



NDT Training in Fiji

Last month Dr Gary Martin trained 16 members of the Fiji Ministry of Labour and Industrial Relations in Magnetic Particle, AS 3998/ISO 9712 MT Level 1. The course was conducted under the auspices of the Asian Productivity Organisation and was held at the Fiji Government Training Centre in Suva.

The OH & S inspectors on the course grasped the opportunity for training in a work related field showing high levels of interest and enthusiasm for the subject matter. So important was the course to the Fiji Government that it was opened by the Minister of Labour and Industrial Relations, the Honourable Lekh Ram Vayeshnoi and was closed by the Acting Permanent Secretary Mr Osea Cawaru. All students sat AINDT exams at the course end with a high level of success. After appropriate work experience many will be eligible to apply the Australian Institute for Non-Destructive Testing for

Certification to AS 3998/ISO 9712.

Suva was a warm and humid environment in which to work. The buses outside the training facility ran frequently and were always filled with people and music.

Gary was introduced to Fijian hospitality with great morning teas, lunches and afternoon teas, as well as Fiji time.

Apart from a small fire on the 9th floor of his hotel on the Wednesday night and finding Nadi airport evacuated on arrival there Friday afternoon the trip was uneventful. He kept the weight down by early morning walks through the Suva market, filled with villagers selling a range of produce such as Taro, bananas, chickens, etc. The view over the Suva city and its harbour out to the mountains and reef was wonderful in the morning, and the nightly thunderstorms were illuminating.



Students hard at work



The course was officially opened by the Minister of Labour and Industrial Relations, the Honourable Lekh Ram Vayeshnoi.

Engineering & Mining - Testing Times

As published in the Age Careers Feature 23/2/08 page 17

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Do you have a passion for technical work, long to visit places others only dream about, and be financially rewarded as well?

Why not consider a career in non-destructive testing (NDT). NDT includes industrial applications of radiography (X-rays and Gamma rays) and ultrasound. Without such technologies the aerospace, defence and mining industries could barely function.

NDT is used to test industrial structures without compromising their usefulness, ensuring safe operation of a wide range of equipment including jet engines, dredges, and railway track.

Non-destructive testing is performed by skilled technicians trained to international standards. There is a shortage of NOT technicians in Australia, some companies having to outsource from overseas.

Training is available at a number of establishments, including private providers such as ATTAR.

The subjects covered may be used as part of a Certificate IV in Mechanical Engineering and can form part of study towards a diploma.

To work in the industry, in most cases certification is required for which training, work experience and vision criteria must be met as set down in Australian Standard AS 3998. Certification is available through the Australian Institute for Non-Destructive Testing (For more information email certification@aindt.com.au or call 02 9949 8572.)

NDT service companies send employees throughout the Asia Pacific region to sites such as offshore oil rigs, mines, petrochemical plants, power stations and construction sites for pipelines and related processing plants.

Technicians who work offshore carry out radiography, ultrasonic and magnetic particle inspection of welds, ultrasonic thickness surveys on pipelines, crack testing of rotating equipment such as drill rigs using eddy currents, dye penetrants or magnetic particles. The defence and aerospace industries use eddy currents to monitor turbine blades, look for cracks in fuselage and undercarriage structures, all to ensure the safety of operators and passengers. Salaries can exceed \$100,00 a year.

Monitoring High Voltage Transmission Power Lines for Corrosion

From February through to April, ATTAR's David Padfield has been working closely with the linesman of Western Australia and New Zealand monitoring High Voltage Transmission Power Lines for corrosion.

Transmission Power Lines are typically suspended from steel lattice towers, or tall wooden poles, and form the major framework for power transfer from region to region. The transmission power grid is reaching an end-of-life cycle in Australia and other countries and companies are now faced with potentially extremely costly conductor replacements.

A significant portion of conductor types used here and overseas are of the type ACSR (Aluminium Conducting, Steel Reinforced). This type of conductor has aluminium strands on the outside (conducting electricity), wrapped around a steel core (providing strength over long spans). The internal steel strands are typically zinc-galvanised to prevent galvanic (also known as dissimilar metal) corrosion between the steel and aluminium.

