnover with growth projected again this year.

The R&D investment is directed to support Hartridge OE partners Delphi, Denso and Siemens with equipment for the official franchised network as well as further growth in the well-developed 'All-Makes' programme.



Over the past 12 months, growth in the diesel repair market has driven new research, applications and products. Hartridge's flagship product, the AVM2-PC, still remains the benchmark in test platforms for new technology (CR/EUI/EUP). Hartridge has expanded its capability by extending the range of CR injector test products. For the fully-equipped workshop, these products will also work on the CRi-PC to prevent kit duplication.

In addition to injector testing, there are a number of exciting new developments in Common Rail pump test, including the introduction of test kit for Bosch CP2 pumps and an 'All Makes' test kit for Denso HP0. EUI capability is also being expanded rapidly to include the long awaited E series injectors; but expansion of the HEUI test capability has not

been overlooked with additional Caterpillar test capability currently under evaluation.

The flexibility of the AVM2-PC provides an 'All-Makes' solution for the predominantly transport and industrial driven Australasian market, but also caters to the higher end of the diesel market with its Common Rail facility. To underline their commitment to enable workshops to test cutting-edge technology, Hartridge have also introduced products that, whilst not completely aligned with the current Australasian diesel market, anticipate it's future direction with the population of diesel cars (and therefore Common Rail technology) increasing exponentially.

These new products include the CRp-PC, a dedicated CR pump test stand, FQM-50, a fuel quality meter which detects particles in diesel fuel and finally, IFT-70, an injector function tester. An integral part of the IFT-70 is a CR signal unit (IFT-c) capable of driving all makes of Common Rail injectors including Bosch piezo – an excellent example of how Hartridge develop products in advance of consumer demand.

The global growth in diesel continues unabated and Hartridge is proud to be at the forefront of test and calibration development serving the needs of the service network with a comprehensive all makes programme.

These are exciting times and Hartridge MD, Pete Smallwood, is eager to expand on these developments with delegates at the 2008 AADS Convention.



CHANGING OF THE GUARD

at United Fuel Injection in Western Australia

THE 31st of January 2008 saw the long established company, **United Fuel Injection**, change hands in an amicable management buy-out.

Long term industry participant, **Shirley Pusey** decided to retire and five staff members/shareholders have purchased her remaining shares in the company.

For the first time in the long 54-year history of the company, there will not be a Pusey family member who is either a shareholder or Director of the company. Some tradition will remain however, with Shirley's son **Simon Pusey**, and daughter-in-law **Suellen**, remaining in employment with the company.

United Fuel Injection commenced under the name of Pusey and Esbrey in 1954, with the prime motivator behind the company being the late **Bert Pusey**. The company split in 1971 and became known as 'Pusey's', a name that became synonymous with the Diesel Industry in Western Australia.

Bert Pusey unfortunately passed away in 1978 and the company was then run by Shirley, with the help of the then workshop manager **John Nicholls**. As everyone knows in the trade, John and Shirley became an item, and together ran the business for many years.

In 1998 Puseys merged with EZ Diesel Services (EZ was established by Managing Director **Mike Gorey** in 1979) and started

trading as United Fuel Injection in its current form. The merger made the new entity of United Fuel Injection the largest Fuel Injection business in Western Australia and one of the largest in Australia.

In 2000 the company expanded and relocated to their current premises at 479 Great Eastern Highway.

Unfortunately 2003 saw the passing of John Nicholls, at which time **Mike Gorey** was installed as Managing Director, also replacing John as Chairman of the Board as is the case today. Shirley, also in her capacity as a Director, assumed the role as Company Secretary, taking over from John.

United Fuel Injection has seen unprecedented growth in the last 5 years, fuelled by the huge growth of the Western Australian economy, particularly in mining.

Mike said, "We wish Shirley all the happiness and health in her retirement and thank her for her contributions. I am sure everyone in Australia and New Zealand will miss her colourful nature at future AADS conventions."

Mike went on to say, "The company has an extremely bright future, with both sales and profit far exceeding expectations in the past three years. This has consolidated the company base into a strong financial position and the company is currently looking at further expansion plans".

Queensland Branch Report continued from page 5
fee to be charged. On completion and passing,



a certificate from the AADS will be issued. Contact **Ross Fisher** on (07) 3375 3755 for more information. Booking form should be with this issue of *Diesel Torque*.

The Queensland committee has inspected the venue and found it to be very satisfactory, and don't forget there is a fishing trip. **STARTING TIME WILL BE 6.00AM** at the latest. Weather permitting it will produce some good fish and have a good time as well. The boat is very nice and nothing like the Gilligan's Island episode.

See you all at the conference.

Walter Vrbancic
Chairman, Queensland Branch
AADS Inc.





ALIFETIME working in the diesel fuel injection industry is a long way from her original start in life. Trained as a professional ballroom dancer, Shirley's first job was at 14 teaching dance at the Gilkinson Dance Studio in Perth.

It was here many years later that she met **Bert Pusey** and so began a 35 year livelihood in the male-dominated industry of Diesel Fuel Injection.

It was hard work in those days. Before computers Shirley would hand write part listings and type invoices manually. Paperwork and bills needed to be paid and even when in hospital for the birth of her son Simon she would dutifully sit and bang out an invoice on the typewriter.

Literately thrown in the deep end with the death of Bert in 1978 it was a case of sink or swim. Swim she did and out came her never-give-up attitude and keep on smiling no-matter what others said or thought. Shirley is a survivor; a woman of drive, determination, passion and strength.

Working hard over the next 25 years to create a name synonymous with the best of workmanship, expertise and customer service. Shirley, along with John Nicholls, would take the business from Bert Pusey's Fuel Injection to Pusey's Fuel Injection through to the merge in 1998 of Pusey's, Diesel Automotive Services, Automotif and EZ Diesel Services into today's United Fuel Injection.

Many would associate Shirley as a larger than

life charter with her contagious laugh, her perfume, a good time and many a champers! She did however hold various roles within the diesel related associations such as AADS and BASDN. She was hands-on and keen to take on the challenges of the constant changes in technology and commercial market demands.

Many may strive but would struggle to keep up with the lifestyle of Shirley Pusey who has raised a family of five children, hosted just as many international exchange students, kept in touch with her countless circles of friends and supported charities/organisations such as Variety Club of WA and Rotary International.

In amongst this busy schedule Shirley would still find time to bring in a plate of sandwiches, cakes or roast dinners for her staff and have a good old chat and a laugh.

Her flare for fashion would not be contained even in a fuel room. Safety first was not a priority when it came to looking good in those stilettos, she learnt the painful way when long time employee Greg Wellington and John watched a camshaft roll off the bench and drop on her toe. No sympathy from John here!

