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26 July 2012

Submission to the Canterbury Earthquakes Royal Commission, on the role of professional societies in the engineering sector

Dear Commissioners

I am moved to make this submission to the Royal Commission with regard to the "Discussion Paper: Training and education of engineers and organisation of the engineering profession" because, from my past dealings with IPENZ, it is absolutely clear to me that IPENZ has a culture that is rotten to the core, and is therefore not a fit and proper organisation to be in charge of the registration and disciplining of Chartered Professional Engineers in New Zealand.

Over the years, I have documented my dealings with IPENZ after I laid formal complaints against first one, and then two more IPENZ members. As a result of laying my complaints, I was ridiculed and vilified by IPENZ as the organisation closed ranks around firstly the member about whom I had complained, and secondly around the members of the Investigating Committee after I received the Committee's report, which was, frankly, of such a poor standard that it remains an indictment of IPENZ as a supposedly professional body. I have made personal appeals to the board members of both IPENZ and the Chartered Professional Engineers Council, to no avail.

I am willing to travel to Christchurch to testify before the Royal Commission.

My dossier is on the following pages of this document.

Sincerely

Peter J. Morgan

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19 June 2012

A Sordid Saga of Corruption and Incompetence within the New Zealand Marine Industry and the Engineering Profession

This is an abridged record of what has so far happened to Mr David Rickards and Mrs Robyn Rickards, who have been, as a direct result of the actions (the reader is left to decide whether these actions were corrupt, or incompetent, or both) of a professional engineer, who was a Fellow of IPENZ no less, and two barristers regarding the catastrophic failure of the camshaft in a Volvo KAD 43P diesel engine in their charter boat Silver Wing as hereinafter described, denied justice and have suffered a substantial loss, fairly estimated at approximately $750,000. The camshaft in the Volvo diesel snapped in two because the engine was supplied with its camshaft timing gear two teeth retarded. This caused each inlet valve and each exhaust valve to open and close so late that each exhaust valve was struck by its cylinder's piston when each exhaust valve was approximately 4 mm away from completing its closing motion. This caused a cyclic torsional shock wave in the camshaft, which caused it to snap in two after only approximately 2100 hours of operation. Another identical engine in another vessel failed in exactly the same manner.

To arouse readers' immediate interest, here is the link to a video on **YouTube** that shows the inner workings of the Rickards' Volvo diesel engine: **KAD 43 P Volvo Penta Marine Engine June 3, 2011.wmv**

The video clearly shows one of the *Silver Wing* port engine's exhaust valves (in the No. 1 cylinder) being struck by the No. 1 piston just before the valve closes. Note that light can clearly be seen between the valve and the valve seat at the instant it is struck. The valve that can be seen in the background is the No. 1 cylinder's inlet valve.

The reason that I have no qualms about making this whole matter public knowledge is that in his letter to barrister Eugene St John dated 21 October 2005 (Appendix 2), which led directly to the Settlement Agreement dated 23 November 2005 (Appendix 3), barrister Paul Dale, acting for the third and fourth defendants Ovlov Marine Ltd and Volpower NZ Ltd respectively, wrote: **"Mr Rickards and Mr Smithson have made this claim publicly known to the marine industry. The Maritime Safety Authority has been notified by Mr Rickards, and we are instructed there are other interested parties awaiting the outcome. Some may think that if this claim succeeds, or the plaintiff is somehow able to extract a settlement, that similar claims might result in a payment. It is for this reason that any condition of confidentiality is utterly rejected. Because (sic) both Volpower and Ovlov value their good reputation in the industry, and they would prefer to see this case go through to a full hearing rather than there be left any suspicion that there is left any liability on their part."**

Presumably, when the directors of Volpower and Ovlov learn, through this chronicle and its Appendicies, the truth that their 'expert' Eric Stevens, who was then a Fellow of IPENZ, was wrong and that Tim Smithson and I were right all along about the reason for the catastrophic failure of the camshaft in the Rickards' **Volvo KAD 43P diesel engine**, and a near-identical failure in another **Volvo KAD 43P diesel engine** in Mr Tom Callagher's water taxi, *Kawau Cat*, they will be very quick to preserve "their good reputation in the industry" and will have no hesitation in between them reimbursing Mr and Mrs Rickards with cheques totalling $750,000 and also contacting Mr Callagher and making arrangements to reimburse him as well.

Special thanks are due to Dr Jonathan Smith PhD, and his team of metallurgists at Optimech Ltd for the quality of their forensic engineering work and the series of brilliantly clear photographs in their report, which is attached as Appendix 22.

This whole sordid saga ought to teach three salutary lessons to all those who are involved either in dealing with complaints from their customers, or as a customer making a complaint:

1. Be honest and try to do the right thing, for the truth will out in the end, and
2. If you have to take legal action, hire a lawyer and an expert witness who both have reputations for being honest truth-seekers and who have dogged determination, for the truth will out in the end.
3. A good reputation takes a long time to earn but can be quickly destroyed if you don't do the right thing and are subsequently caught out when the truth wins out, as it does in the end.

Background

In December 2005 I received a telephone call from an old friend, Mr Len Gilbert, a well-known and recognised expert on the performance of diesel engines in marine craft, asking if I would be willing to accept instructions as an expert witness in a Court case involving the failure of a diesel engine in a charter vessel named Silver Wing. I replied in the affirmative and duly received a telephone call from Mr David Rickards, one of the vessel's owners (the other being his wife Robyn).

Sequence of Events

Mr Rickards arranged for me to be sent several Briefs of Evidence, two of which were by a Fellow of the Institution of Professional Engineers New Zealand (IPENZ), Mr Edward Eric Stevens, and one of which was by Mr Timothy H. Smithson of Assessco General & Marine. The first of Mr Stevens' Briefs of Evidence was prepared for Mr Keith Langdon, lawyer for Bladerunner Boats Ltd, and the second was prepared for Mr Paul Dale, barrister for Ovlov Marine Ltd and Volpower New Zealand Ltd, the engine suppliers. Mr Smithson's Brief of Evidence was prepared for Mr Eugene St John, barrister for Mr and Mrs Rickards.