Once the zinc galvanising coating is lost, rapid corrosion occurs between the steel and aluminium which can cause a conductor to fail completely.

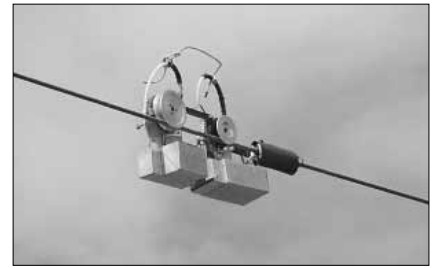
ATTAR offers a unique opportunity to determine the thickness of the zinc galvanising coating on the steel without taking the line out of service

by using equipment called an OHLCD (Over Head Line Corrosion Detector). The OHLCD measures the thickness of the zinc layer using a derivative form of the non-destructive testing method known as Eddy Current testing, whereby eddy currents are generated within both the aluminium and steel strands and measured for phase and intensity.

The OHLCD is placed onto a conductor and its self-powered motor pulls it through to the following pole, allowing for complete-length conductor scanning (barring obstacles). Measurements of the conductor are made every 10 milliseconds, with a report indicating a length of conductor's overall condition and location specific results.

Recent testing by David Padfield has identified many areas where corrosion was occurring internally and unnoticed, preventing costly surprises. Of equal importance, the OHLCD has identified many spans that are at the end of their theoretical service-life, but have not yet displayed evidence of corrosion, allowing transmission companies to prioritise valuable resources.

If you would like any further information regarding this type of testing, or provision of a sample report, please contact David Padfield on (03) 9574 6144.



The OHLCD.



Using an EWP to place the OHLCD on a conductor.



Using a helicopter to put the OHLCD on a conductor.

ATTAR Strategic Planning Conference 2008

As in April every year it was Planning time again for the ATTAR team! ATTAR closed the doors for one day, Friday 4th April and over the Friday and Saturday all ATTAR Employees were involved in the Annual Strategic Planning Conference.

This year, an exceptional effort was made by all and it was evident that ATTAR Employees have good grasp of our Company, our direction and our financials. All contributed actively to planning the actions and budget for FY09 and were also able to take some time away from the office to work 'on the businesses' not 'in the business' for a change! We were also joined by Brett Burden our ACTIONCoach Business Coach to help motivate us towards our goals!

On the Friday night, the ATTAR Team were joined by partners and family for a 'Tie' Dinner and Quiz Night! The Quiz night had a more than capable Quiz Master in Liz Saunders, (helped out by her lovely Assistant Jim Saunders) and

the night was a blast! The Babysitter Club team made up of Marcus, Kelly, Jenna and Natalie Braché, Christine Elliott, Jacqui Miles & Matthew Randell won the spoils and all thoroughly enjoyed themselves. The best Tie Award went to Paul Grosser and Allison Saunders.

Overall the ATTAR Strategic Planning Conference was a huge success, with valued contributions made by all Employees towards FY09 and beyond for ATTAR. Thanks to our clients for your patience on the Friday that we were closed, your support is greatly appreciated.

We now look forward to living out the plans and passing on some of the improvements and new technology to our clients!

Upcoming Expos for ATTAR

ATTAR will be exhibiting at a variety of conference and expo's later this year. We would love to see you there!

20-22 July 2008
Herald Sun Careers Expo - Melbourne

27-30 August 2008
NDT World Conference - China

28-29 October 2008
Condition Monitoring Forum - Melbourne

Detective Work

As published in the VACC Tech Talk Magazine 2008
With thanks to Rick Besserdin

Ever since the famous detective Sherlock Holmes first appeared in print, people have tried to emulate his deductive prowess. His skilful use of deductive reasoning in conjunction with astute observation enabled him to solve the most difficult of cases. The same skills are required of mechanics that need to understand exactly what went wrong and why, whenever repairing a vehicle.

Mechanics know that without this understanding the same car will be back, with the same failed part, in only a few short weeks. Just like Sherlock Holmes, we need to use astute observation and deductive reasoning, along with

various types of equipment. While a good magnifying glass is still useful, ultraviolet lights and borescopes are now part of the tool catalogue of any good workshop.