Greg, like many employees, had many an adventure with Shirley. One Christmas shopping trip in particular sticks in Greg's mind. He was sent off with Shirley to help push the trolleys. He has never seen so much shopping, grog, gifts and kids to boot to be squashed into a small Toyota Celica!

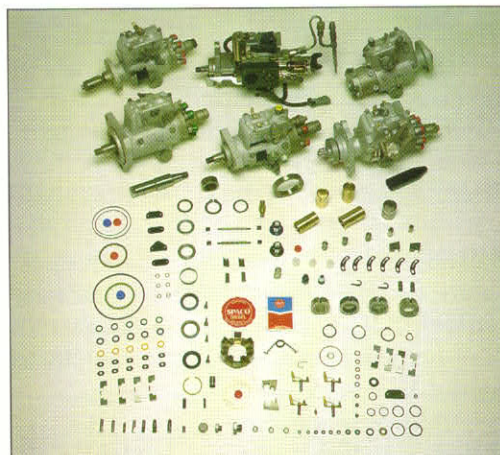
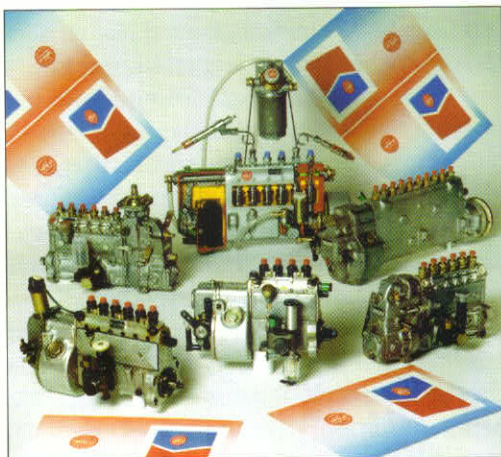
After the death of John Nicholls in 2003, Shirley who, along with John, was looking forward to the prospect of retirement, found herself again up against another one of life's hurdles. For the next four years she, along with the remaining Directors of United Fuel Injection, continued on with the company's projections and goals.

In late 2007 it was time for Shirley to retire; this could not have been an easy decision to make. To leave behind a lifetime of memories – the good, the bad, the hard thankless work, watching her sons grow up literally with diesel in their veins and complete their trade, her employees and their families, the many friendships of others in the industry.

Shirley, may you look forward to travelling, playing grandma and spending time with your friends and family. Maybe even slow down a little? We can only hope, but we can't see that happening!

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ALLTECH DIESEL & TURBOCHARGER is located in New Zealand on Auckland's sunny North Shore. The company was formed in 1993 and has steadily grown into New Zealand's largest supplier of genuine turbochargers and parts, with over 465 individual turbo models and over 9,000 individual parts carried on the shelf, and growing.

As New Zealand's premier turbocharger supplier, we carry the hard-to-find parts and many oversize and undersize items.

Alltech also has a fully equipped turbo repair facility that includes New Zealand's only true VSR balancing machine, along with its other state-of-the-art equipment; this makes Alltech's turbo repairs and remanufacturing program second to none.

Alltech Diesel & Turbocharger has a total of 12 staff members with 6 dedicated to the turbocharger sales and repair shop, with the remainder working in the fuel shop and vehicle repair shop.

With over 90 years of combined experience and knowledge, this makes Alltech the leaders of the turbo industry in New Zealand.

Last year, Alltech Diesel and Turbocharger was appointed a New Zealand Garrett master distributor, as well as already being the New Zealand MHI master distributor. Alltech also has an extensive range of all other leading manufacturers' turbos and parts for IHI, Holset, Schwitzer and 3K.

With New Zealand being flooded with Japanese import vehicles since the late eighties and early nineties, and as many as 200,000 cars entering the country a year since 2000, Alltech Diesel and Turbocharger knows the import market very well – if you are stuck and we don't stock it we can usually build something to suit or outsource it for you.

Alltech Diesel & Turbocharger pride themselves on supporting the local turbo industry, whether it be advertising, price or just catering to the needs of the turbo repairer.

Alltech also exports turbochargers and parts throughout the world, currently selling into Australia, the Islands, Singapore, Malaysia and the USA etc. ... we are familiar with shipping to many countries around the world and have accounts with all major freight companies.

Alltech have always been strong supporters of the AADS. We last exhibited at the National Conference in Queenstown 2004 and previously at the Auckland conference in 2000. It has always been a pleasure to attend and exhibit at the AADS conferences held annually in New Zealand.

This will be the first time Alltech Diesel and Turbocharger have travelled to an Australian conference to exhibit and are looking forward to meeting as many of you as possible.

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IT doesn't sit comfortably when asked to write about yourself, but asked I have been, so let's try.

With that, I will go back to the beginning.

My full name is **Arzuman Vaganiance**. As a 6 year old kid having just migrated to Australia, not many kids at school could pronounce my name so from that point on I was christened Oz by my school mates and it stuck.

Mechanical things had always caught my attention to a point that almost sent my mother crazy. Just about anything in the house was pulled to bits but rarely put back together.

As my interests were more mechanical than academia it was only natural to go to a tech school, as they were referred to back then. I completed 5th form in fitting and machining but couldn't make up my mind as to a career choice. It was suggested by our school careers advisor that I should further my education and repeat 5th form, but this time in applied sciences. (this was the best thing I ever did).

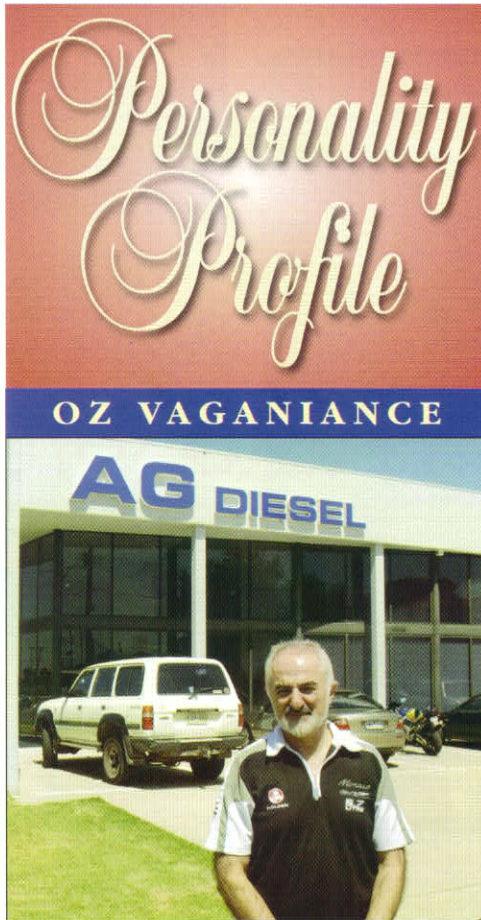
I completed this year and decided to pursue drafting, as I was very interested in mechanical design and drawing. I completed and received my mechanical drafting certificate and had just signed on for a position as a trainee detail draftsman with a large engineering firm with a view to becoming a design draftsman in engineering.