I read all of the Briefs of Evidence, and telephoned Mr Rickards to let him know that I did not need to see the engine, but did want to see the vessel, as I could tell from the information I had received that it was underpowered and the engines had clearly been overloaded. I explained that I did not want to inspect the failed engine as Mr Stevens had clearly described in his Brief of Evidence why the camshaft had catastrophically broken in two. At the time, I preferred to believe Mr Stevens' Brief of Evidence (for the defendants) rather than Mr Smithson's (for the plaintiffs) as to the cause of the catastrophic failure of the port engine's camshaft, because at the time, I believed that as Mr Stevens was a Fellow of IPENZ, his testimony would be the more reliable. Mr Rickards pleaded with me to drive from my home on Auckland's North Shore to Hamilton to inspect the failed engine, and I reluctantly agreed to do so.

Mr Stevens had written in both of his Briefs of Evidence, on pages 3 and 2 respectively in the Summary of Conclusions (Appendices 1A and 1B), as follows:

> *10. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.*
>
> *11. The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely.*
>
> *12. The chemical additives in the oil were exhausted as a result of the plaintiff operating a program of extended oil change intervals which significantly exceeded the oil change intervals recommended by Volvo.*

When I inspected the engine I found that quite contrary to what Mr Stevens had written in each Summary of Conclusions, the valve rockers had never been seized on their mounting shaft. On the contrary, the plain bearing surfaces of the rockers and mounting shaft were in pristine condition and

the valve rockers rotated freely on their mounting shaft, just as they were designed to do. There was no sign of excessive wear or any other evidence characteristic of seizure.

Furthermore, when I inspected the vessel's log, I found that the camshaft had catastrophically broken in two only 40 engine hours past the previous oil change. Clearly, there had been absolutely nothing wrong with the lubricating properties of engine oil that was only 40 engine hours old, given that the oil change interval recommended by Volvo was 100 engine hours.

Clearly, given the aforementioned facts, there must have been some other significant reason for the camshaft to have catastrophically broken in two. Clearly, what Mr Stevens had written in his Brief of Evidence was simply not true and was not consistent with the physical evidence. I found it difficult to believe that a professional engineer who claims to have examined thousands of engines during the course of his extensive career could be so mistaken.

I completed my inspection of the engine, and demonstrated that aligning the six equispaced groups of damaged teeth on both the camshaft timing gear and the gear that drives the fuel pump, which the physical evidence clearly showed was the only possible way they could have been aligned when the engine was running, showed conclusively that the camshaft timing gear, and only this gear, had been installed in the 'two teeth retarded' position. This explains how the engine was able to run while each inlet valve and each exhaust valve was opening and closing so late that the exhaust valves were struck by the pistons just before the exhaust valves had completed their closing motion. None of the damage to the teeth on the engine's internal gears could possibly have been due to lack of proper maintenance or other negligence on the part of the Rickards. The damage was due to the fact that the engine's pistons had been impacting its exhaust valves because the camshaft timing gear had been installed by either the manufacturer or suppliers in the 'two teeth retarded' position.

During discussions with Mr Rickards, I learned that on 21 October 2005, before I had been asked to make my investigation, Paul Dale, the barrister acting for the third and fourth defendants, had written a letter to Eugene St John, the Rickards' barrister. Mr Rickards gave me a copy (Appendix 2). This letter contains an implied threat to sue Mr and Mrs Rickards for a sum "well in excess of $100,000" if they do not pay the sum of $25,000 to the third and fourth defendants and remove them from the Court action. Negotiations between the parties subsequently resulted in a Settlement Agreement dated 23 November 2005 being signed, by which the third and fourth defendants were removed from the Court action and the Rickards agreed to pay Volpower and Ovlov jointly the sum of $25,000. Mr Rickards gave me a copy of this Settlement Agreement (Appendix 3).

I duly wrote my Brief of Evidence (Appendix 4).

On 3 March 2006, I took my Brief of Evidence to Eugene St John. He was visibly flabbergasted when he read it, and told me that it "had Smithson's name written all over it". He added that he would delete all references to the camshaft failure. Naturally, I found that both discourteous and insulting, and told Mr St John in no uncertain manner that it was my Brief of Evidence, not Mr Smithson's, and that he (Mr St John) would not dictate to me what went into it or was left out of it. He replied that there had been a Settlement Agreement in which it had been agreed that all reference to the engines in the vessel Silver Wing were to be dropped from the case. I replied that the Settlement Agreement merely stated that there was to be no reference to the engines in the amended Statement of Claim, but that it made no reference to Briefs of Evidence, which are entirely separate legal documents. Mr St John replied that in that case, he would not use my Brief of Evidence. There followed a very heated verbal altercation in Mr St John's office between Mr St John and me, in the presence of Mr St John's assistant, Nigel Cook. In my opinion Mr St John completely lost his composure and went apoplectic. Following the verbal altercation, Mr St John handed me over to his assistant, Nigel Cook, without first informing me of Mr Cook's status in his firm, and told me that I should deal with Mr Cook and not himself. Afterwards, curious as to whether or not Eugene St John had followed the correct procedure when he handed me over to Nigel Cook without first informing me of Mr Cook's status in his firm, I decided to check on the Code of Conduct of the New Zealand Law Society, and found that the Code, in commentary to Rule 2.02 says:

> *(4) A firm must ensure that the public, and other practitioners dealing with a principal or an employee of the firm, should know the name and status of the person with whom they are dealing.*

My curiosity as to Mr Cook's status aroused, I decided to check the Law Register, and found that Mr Cook's name was not on it. Further enquiries quickly revealed that he had been struck off, for, I was told, embezzlement. I then sent an email to Mr St John, telling him that Mr Cook's name did not appear on the law register, and asking him to explain his actions (Appendix 5). To date, no reply has been received from Eugene St John, and on the day of making my formal complaint to the New Zealand Law Society, there was nobody with the surname Cook on the New Zealand Register of Lawyers.