Since the introduction of OBO II, scan tools are also part of our detective kit. Freeze Frame data captures information from the Powertrain Control Module at the time that a fault occurs. Engine speed, temperature; and road speed are all things that will help us deduce why and when the fault occurred.

A good detective will also spend time interviewing witnesses; in our case it will usually be the customer and anyone that may

have worked on the vehicle beforehand. These witnesses however, are not infallible. What people are able to recollect varies greatly, and they can be influenced by what they want to remember, rather than on what really happened.

Occasionally we come across things that have failed, but despite our best efforts are unable to determine the exact cause. This is where we may have to call on people with advanced equipment and expertise. The following paragraphs highlights how ATTAR were able to use their Metallurgical expertise in deducing the cause of a valve failure.

Fatigue Failure of Diesel Valve

A valve from a 3208 CAT engine had failed in service. In addition to the failure, a reasonable amount of damage was observed on the valve head and wear marks were present on the stem from the valve guide. A heat tinge was apparent on the surface of the stem close to the failure. (See Diagram 1) With this amount of damage, determining the cause seemed impossible.

Damage to the head of the valve, the majority of which was thought to have occurred after the head detached from the stem, has obscured any evidence of a piston/Valve collision that could have contributed to the failure. The uneven wear on the stem indicated a problem with the guide,

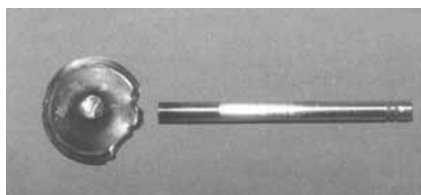


Diagram 1. Failed valve at junction of head and stem. Damage to head, wear on stem and heat tinge can also be observed.

which may have also contributed to the failure.

The fact that there was fretting type wear damage, near the top of where the collets would have sat, indicates that the collets were not fitted correctly, were the wrong size for the stem, or were excessively worn when inserted. See Diagram 2. Fretting damage can only occur over a period of time, and is not thought to have occurred after breakage of the valve. If the collets were not operating correctly, they could have resulted in valve bounce by effectively



Diagram 2. Fretting just above the grooves for the collets.

weakening the valve springs through extension. Valve bounce due to engine over-speed or weak valve springs are potential causes of valve head to stem breakage.

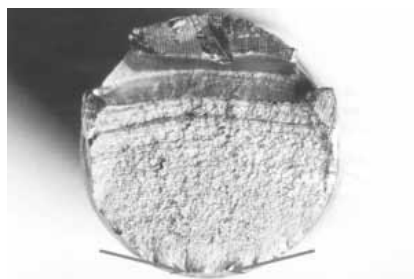


Diagram 3. Fracture surface of failed valve showing indications where crack has initiated

Beach marks were evident on the fracture surface, these started at the points indicated. See Diagram 3. The beach marks are a result of changes in load and/or frequency and may be caused by the excessive cyclic stem stresses produced by valve bounce.

Evidence of final failure was apparent at the top of the surface in Diagram 3, where necking and shear occurred as the load exceeded the final yield stress. Metallography revealed a fine martensitic microstructure, which was consistent throughout the sample. See Diagram 4.

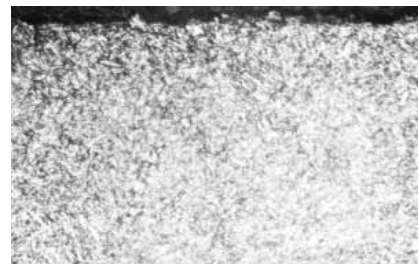


Diagram 4. Martensitic microstructure near the region of initiation of failure

The stem near the failure was found to have a lower hardness of 367 HV30 compared to 384 HV30, around 18mm from the failure. Because no difference in microstructure was apparent, this softening effect is thought to have arisen because of the heating that caused the heat tinge.

Using astute observation, deductive reasoning, along with specialised equipment, allowed the ATTAR team to reach a conclusion. The failure of the valve is thought to have been due to excessive cyclic stem stresses, brought about through a worn or incorrectly fitted collet. As Sherlock Holmes would say "Elementary ..."

Definitions

Beach Marks - Beach marks are progressive marks that appear on a fatigue fracture surface that indicate successive positions of an advancing crack front. The terms comes from the similarity of the beach mark pattern to that left on a sandy beach by a series of waves.