My first job ended before it even started. I resigned before commencing work in the hope of obtaining a cadetship in Marine Engineering with the Australian National Line. It was a bit of a gamble as they were only accepting 9 cadets from all around Australia.

After several interviews, I was accepted and my life as a Marine Engineer started. I was 18 years old at this point and spent a lot of time at sea during the school term breaks, and in my third year our training involved spending several weeks at Peacocks and Smiths under the guidance of Bruce Cornell, learning the facets of diesel fuel injection.

It was at this point I was hooked.

Early in 1980, along with my best friend Gerry van Hoof who is a tool maker fitter and turner, we



purchased a test bench at auction and went into partnership together to form AG Diesel. We opened our doors in 1981 at a leased factory in Westall road only to flounder and struggled to gain work. We continued to struggle and develop the business with the aim of having our name recognized by the public and to build a workshop environment to suit our own requirements and purpose built to convey a sense of confidence for our customers.

In 1998 we completed our current premises and moved in. The whole time during our commercial existence our aim and goal was to build the business and provide a standard of workmanship that we could be proud of and our customers could have confidence in.

In late 2002 Gerry decided to move on and with that I purchased his share and continued to push the business to a technological standard that is in tune with the trends in the diesel industry.

It is clear to me that for a business such as ours to survive and expand into the future, and we as an industry to survive, all of us must be prepared to embrace new technology and move with it. Many people make comments about "Why do we need all this expensive test equipment?"

My response is that it is our responsibility to attain a level of understanding and expertise that is commensurate with our industry. It is unacceptable for the future of our industry to simply become shop fronts. We are in a service industry where we as specialists, specialize in the repair and test of fuel injection systems. The financial burden placed on business to keep abreast of and update equipment is quite significant and this is where I feel the Association, through its membership, can assist each other. By networking between various shops, we can provide services that each of us may be lacking, or when we don't have the funds for the necessary test equipment. I understand that it may not sit well with some shops to lose control of a job but I feel it is better to service your customer with his immediate requirement in this manner than to turn him away. ■

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Diesel Technicians Queensland Style

(from apprentices to tradesmen)

by Steve Martin

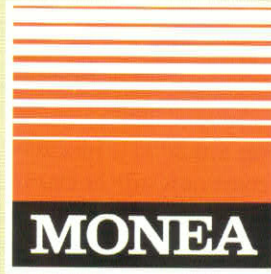
Skills Tech Australia – Mt Gravatt Training Centre

WE at Skills Tech Australia Mt Gravatt training centre, formerly Mt Gravatt TAFE, have been training diesel fuel specialists for 10 years now. During that time the apprentices have been doing 3 years off-the-job training in 6-, 4- and 3-week blocks at the College. When they are about to complete their apprenticeship, we come out to the workplace and allow the apprentice to overhaul and test a fuel injection pump for us. Usually both the workplace and apprentice are nervous, but once they get on the way of dismantling checking assembling then testing the fuel injection pump everybody settles down the skills and confidence the apprentice has obtained over the years is quite noticeable.

After seeing what the apprentices have done and the certificate they received, technicians in these workshops are now asking if they too can have the same qualification as the apprentices are getting, which is: Certificate 111 in Automotive Mechanical Diesel Fuel Specialist.

This year will see the introduction of a RPL process (Recognised Prior Learning) which will enable these Queensland technicians to gain the certificate 111 in Diesel Fuel Specialist. At the AADS national conference on the Gold Coast on April the 11th to the 14th will see the RPL process begin. The procedure will require the applicant to provide certified copies of industry experience and courses including trade certificates, also a test will be held at the end of the conference, this test will recognise areas that may need to be worked on to gain the Cert 111 Diesel Fuel Specialist. Each attendee that does the test will receive a training record book which can also be signed off by their supervisor as further evidence to build a case for the RPL process. The cost of this process will depend on how many competencies the technician will do. It can range from \$50 to \$1200 – the test will again help identify this.

To sum up Diesel Technicians Queensland style – “apprentices to tradesmen” – in the last ten years I have had the privilege to be apart of the apprentice diesel fuel specialist training program and have enjoyed watching the growth of these people from apprentice to tradesman, where they are able to become worthwhile Diesel Technicians. It also has been a worthwhile process of being allowed into workshops and meeting technicians, in an industry that prides itself on quality, it is hoped that introduction of the RPL process will enable technicians to have the recognition of who they are and also it is hoped that it will be adopted in the other states as well. ■



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By all means you can also give us your postal address and phone numbers, even mobile number.

You can even give us details of other people's emails who want to be kept in touch.

We're happy to keep in touch with friends who are not members, just as much as with members.

But it's YOUR EMAIL address we need the most!

aads@pams.org.au

Modern Diesel Emissions

by Herbert Leijen

THE following article is a modified extraction from the brand new AECS DMS1-3 Common rail Diesel 2 day diagnostic training seminar. I believe that the DMS 1-3 training seminar is important for everyone in the automotive industry as it contains the latest technologies used in the Diesel field, and explains in detail how to diagnose faults on those systems.

The common rail diesel systems are going to be on all vehicles very soon, from small hybrid diesels to large truck engines. Currently no other big changes are in the pipeline for Diesel technology. This knowledge will make you current for many years to come. The diagnostics should be the domain of the diesel specialists, but a lot will find their way to the common garages as the diesel specialists usually stick to repairing and calibrating components – that is what most of you are best known for.

The components used are simple to understand and replace, but of very high precision and equally high cost. Simply swapping parts is going to be impossible, as the most important items are vehicle coded. Thorough accurate diagnostics (knowledge: AECS diagnostic training for the AADS) and quality equipment (ATS scope) is going to be of defining difference for your future.

I would like to share with you in this article part of the emission research for this training on Denso common rail (CR) systems.

Diesel emissions general

In every combustion chamber are 'dead' spots, where the combustion stays too cold or where there is not enough swirl to make the air mix with fuel properly.

The Diesel (HC's) will fall apart in Hydrogen (H₂) and Carbon (C). The H₂ will find oxygen as it is very reactive, but the carbon will not. The carbon will form black flakes, visible as black smoke. The larger the particle, the more visible they are. The more particles there are in the emissions the more visible (light absorption) the smoke is.

K value

The emissions from a diesel engine are measured by light absorption. The amount of light absorbed by the particles is an accepted standard measure for the engine's emissions.

Light absorption is measured as a percentage of light arriving at the other side of a tube. To make sure that all equipment comes up with a comparable value, the light absorption percentage is calculated back to an opacity co-efficient expressed as K.