It is my belief that in accepting Mr Eric Stevens' explanation, given on behalf of Ovlov and Volpower, as to the cause of the camshaft failure in the Rickards' engine, while rejecting Mr Smithson's explanation and neglecting to seek a second professional opinion as to the cause before he exhorted the Rickards to sign the Settlement Agreement, Eugene St John failed to act in his clients' best interests. In my opinion, this explains Mr St John's extremely adverse reaction when he read my Brief of Evidence, as he realised that it placed him wide open to an allegation by Mr and Mrs Rickards that by persuading them to sign the Settlement Agreement he had not acted in their best interests.

After much thought, I decided that the best course of action to take, in the interests of my clients Mr and Mrs Rickards, was for me to make a direct appeal to Eric Stevens' professionalism and sense of fair play. To this end, I wrote a letter to him, dated 10 June 2006 (Appendix 6).

At the time, I sincerely believed that Mr Stevens would act as I would have done in the circumstances, and revisit and re-examine the engines and then make a formal apology to Mr and Mrs Rickards that they could submit to their insurance company, which to this day has refused to accept their claim that the engine had a latent defect in that it was mis-timed, with the camshaft timing gear being installed in the 'two teeth retarded' position with the result that the exhaust valves impacted on the pistons, ultimately causing the camshaft to break in two from metal fatigue.

Having waited for some three weeks and not having received any reply from Eric Stevens, I then decided to make a formal complaint against him to his professional body, the Institution of Professional Engineers New Zealand (IPENZ) under its code of ethics. This was made in a letter to IPENZ dated 4 July 2006 (Appendix 7).

Some ten and a half months later, IPENZ rejected my complaint, in a letter dated 22 May 2007, (Appendix 8) and attached a copy of the Investigating Committee's report (Appendix 9.) The Committee's view of Mr Stevens' report and the Committee's decision on my complaint are reproduced verbatim as follows:

> "THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT
>
> The role of the Committee was to examine Mr Stevens's behaviour, not to review the cause of the failure. The test on Mr Stevens was the quality of the work he performed. The Committee consider that Mr Stevens has conducted his enquiry in a generally professional manner.
>
> The Committee is, however, critical of some aspects of his report. Given his late involvement in the case, Mr Stevens was forced to rely on the testimony of other persons. He placed great weight on the evidence that the valve rockers had seized on the rocker shaft. This evidence was that of three engineers who examined the motor after the failure. Mr Stevens does not make sufficiently clear in his report that he was unable to witness the seized valve rockers for himself.
>
> Mr Stevens stated also that the oil was faulty which lead to the failure. This may well have been correct but there was no evidence to support this contention.
>
> Despite these reservations about Mr Stevens report the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time.
>
> THE COMMITTEES DECISION

> The Committee dismisses the complaint laid by Mr Morgan on the grounds of regulation 8(c) the alleged breach is insufficiently grave to warrant further pursuit because the shortcomings as outlined above were small."

It is my contention that anybody reading the extract immediately above could be forgiven for believing that the rocker arms were indeed seized on the rocker shaft. In fact, both Neil Rogers and Kelvin Barclay, the two members of the IPENZ Investigating Committee who examined the port engine at the premises of Assessco General & Marine on 19 November 2006, were witnessed by Tim Smithson and Dave Rickards, as they discovered for themselves that the valve rockers definitely were not, and never had been, seized on the rocker shaft, but nowhere in the Investigating Committee's report is this fact stated. Messrs Rogers and Barclay were hence duty bound to find Mr Stevens grossly negligent or dishonest, but they did not. That is why I subsequently accused IPENZ of conducting an "orchestrated litany of deceit".

Contrary to what is written in "THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT", Mr Stevens was definitely not "forced to rely on the testimony of other persons." He conducted an examination of the engine and its components himself (although I am advised by Mr Smithson that this examination was brief, taking about half an hour), and saw for himself, witnessed by Mr Smithson, and also by Peter Jacobs and Grant Allen, of Ovlov and Volpower respectively, that the rocker arms were, rather than being seized to the rocker shaft, able to be rotated by hand, although they were a little stiff as they had been cleaned with a degreasing agent and were not lubricated.

On 2 October 2007 I sent to IPENZ a formal letter of complaint against the three members of the Investigating Committee, under the IPENZ Code of Ethics (Appendix 10). In it, I reproduced the Committee's Report in full, and inserted my comments in the appropriate places in bold red text, over seven pages. They are damning, to say the least.

I duly received a letter dated 22 November 2007 from IPENZ (Appendix 11) notifying me that my complaint had been dismissed and enclosing the decision of the Chairman of Investigating Committees (Appendix 12). Brian Hasell, the Chairman of the new Investigating Committee, rejected my complaint, stating "It is clear to me that the complaint is an attempt to relitigate issues already decided. It is *prima facie vexatious* and an abuse of process (i.e. in bad faith). It should not proceed any further."

On 7 December 2007 I wrote a formal letter of complaint to IPENZ in its other capacity as the Registration Authority under the Chartered Professional Engineers of New Zealand Act 2002, against the three Chartered Professional Engineers who had constituted the Investigating Committee for my original complaint against Eric Stevens, who although he was a Fellow of IPENZ, was not a Chartered Professional Engineer (Appendix 13.)

I received a letter dated 25 March 2008 from IPENZ (Appendix 14), notifying me that my complaint had been dismissed and enclosing the decision of the Chairman of the Investigating Committee (Appendix 15).