Martensite - In the 1890s, German metallurgist Adolf Martens studied samples of different steels under microscope, and found that the hardest steels had a regular crystalline structure. This crystal structure is now termed Martensite and is therefore Martensitic. It is formed by rapid cooling or quenching of the heated iron, which traps carbon atoms that do not have time to diffuse out of the crystal structure.

A day in the education of Callum

ATTAR has kindly sponsored Callum Oakey - Engineering and NDT Assistant on a voyage of engineering discovery. Once a week, he heads off to Swinburne University, in Hawthorn, where he's undertaking his Advanced Diploma of Engineering.

His day starts at 8.30, with a couple of hours of Technical Drawing & Sketching, followed by lunch.

For lunch he has a \$5 lamb kabab, or, if he's feeling especially adventurous, a jacket potato, one of the high class ones that's disguised under a mound of toppings and hippy marketing. Soon

enough, its time for Materials Science, where Callum, his appetite sated, feeds his mind interesting little nuggets, like stress strain graphs, the carbon content of steels, advanced ceramics and precisely why they're lovely, the correct method for reducing the moisture content of wood, and the reasons why his lamenting tutor's tools have rusted since he moved to the Otways.

Suddenly, its 4.30, and he pops down to the Indian, or possibly Thai, if he's feeling exotic, for a dinner of curried delights. Come 5.30, the bell metaphorically rings once more, and our rampant hero of

learning finds himself back in class, learning about computer aided design, and technical annotations, presently, he is drawing up the plans for a steam engine, which is wildly frustrating, but in a good way. Which brings our knight of the pen up to 9pm, where he mounts his mighty yellow steed, and flies a twisting course through a whirl of street lights and traffic, back home. Callum will complete his Advanced Diploma of Engineering in 2011 when his skills will be put to even more good use at ATTAR

Baby News!

Another addition to the ATTAR family

Jackson Austin Grosser was born at 2:02pm Tuesday 26th February 2008. Jackson came into the world weighing 6lb 9 oz.

Huge congratulations from all the Team at ATTAR to Vikki & Paul who are thrilled at this very special addition to their family.

Double Trouble!

Yes that's right Georgina & Chris Ablett are pregnant and it's confirmed they are having twins.

Huge congratulations to both Georgina & Chris who are looking very forward to contributing to the ever growing ATTAR family.

Chris Ablett - Sales & Marketing Manager

We would like to welcome and introduce to you our newest member of the ATTAR team. Chris Ablett has come on board as our Sales and Marketing Manager.

His experience is diverse, having worked for one of Australia's largest Direct Mailing companies in a sales and project management capacity. He has lived overseas in the UK where he worked in the events industry organising and delivering themed parties throughout Europe, before completing his time overseas with Foxtons Real Estate Agency negotiating property pricing and contract issues

between landlords and tenants. After returning to Australia Chris entered the Fitness Industry and as well as being a qualified personal trainer has spent the last 2 ½ years selling commercial fitness equipment into large gymnasiums, hotels and the defence force.

Chris has already performed project work on a casual basis with ATTAR prior to commencing this new role so already has a good working relationship with the team and a thorough understanding of the services ATTAR provides. Chris can be contacted on 0413 767 363 or chrisablett@attar.com.au



ATTAR Runs for the Kids!



THE ATTAR ALLSTARS AFTER THE RACE!
Back Row: Georgina, John, Anne, Matt, Jacqui, Callum, Gary, Chris & Robyn Front Row: Christine & Liam

ATTAR entered their team "The ATTAR ALLSTARS" in the Run for the Kids - Fun Run (5.76kms) held on Sunday 30th March 2008. It was a chilly start to the morning with everyone arriving at Federation Square- Melbourne at 7:30am to get warmed up and ready to cross the starting line. The day was a great success with everyone from the ATTAR ALL STARS finishing the race in tremendous fashion! A special mention goes out to Liam (aged 6) whose little legs and fighting spirit got him through the race without a hitch! Congratulations to all ATTAR team members on a wonderful effort! ATTAR contributed to a worthy cause and The Royal Children's Hospital raised a total of \$738K for sick kids in need! Go ATTAR!

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