In Europe the in service limit of most countries is $K=2.5m^{-1}$ for non-turbo and $K=3m^{-1}$ for turbo charged models.

A well-maintained non-catalyst equipped vehicle with mechanical injection and turbo will produce around $K=1.5$ to $K=2.5$ during a snap acceleration emission test.

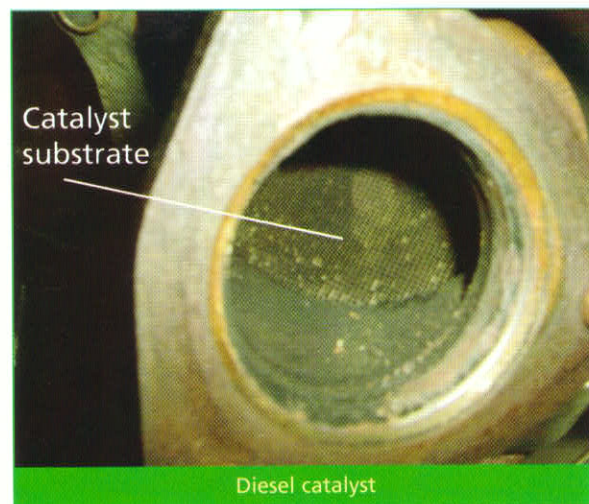
Catalyst

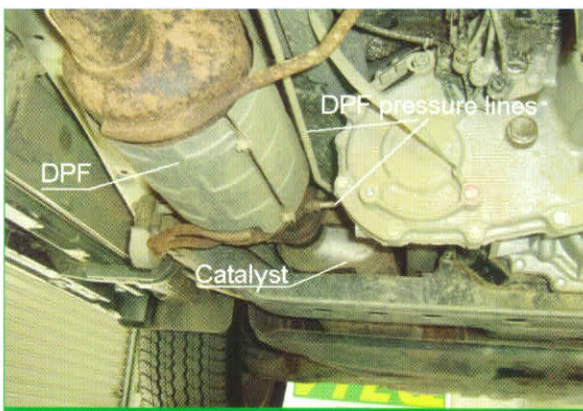
Most modern diesel engines are equipped with a catalytic converter. Simply explained, the catalyst in the converter promotes the chemical reaction between unused fuel (HC's) and air and between partially burned diesel (carbon) and air.

The catalyst greatly improves the emission quality and reduces the particulate levels from the emissions.

An average electronic controlled DI diesel engine (non-common rail) with catalyst would produce around $K=0.5m^{-1}$ to $K=1.5m^{-1}$.

A badly maintained engine with for example low compression, worn injectors or incorrect timed injection (e.g. pump cam ring worn as result of water, or timing out as result of incorrect viscosity bio fuel), or stuck EGR valve, can quickly block the catalyst. The emissions will be very high as a result and the performance of the engine will be down.





Exhaust system with emission treatment components

A common rail diesel engine equipped with only a catalyst will produce even lower emissions as the injection pressures are higher and the injection control strategy is more precise.

During research, values of between $K=0.3m^{-1}$ and $K=1.4m^{-1}$ were measured on similar CR engines of different makes.

Some early (<2000) high kilometre (e.g. Taxi) CR turbo engines (no cat) are common for failing the common European emission tests ($K=3m^{-1}$).

Diesel particulate filter system

To capture even the finest particulates in the emissions (these pose the greatest health risk) currently filters are being fitted in the exhaust, called the Diesel Particulate Filter (DPF).

The filter will capture the particulates and store these. As with any filter, it gets blocked after a period of use. The filter needs to be cleaned when it is restricting the exhaust to a certain point. The cleaning process is called regenerating.

Simply explained, the process of regenerating is to burn the Carbon (C) particles into a gas carbon dioxide (CO₂). For this chemical reaction to take place, the filter needs heat. CO₂ is a gas, so it will flow through any filter virtually unobstructed.



Particulate filter

Regeneration

If the pressure across the DPF reaches a certain threshold, the ECU will initiate a regeneration procedure. The regeneration process takes place automatically when certain engine operating conditions are met.

These conditions are for example that the engine needs to be up to operating temperature, and that the vehicle speed is more than 40Km/h and reasonable constant.

For the high temperature in the DPF extra Diesel will be injected very late in the labour stroke.

The regeneration process can also be activated in the workshop with a scantool. Extreme caution needs to be taken while doing this in the workshop!

At top of the following page is the ATS 5004 scope recording of Rail pressure, Injector voltage, Throttle position and VNT duty cycle during regeneration.

As can be seen from the pattern, there are 5 injection pulses per cylinder cycle. The engine revs were fixed at 1500 RPM by the ECU without touching the throttle.

The following pattern shows the injection offset in crank angle degrees during one engine cycle.

If assumed would be that the first injection activation is at 10° before TDC, then the last would be finished 133° crank angle degrees after TDC, or 47° before BDC. This would be just after when for example the 4M41's exhaust valve opens at 51° before BDC!

Caution!

It should be noted that the regeneration process makes the exhaust dangerously hot!

It should also be noted that a vehicle with DPF has a higher fuel consumption than a vehicle without DPF, as a result of the fuel-hungry regeneration process.

It should be noted that during the +/- 20-minute regeneration process in the workshop the exhaust external temperatures rose to:

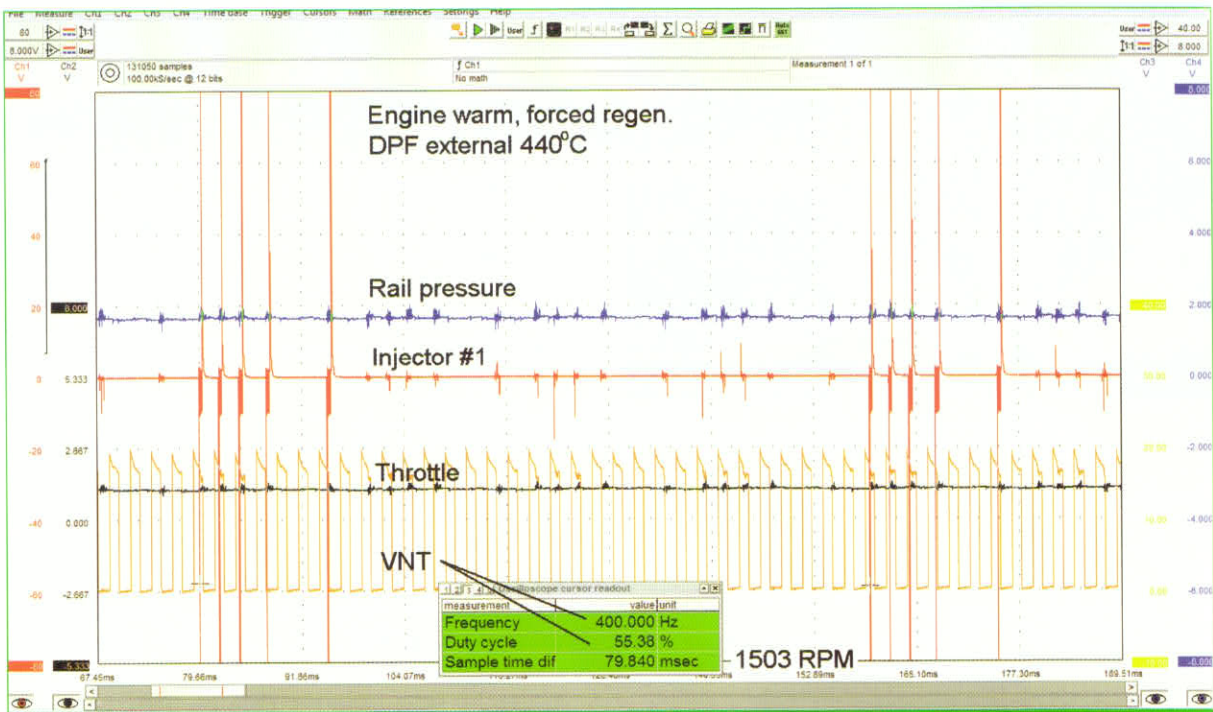
At the exhaust manifold 240° C

At the DPF outlet 480° C

At the tail pipe 285° C

A tail pipe temperature of 285°C is enough to set fire to standard emission extraction equipment. Normal emission extraction equipment is able to handle not more than around 150°C to 200°C.

Also the soot (carbon particles) accumulated inside the extraction ducting after years of use could ignite at a little more than 300° C.



ATS 5004 scope recording of Rail pressure, injector voltage, Throttle position and VNT duty cycle during regeneration.

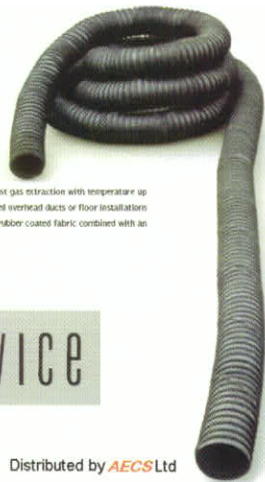


ATS scope pattern zoomed in on injection cycle during regeneration.

Please look at spec sheets opposite, of the Italian extraction equipment manufacturer Aerservice. The high temperature rating hoses were in the past only used in dyno applications. In workshops they are now used as an extension of the normal hardware hoses during regeneration.

It should also be noted that the high outside temperature of the DPF (more than 400°C) is enough to ignite paper (rubbish fire) or dry grass (grass fire) if it were to come into contact with the DPF for long enough. This is also one of the reasons why the vehicle speed needs to be sufficient before regeneration starts.

TGA



Anti-crushing flexible hose for cars and industrial vehicles exhaust gas extraction with temperature up to 170°C. The new generalized use of this hosing on roofs, suspended overhead ducts or floor installations safely. The majority of installation thanks to the light structure in rubber coated fabric combined with an outer anti-abrasion polyamide spiral coated with rubber.

170°C



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'Normal' hardwearing emission extraction hose.



T40



aer service

Flexible hose in special glass fibre fabric for cars, industrial vehicles and military mean exhaust gas extraction with temperature up to 400°C. The use recommended for cooling with assumed installation oil. Is not realized in anti-crushing version! fulfils the applications on high temperature thanks to the special glass fibre fabric and silicon with a coated external metal sliding increasing the resistance to the abrasions and not transmitting the heating.

400°C

Distributed by AECS Ltd

Special application hoses are available at 300°C and 400°C ratings.

Several modern Common rail vehicles measured by AECS with Cat and DPF were all emitting K=0m-1 (K zero) during the standard snap acceleration test!

Opacity measured during a forced regeneration of a DPF equipped vehicle in our research centre was K=1.15m-1.

It should be noted that the extra injection during regeneration causes a very high oil

contamination rate. It is advisable to change engine oil after a forced regeneration.

It should also be noted that normal cheap engine oil contains sulphur. Sulphur combinations in the emissions can easily block the DPF, with substances that are not transforming into gas during regeneration. The remaining ash will block the filter permanently. Care needs to be taken when changing oil on DPF equipped vehicles!

Report of emission test

Date: 1/17/2008 8:12:19 AM

AECS Ltd 897 Valley rd RD 4 Hastings Phone: 06 8749077 Fax: 06 8749 078

Procedure: Diesel with OBD

Vehicle identification data

Licence plate:
Mileage: 17000
Registration date:
Vehicle manufacturer: Mitsubishi
Vehicle type: Pajero
Vehicle identification number:
Engine code: 4M41

Measurement results	Unit	Limit values Min.	Limit values Max.	Actual values	

Relevant exhaust components					
Visual inspection					i.O.

Conditioning					
Idle speed	RPM				740
Cut off speed	RPM				4690

Gas blast measurement					
k mean value	1/m			1.50	0.00
k bandwidth	1/m			0.7	0.00

Gas blast	Idle speed		Cut off speed	k	Acc.time	Engine temp.
	RPM	RPM				
1	740	4630	0.00	1.40	77	
2	740	4630	0.00	1.42	77	
3	740	4620	0.00	1.43	77	

Performance test OBD Status: EOBD

Readiness codes Supported: All readiness tests done 010000000000
Performed: 000000000000

Readiness codes Supported: All readiness tests done 010000000000
Performed: 000000000000

Trouble codes Number of trouble codes: 0

Total result Emission test: Passed

Control number: Operator: Herbert Leijen

	Identification	Version	Edition	Manufacturer
OM software version	AVL DiX OM-INT	V1.6.0.58	04/2006	AVL DITEST GmbH
Measuring device	AVL DiSmoke 480	V2.1	04/2005	AVL DITEST GmbH
Scantool	AVL DiOBD 880	V1.2	04/2004	AVL DITEST GmbH

In service emission test on DPF equipped CR Pajero. Please note the K value of Zero!

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A DIAMOND OF A TWIN

Diamond's latest release, the stunning DA-42 Twin Star, is the first serious all-new light twin to appear in over 20 years. **Paul Phelan** flies this remarkable 'sports sedan'.