On 28 April 2008 I emailed a letter (Appendix 16), to Andrew Cleland, in his capacity as the Chief Executive of the Registration Authority under the Chartered Professional Engineers of New Zealand Act 2002. Also on 28 April 2008 I emailed a letter (Appendix 17), to each member of the IPENZ Board and a letter (Appendix 18), to each member of the Chartered Professional Engineers Council. I set out what had happened and asked each member what he or she intended to do about the matter. To date, the only response has been a letter dated 16 May 2008 from the President of IPENZ (Appendix 19). I replied to that letter on 7 June 2008 (Appendix 20). It was sent to each member of the IPENZ Board. Also on 7 June 2008, I sent a copy of this reply as an email attachment with a letter of that date to the Secretary of the Chartered Professional Engineers Council, with a request that my email be forwarded to each member of the Chartered Professional Engineers Council. I received a reply dated 10 June 2008 (Appendix 21). This reply contained statements as follows:

> "As no appeal was lodged in this matter the Council is unable to consider your complaint in a "quasi-judicial" capacity.

> However, the Council does look at the functions of the Registration Authority and reviews their processes on each complaint received after the statutory period for an appeal has passed.
>
> This process will be followed in the case you outline and the issues you have raised will be discussed with the Registration Authority."

I wish to point out that the only reason that I did not lodge an appeal is that under the rules for doing so, I would have become liable for the legal fees incurred by the professional members and the professional bodies, were my appeal to be rejected, which in my opinion, in the light of the whole contents of the correspondence between IPENZ and me, would have been highly likely.

More than three years have passed since my last communication from the Chartered Professional Engineers Council, and I must say that it is no surprise to me that the Chartered Professional Engineers Council has never informed me of the outcome of its discussions with the Registration Authority for Chartered Professional Engineers.

The shenanigans of The Institution of Professional Engineers New Zealand as detailed in this chronicle provide, in my view, ample evidence that this professional body should never again be allowed to investigate any complaint made against one or more of its members. Rather, there needs to be as part of the Department of Internal Affairs, a New Zealand Professional Complaints Authority, that has power to make such investigations, with the aid as required of a selection from a panel of impartial, properly qualified and experienced people.

Further evidence that Mr Smithson was correct in his original Brief of Evidence as to the reason for the catastrophic failure of the camshaft in the Rickards' engine is a report commissioned by Mr Rickards from Optimech International Limited (Appendix 22). The Optimech report confirms that the rocker arms spin freely on, and had never been seized to, the rocker shaft. It also completely concurs with Mr Smithson's explanation of the cause of failure of the camshaft, given in his original Brief of Evidence, which was rejected by Eugene St John, the Rickards' barrister, and also with my explanation, given in my original Brief of Evidence, aforementioned as Appendix 4.

Also in support of this chronicle's statements is a video made by Mr Tim Smithson, using a laparoscope and a small light inserted into the combustion chamber of the engine's No. 1 cylinder. The video clearly shows one of the Silver Wing port engine's exhaust valves being struck by a piston just before the valve closes. Note that light can clearly be seen between the valve and the valve seat at the instant it is struck. The valve that can be seen in the background is the No. 1 cylinder's inlet valve. This video, in conjunction with the Optimech report, proves conclusively that my original finding as to the cause of failure of the Rickards' diesel engine camshaft was absolutely correct, as was Mr Smithson's, and that the members of the IPENZ Investigating Committee were remiss in stating that they "do not accept" that my explanation "is a plausible theory". The URL for video on **YouTube** that shows the inner workings of the Rickards' Volvo diesel engine is:

KAD 43 P Volvo Penta Marine Engine June 3, 2011.wmv

In the matter of insurance, the Rickards were dealt a further blow by their insurance company. Vero Insurance subsidiary Mariner Insurance, were once again refused to honour the Rickards' claim. The first time it rejected the Rickards' claim, Mariner was undoubtedly influenced by the previously detailed false statements in Eric Stevens' Brief of Evidence. However, now that the Rickards have available the Optimech report and the Smithson video, both of which have been sent to Vero Insurance, the Rickards had a reasonable hope that at last their insurance claim would be honoured.

The Rickards' insurance policy had a latent defect clause as follows:

> **Perils Insured or Cover**
>
> We cover your vessel against all risks of sudden accidental physical loss or damage. We also cover physical damage that is caused directly by any latent defect in your vessel. However, we do not cover the cost of repairing or replacing any defective part.

exclusions

We do not cover:

1. Physical damage or losses caused by or resulting from normal wear and tear, gradual deterioration, delamination, marine life (except for marine mammals and large fish), mechanical breakdown, electrolysis, osmosis, corrosion, rust, dampness, normal wetting or weathering.

Vero again turned down the claim, on the basis that even though it "may have been" a latent defect, it was nevertheless a mechanical breakdown, and the exclusions section of the policy includes "mechanical breakdown".
The last rejection email from Vero included the following:

> "Although we would reserve our position on cause, I accept that latent defect is covered under the policy's operative clause.
> The operative clause, including latent defect, is subject however to the policy exclusions. Exclusion 1 of the policy applies. It excludes "physical damage or losses caused by or resulting from..... mechanical breakdown". The enquiry this exclusion has means it doesn't matter what caused the mechanical breakdown or the extent of causation between them, there just has to be a connection between the mechanical breakdown and the damage.
> On this basis your argument is still captured by the policy exclusion.
> I regret that we are unable to help you any further."

I am of the opinion that the phrase in the policy, "any latent defect", includes a latent defect that is the direct cause of a mechanical breakdown, and I am further of the opinion that the principle of "contra preferentum" would apply, in that when there is an ambiguity in an insurance policy, a Court, or an Ombudsman, would rule in favour of the insured, as it was the insurer, not the insured, who wrote the ambiguity into the policy wording. There is a substantial body of case law from around the English-speaking world that has established the contra preferentum principle.
Therefore, I am of the opinion that had the insurance company intended to exclude latent defects that directly caused mechanical breakdowns, it should have worded the policy as follows:

Perils Insured or Cover

We cover your vessel against all risks of sudden accidental physical loss or damage. We also cover physicaldamage that is caused directly by any latent defect, except one that directly results in a mechanical breakdown, in your vessel. However, we do not cover the cost of repairing or replacing any defective part.