Part 2 continues from the previous edition of *Diesel Torque*

New engine technology

The 1.7 litre engines are Jet A fuelled, four-cylinder compression-ignition (diesel cycle) engines, producing just 135 horsepower each. Like any pilot with a lengthy GA twin background, I find myself wondering how on earth this aeroplane will meet the standard GA S/E certification performance requirement of a minimum 1% climb gradient at 5,000' in ISA conditions – but I needn't have worried, as I'm about to find out. Engine mounting is another first, with 'engine vibration isolators' (mounts) that are much softer and more flexible than typical mounting structures. Suppression of any diesel-type vibration from the 18:1 compression ratio engine is further enhanced by the three-bladed MT Propeller™ constant speed feathering props, controlled by gearbox oil pressure and driven through a 1:1.69 ratio reduction gearbox that provides a maximum continuous prop RPM of 2300 (3,890 engine RPM.) Propeller blades are wood with a composite sheath and metal leading edge. A torsional vibration dampener and clutch assembly prevent engine damage in the event of a prop strike, by disconnecting the engine-propeller linkage.

It's a very electric aeroplane, especially

because the FADEC systems are fully electric dependent. Two 244-volt 60-amp alternators (one on each engine) power two separate batteries, the main battery being a 24-volt 10-amp-hour unit. There's also a 24-volt 1.3-amp-hour battery to provide alternator start up (excitation) voltage if the main is discharged below the excitation threshold, and the third stand-alone, non-rechargeable emergency dry battery powers the electric artificial horizon and instrument floodlighting for ninety minutes.

Ailerons and elevator controls are activated through push rods; rudder controls are cable-driven; and the interconnected flaps are set to the approach and landing values by an electric position switch. Max approach flap speed is 137 KIAS, and full (landing) flap can only be selected below 111 KIAS. Max gear speed is a generous 194 KIAS, which is also V_{NE}, and best single-engine rate of climb (V_{YSE}), on the blue line, is 82 KIAS.

Landing gear system actuation is by an electric motor driven hydraulic pump, with landing gear sequencing valves also electrically controlled.

Engine management by the FADEC system means that the pilot only needs to move a

continued on page 29

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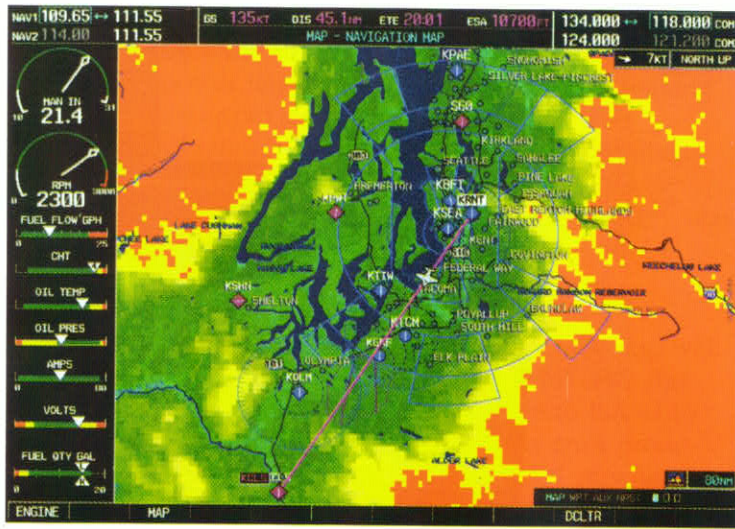


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single engine-control for each engine lever to select the desired percentage of power. There are no fuel mixture, propeller rpm, manifold pressure, or cowl flap controls, or even exhaust gas or cylinder head temperatures to monitor.

The FADEC system measures camshaft and crankshaft rpm, fuel injection rail fuel pressure, manifold pressure, manifold and ambient air temperatures, propeller governor oil pressure, power lever position, and aircraft bus voltage. All that data goes to the dual engine control units (ECUs), which send the resulting calculated signals to the prop governor pressure valve, the fuel rail pressure regulation valve, the injection nozzles, and the turbo-charger waste gate. The pilot only needs to move the power levers to the required percent power, which is displayed digitally on the primary flight displays (PFD) and multifunction displays (MFD). Power setting changes cause the ECUs to manage the propeller rpm automatically, which also automatically stabilises the props after a few seconds.

Each engine is equipped with two ECUs – A and B, either of which is capable of automatically assuming complete engine control. Because these devices constantly test and monitor all engine parameters, there's no need for a conventional pre-takeoff engine run-up, and there are no mag checks because there are no magnetos. The pilot simply brings the engines back to idle and holds down two black buttons, and the ECUs' automatic self



The Garmin 1000 MFD forms an integral part of the sophisticated glass cockpit system.

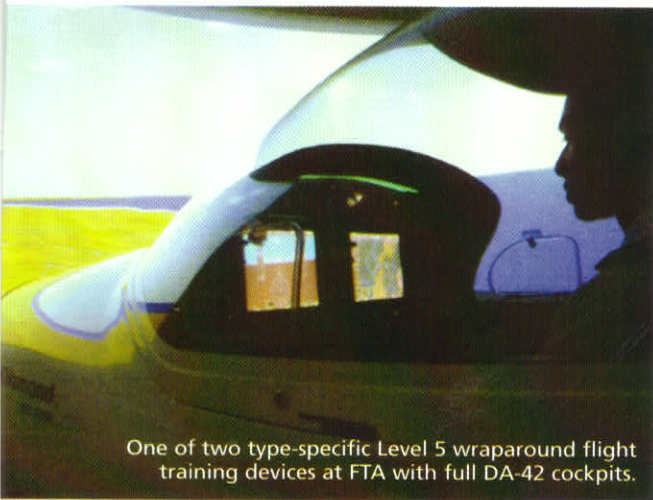
tests are completed in about ten seconds. The pilot then completes the test sequence by manually switching from ECU (A) to (B) and back on each engine, and the run up is complete if no abnormalities are indicated. The FADEC system also delivers automatic warnings for a range of parameters including temperatures and pressures of cylinderhead coolant, ECU systems, engine and gearbox oil, and fuel system, and all limit values are also colour-coded on the FADEC-controlled engine and system instruments.

The pilot experience

'Climbing into' this aircraft with its open canopy hinged at the front, is made easy through well placed steps, fuselage mounted behind the trailing edge, wide no-slip walkways on both wings, a relatively low door sill, and logically located hand grips. (However boarding in rain, if you don't want to share the cabin with a lot of moisture, will take some intelligent umbrella management.) The two rear seats are accessed by a dorsally hinged door that opens to the right, allowing easy access from the left wing walk. Baggage space is modest but manageable. The nose locker, with a door on either side, is limited to 30 kg, and the main cabin baggage area, accessed from the rear cabin, takes another 45 kg.

Once aboard, you can lower and lock the canopy to an almost closed 'cooling gap' position that still allows external air if there's a breeze, but ram air driven spherical cabin ventilation nozzles are also available and

continued on page 31



One of two type-specific Level 5 wraparound flight training devices at FTA with full DA-42 cockpits.