On behalf of Mr and Mrs Rickards, I am now proceeding with an appeal to the Insurance Ombudsman for a clarification ruling as to whether or not, under the terms of the policy, the latent defect can be lawfully excluded on the grounds stated by Vero Insurance. Unfortunately, the upper limit on claims is a paltry $200,000. I look forward to receiving the Ombudsman's ruling.

In my opinion, if ever there was a case that should go for judicial review at the taxpayers' expense, this surely is it.

Sincerely
Peter J. Morgan

Appendix 1A – Page 2 of the Brief of Evidence prepared by Eric Stevens for Paul Dale

I have owned both power boats and sail boats for many years and have made a particular study of performance issues. In particular have undertaken systematic experiments on one of my own boats to quantify the effects of various factors such as trim, loading, and bottom condition on the performance of the vessel.

8. I have given evidence as an expert in both the High Court and the District Court on numerous occasions.

My Instructions

9. I have been instructed by Grove Darlow & Partners to investigate the circumstances of the failure of the port engine of the Bladerunner catamaran *Silver Wings* and to report to them as to the various factors giving rise to the failure.

Summary of Conclusions

10. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.

11. The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely.

12. The chemical additives in the oil were exhausted as a result of the plaintiff operating a program of extended oil change intervals which significantly exceeded the oil change intervals recommended by Volvo.

13. The commissioning trials showed that when new, with fuel tanks three-quarters full, six passengers and 1100kg of water ballast, the vessel would do 33 knots without overloading the engines.

14. The vessels log shows that, when the vessel was in service, as long as the vessel had a clean bottom, a similar performance was achieved on many occasions.

15. The vessels log shows that on many occasions the vessel was operated with a foul bottom to the detriment of its performance. The engines were frequently overloaded under these circumstances.

16. There is evidence within the engine of high operating temperatures and these will have accelerated the depletion of the chemical additives in the oil and contributed to the camshaft failure.

The Information upon which I have relied

17. I have read the Amended Statement of Claim [Dated ... ?] and the the Statement of Defence

18. I have read the briefs of evidence of

Appendix 1B – Page 3 of the Brief of Evidence prepared by Eric Stevens for Keith Langdon

8. I have given evidence as an expert in both the High Court and the District Court on numerous occasions.

My Instructions

9. I have been instructed by Keith Langton solicitor for Bladerunner Boats Ltd to investigate the circumstances of the failure of the port engine of the Bladerunner catamaran *Silver Wings* and to report to them as to the various factors giving rise to the failure.

Summary of Conclusions

10. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.

11. The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely.

12. The chemical additives in the oil were exhausted as a result of the plaintiff operating a program of extended oil change intervals which significantly exceeded the oil change intervals recommended by Volvo.

13. The commissioning trials showed that when new, with fuel tanks three-quarters full, six passengers and 1100kg of water ballast, the vessel would do 33 knots without overloading the engines.

14. The vessels log shows that, when the vessel was in service, as long as the vessel had a clean bottom, a similar performance was achieved on many occasions.

15. The vessels log shows that on many occasions the vessel was operated with a foul bottom to the detriment of its performance. The engines were frequently overloaded under these circumstances.

16. There is evidence within the engine of high operating temperatures and these will have accelerated the depletion of the chemical additives in the oil and contributed to the camshaft failure.

The Information upon which I have relied

17. I have read the Second Amended Statement of Claim and the Statement of Defence

18. I have read the briefs of evidence of

    18.1 Leonard Raymond Gilbert

    18.2 Peter Jacobs

Appendix 2 – Letter from Paul Dale to Eugene St John

GROVE DARLOW & PARTNERS
BARRISTERS & SOLICITORS

[illegible]
THE SHORTLAND CENTRE
[illegible] SHORTLAND STREET
AUCKLAND 1
NEW ZEALAND
[illegible]
AUCKLAND 1
[illegible]
TELEPHONE (09) [illegible]
FACSIMILE (09) [illegible]

[illegible]

In reply please refer Paul Dale (e-mail: [illegible])

21 October 2005

Eugene St John
Barrister
FAX NO 357 6034

WITHOUT PREJUDICE
Save as to Costs

RICKARD BROS LTD v BLADERUNNER BOATS LTD & ORS

1 We acknowledge receipt of your letter of 19 October 2005.

2 The offer contained in your letter is declined. By way of counteroffer, Ovlov and Volpower are prepared to settle on the following basis:

(a) The Plaintiff will pay to our clients jointly the sum of $25,000 by way of costs (inclusive of GST), payment to be made within 14 days of the delivery of a judgment in the High Court in respect of your claim against the First and Second Defendants, or alternatively within 14 days of any settlement being concluded with those parties.

(b) Our clients will agree to a term of confidentiality only up until the date specified in the preceding paragraph. After that period has expired the Defendants will be free to disclose to any third party the terms of the settlement, and in particular that there was no finding of liability or any admission of liability on their part.

3 We think it appropriate to set out the reason for our clients' stance in this matter.

4 You will be aware of not only the formidable legal and conceptual difficulties in the way of a claim against Volpower and Ovlov, but also their very firm belief that there has been no negligence on their part. These issues were all canvassed at some length at the settlement conference.

5 Having now received your briefs, there is nothing which changes their view. Most of the evidence is directed at the issue of the design of the boat, an issue for which neither Volpower or Ovlov have any responsibility whatsoever. They had had no dealings or contractual relationship with the Plaintiff.

6 Mr Gilbert, who we accept is a well respected marine expert, does not attribute any fault to Volpower. He seems to be suggesting that there was some failing on Mr Jacobs' part in respect of the marine trials, but aside from the question of whether undertaking those trials gave rise to any duty of care to the Plaintiff, we are satisfied that anything that occurred in respect of those trials was not causative of loss and that there was no negligence.