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effective. You're now embraced by luxurious seating comfort which instructors will appreciate, with ample room but no wasted space, and an excellent pilot view of everything you need to see. The panel is dominated by twin 10.5 inch (27 cm) flat panels displaying PFD and MFD data. Standby full sized conventionally-powered ASI, A/H and altimeter are set above the displays, just under the coaming. Twin between-the-knees control sticks have replaced conventional yokes, enhancing the view of the instrument panel. Even if you've never flown a stick-controlled aeroplane, you'll feel accustomed to these within minutes. Rear seat foot-room is also surprisingly generous and cabin width is ample. The forward and sideways external views are amazing, since the main wide screen is a single plexiglass panel with a better than 200 degree unobstructed view because there's no centre divider or roof support structure in the way and you can see the taxiway (about) three metres ahead over the low nose. The aft part of the overhead canopy is opaque to prevent direct sunlight from entering the cabin.

Pilot seats are not adjustable, but you can easily adjust rudder pedal reach, and that's important because steering beyond the nosewheel's 30 degree limit is effected by differential braking, which is smooth, grab-free and very effective.

Starting, testing and managing the engines is

simple if you follow the checklists, and taxiing on a flat surface is done comfortably with the power levers at idle and no need for braking except to stop. Cabin noise is low and vibration not noticeable, but the high-quality intercom and headsets are normally used.

There are headset plug-in points for every seat, which will facilitate observer monitoring in multi-crew training, and the rear-seat microphones can be blocked out.

With full main tanks, we're at 1,649 kg, well below the Diamond's 1,785 kg MTOW, and ambient temperature is so close to ISA as to make graph reading a little less error-prone. The graphs indicate a 340 m (391 m when factored by 1.15%) still-air take-off run, 500 m (575 m when factored by 1.15%) to clear a 50 ft obstacle, a 1,180 fpm initial climb, and 1,200 fpm cruise climb at 85 KIAS. Engine-out climb at 5,000' is graph-predicted at 220 fpm, equating to a 5.5% climb gradient compared to the 1% minimum certification requirement.

Senior Instructor Michael Smart has explained an unusual feature. The aircraft is equipped with an electronically operated actuator that limits elevator-up travel to 13°, which is 2.5 less than full deflection, when more than 20% (approach power) is selected on both engines with landing flap selected. This because handling qualities and stall characteristics are degraded with full elevator deflection in a stall. The actuator is controlled by three switches –

on both power levers and the flap selector. Normal full elevator deflection is restored if power on one engine is selected below 20% and the flap is selected to landing.

The high-RPM engines are notably smooth while accelerating, and liftoff is clean and positive. Graph performance predictions are confirmed or exceeded, but we select a more comfortable 100 kt cruise climb towards the training area, for better traffic vision.

General handling

Climbing at 100% power to 5,000' on autopilot with altitude and vertical speed

continued on page 33



Anxious to get their hands on a brand new twin, FTA instructors pore over the latest arrival from tip to toe. Seven of the DA-42s are now on line at the school.

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armed, we're achieving a rate of climb of 800 fpm. An altitude warning sounds when you have 1000 feet and 200 feet to go. At 4,800' the autopilot smoothly captures the preselected level. The traffic function on the navigation display helps us locate proximate traffic, which is clearly indicated on the moving map and aids visual contact by telling you where to look.



Boasting improved safety and redundancy, and excellent comfort levels for instructor, student and observer, the DA-42 should prove a winning combination for any flight training school.

The Twin Star has a solid feel in light turbulence, with light and well-balanced controls, and the long wingspan requires some attention to rudder input, which is a good training feature. Excellent visibility in turns, another desirable training feature, is further aided by the low nose and unobstructed 180° pilot view. A roll from a steep 60° left turn to 60° right takes about four seconds. Rudder and elevator trim wheels, located on the centre console, are responsive once you've become accustomed. Trimmed out at 5,000' with cruise power of 70% selected, we note a TAS of 142 kt, which the graphs indicate would increase to 150 kt at 11,000'. The KAP 140 autopilot smoothly captures selected altitude, and faithfully holds heading or selected track in nav mode, and will be an asset in developing students' autopilot management skills. The autopilot is also capable of fully coupled ILS or GPS non-precision approaches, which we have practised in the simulator. Flashing-light warnings indicate the decoupling of nav, heading and barometric modes, and a voice 'Autopilot' warning indicates uncommanded A/P disconnection.

Stabilised in cruise at 3,000' we run a quick instrument check. Indicated airspeed is 136 kt, TAS 144, power 70%, fuel burn 5.2 GPH (19.7 lit), range at these settings of 560 m (901 km), and remaining endurance 4 h 20 min. Smart points out another of the dozens of benefits of the Garmin 1000 system. With the nav display zoomed out to near-maximum, two system-resident concentric rings become visible and indicate the total remaining range with 45 minutes reserve on the inner ring, and the range to empty tanks on the yellow outer ring. This feature uses pilot-input fuel on board data, current burn rate, and spot winds, which

explains the slightly oval shape of the rings as they calculate upwind, crosswind and downwind range. If power is increased, the range rings instantly calculate the changed burn rate and shrink or extend, providing an immediate means of identifying a power setting that will get you home.

Pilots who are unaccustomed to the Garmin PFD may be tempted to over-correct when flying by reference to the extremely precise digital altitude readouts and the magenta trend lines. However, trimming the aircraft on the standby artificial horizon and altimeter will provide stabilised flight that can then be fine tuned.

Non normal training

Stalling in all configurations gives further confidence that this aircraft will be an excellent trainer. Stalls are gentle with a non-violent nose drop, and response to normal recovery inputs is rapid and predictable.

At MTOW stall speeds are Vs 64 kts clean with no power, at MTOW, and 57 kts in landing configuration (Vso). Stall symptoms are typical with a light buffet approaching the stall. As the power is reduced to idle, a noticeable increase in drag occurs at around 15-20% power. In normal stalls good control is available throughout. Stalling in the approach configuration (full flap, gear down and approach power, the aircraft can experience a left wing drop, but recovery using normal techniques is normal.