7 The other "expert" upon whom the Plaintiff relies is Mr Smithson. The Defendants reject entirely both Mr Smithson's status as an expert and the conclusions which he has reached.

8 You will see from perusal of Mr Smithson's brief that his qualifications are not extensive, and we are aware that his evidence has been rejected previously by a Court in this jurisdiction.

9 A perusal of Mr Smithson's reports and his brief shows that he has adopted a subjective and unbalanced stance.

10 If this matter proceeds to trial the Defendants will be calling a suitably qualified expert witness who will testify that it is simply impossible for the engine to have been mistimed in the way that Mr Smithson suggests. His evidence is inherently implausible, and we are confident it will be rejected.

11 Since these proceedings were issued, both the Defendants have incurred significant legal costs, and the amount now sought does not reflect all of those costs or the very considerable internal costs as a result of having to deal with claims which have no merit. The combined internal costs are currently well in excess of $100,000.

12 Mr Rickards and Mr Smithson have made this claim publicly known to the marine industry. The Maritime Safety Authority has been notified by Mr Rickards, and we are instructed there are other interested parties awaiting the outcome. Some may think that if this claim succeeds, or the Plaintiff is somehow able to extract a settlement, that similar claims might result in a payment.

13 It is for this reason that any condition of confidentiality is utterly rejected. Because both Volpower and Ovlov value their good reputation in the industry, and they would prefer to see this case go through to a full hearing rather than there be left any suspicion that there is any suggestion of liability on their part.

14 This counteroffer will remain open for acceptance until 5.00pm Tuesday 25 October. You will appreciate that because of the need to finalise the Defendants' briefs there will be significant additional attendances between now and the conclusion of the trial. The Defendants whom we represent will be seeking to recover all of those costs once the issue of liability has been determined.

Yours faithfully
GROVE BARLOW & PARTNERS

Appendix 3 – The Settlement Agreement

IN THE HIGH COURT OF NEW ZEALAND
AUCKLAND REGISTRY CIV 2004-404-816

BETWEEN	**RICKARD BROTHERS LIMITED**	
	Plaintiff	
AND	**BLADERUNNER BOATS LIMITED**	
	First Defendant	
AND	**GREGORY JOHN SHINE**	
	Second Defendant	
AND	**VOLPOWER NZ LIMITED**	
	Third Defendant	
AND	**OVLOV MARINE LIMITED**	
	Fourth Defendant	

SETTLEMENT AGREEMENT

GROVE DARLOW & PARTNERS
SOLICITORS
AUCKLAND

P J Dale
Telephone (09) 309 9875
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DX CP24049, Queen Street Central
P O Box 2882, Auckland

PJD

IN THE HIGH COURT OF NEW ZEALAND
AUCKLAND REGISTRY

CIV 2004-404-816

BETWEEN	**RICKARD BROTHERS LIMITED**	
	Plaintiff	
AND	**BLADERUNNER BOATS LIMITED**	
	First Defendant	
AND	**GREGORY JOHN SHINE**	
	Second Defendant	
AND	**VOLPOWER NZ LIMITED**	
	Third Defendant	
AND	**OVLOV MARINE LIMITED**	
	Fourth Defendant	

SETTLEMENT AGREEMENT

BETWEEN RICKARDS BROS LIMITED ("Rickards")

AND VOLPOWER N.Z LIMITED ("Volpower")

AND OVLOV MARINE LIMITED ("Ovlov")

(the Parties)

1.0 BACKGROUND

1.1 Rickards commenced proceedings in the Auckland High Court under CIV 2004-404-816 ("the Proceedings"). The Proceedings allege negligence as against Ovlov in relation to the engines in the propulsion system on a vessel. As against Volpower and Ovlov, Rickards alleges negligence in relation to a defect in the port engine.

1.2 The full background to the dispute is set out in the operative pleadings to the proceedings.

2.0 THE PARTIES have now agreed to settle the dispute/the proceedings (the settlement agreement).

2.1 Rickards agrees to pay Volpower and Ovlov jointly, the sum of $25,000.00 by way of costs (inclusive of GST), payment to be made on or before 15 November 2005, time being strictly of the essence.

2.2 Rickards agrees to pay interest at 12% if the sum of $25,000 is not paid on or before 15 November 2005.

2.3 Rickards agrees that on signing of the settlement agreement, it will file an amended statement of claim in which any reference to Volpower and Ovlov and any allegations against them are deleted. Any reference to alleged latent defects of the engine will also be deleted.

2.4 Volpower and Ovlov will agree to a term of confidentiality only up until the conclusion of the trial or not later than 16 December 2005, whichever occurs first. After that period has expired, Volpower and Ovlov will be free to disclose the terms of the settlement including this deed, to any third party.

2.5 The Parties agree that the terms of this settlement agreement do not constitute an admission of liability.

DATED this 23rd day of November 2005.

SIGNED by
RICKARDS BROS LIMITED

(Director)

R. Rickards (Director)

SIGNED by
VOLPOWER N.Z. LIMITED

(Director)

SIGNED by
OVLOV. LIMITED

Appendix 4 – Brief of Evidence of Peter J. Morgan

IN THE HIGH COURT OF NEW ZEALAND
AUCKLAND REGISTRY

CIV 2004-404-816

BETWEEN **RICKARDS BROS LTD**
Plaintiff

AND **BLADERUNNER BOATS LTD**

First Defendant

AND **GREGORY JOHN SHINE**

Second Defendant

BRIEF OF EVIDENCE OF PETER J. MORGAN IN REPLY TO BRIEF OF GRANT ALLEN

SOLICITOR	**COUNSEL**
John Z Ewart	E St John
P O Box 1090	P O Box 105 270
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Fax: 307 1560	Fax: 357 6034
AUCKLAND	**AUCKLAND**

Peter J. Morgan to say:

Background

1. My full name is Peter James Morgan of 13 Stratford Avenue, Milford, Auckland.

2. I am a qualified engineer holding a B.E. (Mech.) and a Dip. Teaching.

3. I have been involved in the marine industry for more than 50 years. I designed my first powerboat at 14 years of age, which became our family's outboard runabout for several years. In 1964, while a student at the University of Auckland School of Engineering, I was the first person in New Zealand to conduct laboratory experiments on the strength and stiffness of composite sandwich panels, and followed this up by designing and building New Zealand's first composite sandwich boat, a high performance deep V 20 ft powerboat, which was launched in 1965. During the 1970s I manufactured powerboats and trailers of my own design. I was a director of my family's private company, Morgan Marine Ltd, a boat, outboard motor and sterndrive dealership, from 1972 until I sold the business in 1988. From 1985 through 1995 I lectured in Mechanical Engineering at Manukau Institute of Technology. I am contracted as the Technical Editor of Pacific MotorYacht, New Zealand Propeller and Australian Propeller magazines, and write technical articles for them. I also write ship reviews for Baird Publications of Melbourne, Hong Kong and London, publishers of World Shipbuilding, Work Boat World, Asia Pacific Shipping, and Ausmarine, internationally distributed shipping industry magazines. I also do some marine industry related engineering consulting.

4. I acknowledge that I have read the Code of Conduct set out in Schedule 4 to the High Court Rules and will comply with it.

5. I have been instructed by the plaintiff in this matter in regard to the brief of Mr Grant Allen on behalf of the defendants. As that brief also makes reference to the briefs on behalf of the defendants, in particular that of Mr Stevens, I also make comment on the contents of those briefs where relevant.

6. In paragraph 27 of Grant Allen's Brief of Evidence, he states that his firm was advised by one of its dealers that "Mr Smithson was investigating the failure of the KAD43P engine of Mr Rickard's (sic) and he had identified a "latent" defect." Mr Smithson's subsequent report and Brief of Evidence was ridiculed by Mr Allen's firm and its dealer, so much so that on 21 October 2005 their lawyer Paul Dale of Grove Darlow & Partners wrote to Mr Rickards' barrister Eugene St John. Clause 6 of that letter states that "Mr Gilbert, who we accept is a well respected marine expert, does not attribute any fault to Volpower." For Mr Dale to make this statement is a rather "underarm" tactic, because Mr Len Gilbert has told me that he refused to inspect the engines, saying that he was not as well as he used to be and did not want to get involved. He confined his comments in his Brief of Evidence in this action to the performance of the vessel and its suitability for the commercial tasks desired of it by Mr Rickards. It would have been as relevant for Mr Dale to say that Mr Gilbert has not been to the moon! Clause 7 of that letter said "The other "expert" upon which the plaintiff relies is Mr Smithson. The Defendants reject entirely both Mr Smithson's status as an expert and the conclusions which he has reached." Clause 8 says "You will see from perusal of Mr Smithson's brief that his qualifications are not extensive and we are aware that his evidence has been rejected previously by a Court in this jurisdiction." Clause 9 says "A perusal of Mr Smithson's reports and his brief shows that he has adopted a subjective and unbalanced stance." Clause 10 says "If this matter proceeds to trial the Defendants will be calling a suitably qualified expert witness who will testify that it is simply impossible for the engine to have been mistimed in the way that Mr Smithson suggests. His evidence is inherently implausible, and we are confident it will be

rejected." Mr Dale's letter mentions that his two client companies have incurred very substantial internal costs, and very substantial external legal costs, and goes on to state that unless Mr Rickards pays his clients the sum of $25,000 and files an amended statement of claim that leaves out Mr Dale's two client companies as defendants, those two companies "will be seeking to recover all of those costs once the issue of liability has been determined." In my opinion it was unfortunate for Mr Rickards that Mr St John succumbed to this pressure and advised Mr Rickards to sign a settlement agreement and pay the $25,000. Following the logic of Mr Dale's two client companies' directors, nobody in his right mind would ever commission Bruce Farr, who has no formal qualifications, to design either a racing or a cruising yacht. Yeah right! It is my observation, having taught mechanical engineering at Manukau Institute of Technology for 11 years, that university graduates in engineering do not have a monopoly on intelligence and knowledge, and neither for that matter do graduates in law or any other discipline! Mr Dale might be surprised to learn that a very high proportion of engineering tradesmen who studied for an NZCE (Mech.) and then went on to do a B.E. (Mech.), got first class honours! Eventually, Mr Rickards succumbed to the pressure and signed the settlement agreement on 23 November 2005 and paid the $25,000. He has admitted to me, however, that he did so under duress. About three weeks later, I received a telephone call from Mr Len Gilbert, whom I have known for several decades (and advised over that time on matters of mechanical engineering, as a friend). Mr Gilbert said that he had recommended to Mr Rickards that he engage as an expert witness an independent, suitably qualified, mechanical engineer to examine his engines and write a report and Brief of Evidence. He asked if he could put my name forward, and I agreed. Consequently, I was engaged by Mr Rickards to do just that. I report as follows:

7. I read all of the briefs of evidence sent to me in December 2005.

8. I met with Dave Rickards and Tim Smithson at Tim Smithson's premises in Mahana Road, Hamilton from 11am until 5:30pm on 11 January 2006, and again from 8:45am until 1:30pm on 21 January 2006. I made a further visit from 8:45am until 3:00pm on 26 January 2006.

9. I inspected the Silver Wing's port engine components including the turbocharger, five of the six pistons (piston no. 1, the one at the front of the engine as it sits in the boat, was in place in the engine), 10 of the 12 valves (two were in place in the engine, above cylinder no. 1), timing gears, rocker spindle, rocker arms and some of the pushrods. I inspected Tim Smithson's photographs of the broken camshaft pieces and listened to his explanation as to how he had reassembled the pieces of the camshaft and had secured them together with a cap screw. I made a mental note to later check the movement of the rocker arms when they were actuated by the pushrods to satisfy myself that the camshaft pieces are now in the same angular position relative to each other as they were before the fracture occurred.