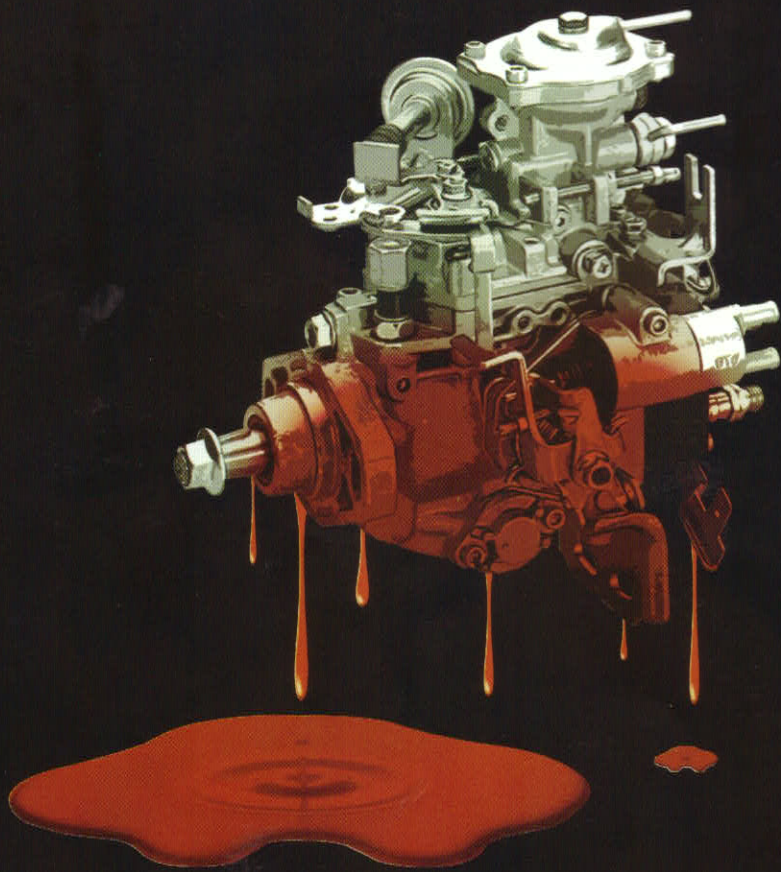
At 3,000' we shut down the left (critical) engine to check performance against chart predictions. With power off the skid ball is kept in the centre and the 'failed engine' procedure including engine identification and

continued on page 35

DENSO

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Counterfeit parts may cause engine damage.
Ensure only genuine parts are used by
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trouble checks follow. Power is then selected to idle, alternate air on, auto-ECU set, fuel off, and with feather activated by turning the left engine master off, the engine stops with the propeller in the feathered position. At full power on the good engine, trimmed straight and level, we indicate 106 kt, with a fuel burn on the right engine at 7.7 USG/hr (29 lit/hr). Climbing at 82 kt blue line speed with full power, we stabilise at 350 fpm – an improvement on the graph figure of 220 fpm.

With the left engine restarted but throttled back to idle thrust, Smart then demonstrates a minimum asymmetric control speed (VMCA) situation. With the right engine at full power, gear and flap up, he pitches the nose up to decelerate the aircraft. Approaching VMCA (68 kt) the aircraft begins to enter a yaw, which immediately stops as the nose is pitched down and speed increases. The professionalism with which this delicate manoeuvre is safely conducted is reassuring.

Back in the Parafield circuit, and now more at ease in the aeroplane, I fly three circuits and landings with a mild crosswind. Again the superior visibility is appreciated, the aircraft effortless to control in all configurations, and good landings easy to achieve. Asked if I'd like to try another circuit, I suggest that three out of three is a better outcome than three out of four, and we return to the ramp.

In common with most turbocharged aircraft, there's a two-minute cool down before engine shutdown. As we go through the shutdown checklist, I reflect that this aircraft offers an optimum combination of aircraft and systems training, that is going to take time for any competitor to match. A wide range of options includes known icing, a Garmin GDL 69A satellite datalink receiver, extended range fuel tanks (fitted to the FTA aircraft), and a built-in oxygen system. And a generously optioned Twin Star still sells for less than US\$600,000. The DA-42 offers relatively high performance along with notable operating economies, advanced systems training that is wholly compatible with the destiny of airline pilot trainees, improved safety and redundancy, and excellent comfort levels for instructor, student and observer – a winning combination for any flight training school. ■

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Diamond DA42 Twin Star

POWER PLANT

Engine 2x THIELERT Aircraft Diesel Engine TAE 125
Propeller 2x IVIT 3 blade Hydraulic Constant Speed

PERFORMANCE/CONSUMPTION

Rate of Climb Sea Level MTOW 1,052 fpm
Rate of Climb 0.000 ft MTOW 840 fpm
Max. Operating Altitude 18,000 ft
Max. Airspeed 194 KIAS
Cruise Speed @ 50%, 18,000 ft 135 KTAS
Fuel Consumption 27.2 Lt/h
Cruise Speed @ 90%, 10,000 ft 163 KIAS
Fuel Consumption 54.5 Lt/h
Cruise Speed @ 60%, 10,000 ft 138 KIAS
Fuel Consumption 33.3 Lt/h
Range @ 60%, 10,000 ft 852 nm
(1,200 nm with long range tank)
Takeoff ground roll/50' obstacle 427/691 m
Stall (flap zero/approach/landing) 64/61/57 KIAS

DIMENSIONS

Length 8.56 m
Height 2.49 m
Wing Span 13.42 m
Wing Area 16.29 m²
Seats 4
Empty Weight 1,260 kg
Max. Take off Weight (MTOW) 1,785 kg
Payload 525 kg
Fuel Capacity Std/Long Range Tanks 197 lt/301 lt
Fuel Grades Jet A1/Diesel

Thielert has already released a two litre variant of the engine with a higher initial 1200 hour life, which it has applied to extend. At present it is intended that time expired engines will be replaced with the newer model rather than overhauled. The only requirement is that the owner provide advance warning of the need for a replacement, and that the time expired engine is returned to the factory in the same box. At the time of writing, the future additional engine life was not known, however a new replacement engine was selling for less than US\$20,000.



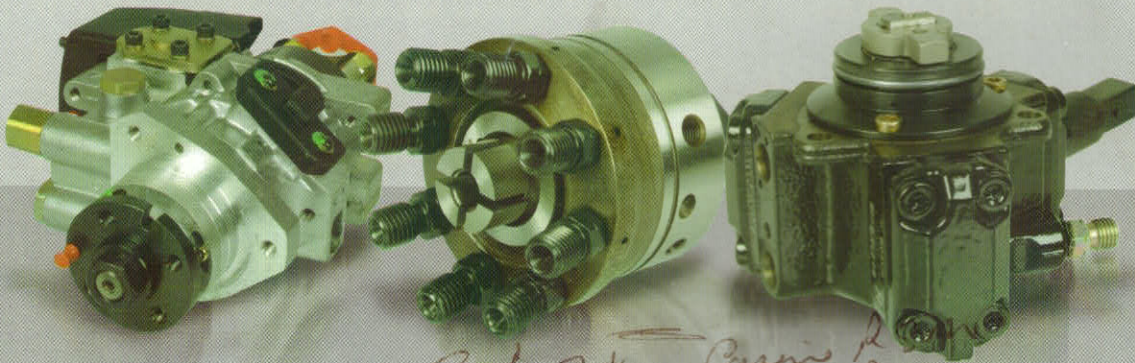
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