10. I examined the tops of each of the five pistons that had been removed from the engine. I observed that there were physical indentations in the tops of the pistons, which was clear evidence of the exhaust valves repeatedly striking the pistons. I looked closely but did not observe any physical indentations in the tops of the pistons immediately adjacent to the position of the inlet valves at their closest approach to the pistons. I am therefore mystified as to why Edward Eric Stevens stated in paragraphs 106, 107, 108 and 109 of his Brief of Evidence signed by him on 16 November 2005 that the inlet valves have been hitting the pistons.

11. As mentioned in paragraph 3 above, the engine components were partially assembled, without valve springs. Recalling that I had read in Edward Eric Stevens' brief of evidence that the valve rockers were seized on the rocker spindle, I tried rotating each of the 12 rocker arms on the rocker spindle and found them to rotate freely. This is contrary to

the statement contained in the Brief of Evidence of Edward Eric Stevens at paragraph 151, which I quote in full as follows:

"151. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft."

I removed a rocker arm from each end of the rocker spindle. In each instance the rocker arm slid off easily, with light finger force only. I was completely satisfied that there was no evidence of their having been seized on the rocker spindle, and there was no evidence of excessive wear.

I asked Tim Smithson and Dave Rickards to explain what had happened that Edward Eric Stevens could state that the rocker arms were seized to their rocker spindle and yet they were now not seized but moved freely. Dave Rickards replied that on 23 May 2003, soon after Silver Wing's port engine had broken down and the vessel was tied up at the wharf at Tairua, he had removed the rocker cover and had observed that the rocker arms and spindle had been covered in oil, and that he had checked a few of the rocker arms and had found them to move freely on the rocker spindle. He asked his daughter to operate the starter while he observed the rocker shaft, and from this he concluded that the camshaft had broken between no. 1 and no. 2 cylinders. He said that at his request Pacific Coast Marine had removed the port engine from the boat and that he had been present when John Booker, proprietor of Pacific Coast Marine, partially dismantled it in Pacific Coast Marine's workshop, in order to observe the reason for failure and to assess the cost of repairs. When the timing cover was removed, the short front piece of the camshaft fell out. John Booker then made a fairly long telephone call, after which he told him that 'the reason for the camshaft failure was overloading causing overheating, this causing stretching of the valves to the extent that they hit the pistons'. Dave Rickards submitted an insurance claim, and the assessor Chris Laird inspected the engine on 3 July 2003. The insurance company's letter of rejection was received by Dave on 21 July 2003. The engine was stored at Pacific Coast Marine in Whitianga until 23 July 2003, on which date Dave Rickards took it to

his farm at Hikuai where he wrapped some of the components in Gladwrap. He said that Tim Smithson had come to his farm workshop on 5 November 2003 and two days later the engine components were transported to the workshop of Assessco General & Marine in Hamilton.

Tim Smithson said that when the rocker spindle assembly had been delivered to his workshop the parts were devoid of oil, as if they had been soaked in a degreasing chemical, and that was the condition they were in on both of the occasions when Edward Eric Stevens had visited. Tim Smithson said that on 21 November 2003 when he took the photo (marked AB-14 in his report dated 20 December 2003) of the rocker shaft with the rockers mounted on it and made the caption, he thought that the rocker arms were, as his photo caption says, "*seized to the rocker shaft*". I should point out here that the rocker spindle assembly had been soaked in a degreasing solvent and had been left to dry for many months before Edward Eric Stevens' first inspection on 19 August 2005. He said that since Edward Eric Stevens' last visit on 7 September 2005, he, Tim Smithson, had occasionally dribbled engine oil down the lubricating hole on the top of each rocker arm, with the result that all 12 of the rocker arms now move freely, just as they are designed to do. Given that it takes a force of approximately 300 newtons (equivalent to a weight of about 30 kg) to compress one of the valve springs, which force is transferred on to the rocker arm, and the present good state of the bearing surfaces between the two end rocker arms and the relevant parts of the rocker spindle on which they pivot, I can unequivocally state that the rocker arms cannot possibly have been seized to the point where the rockers would not move as they are supposed to. It is my opinion that for this to have happened there would have to have been metal to metal transfer between the bronze bearings of the rocker arms and the rocker spindle bearing surfaces on which the rocker arms sit, and that the mating surfaces would have to have been fused together almost as if they had been friction welded. Further, it is my opinion that had this been the case, no amount of degreasing solvent and no subsequent amount of lubrication would have freed them.

I asked Tim Smithson to remove the rocker spindle from the cylinder head, and assisted him to do this. I personally removed four more rocker arms, two from each end of the rocker spindle, and did this quite easily with finger force only, and it is more than likely that in doing so the bronze bushes in the rocker arms suffered some scratching. The rocker spindle is held in place by a total of six pedestals. I removed two more pedestals from the rocker spindle, again needing finger force only, despite the fact that the surfaces of the spindle that were revealed, where it had been cradled in the pedestals, were badly pitted by being impacted when the exhaust valves hit the pistons. It was plainly evident to me that all 12 of the rocker arms' bronze bushes were in excellent order, consistent with the engine having had over 2000 hours of running.

It is important to note here that Edward Eric Stevens' explanation of the cause of the breakage of the camshaft is predicated on his statement that the valve rockers had seized on the rocker spindle, and therefore his explanation and subsequent conclusion are erroneous. Therefore, there must be some other explanation as to the cause of the exhaust valves striking the pistons and hence to the cause of the failure of the camshaft.

12. There are only three different reasons as to how the exhaust valves could have been striking the pistons in the port engine: (a) the rocker arms had been seized on the rocker spindle and had therefore held the valves down so that they could be struck by the pistons, in which case the intake valves would also have been striking the pistons, (this is Edward Eric Stevens' explanation, which I have already disproved), or (b) the valve stems were seized in the valve guides. (I checked, and none of them were), or (c) **the valve timing was so far retarded that the exhaust valves, but not the intake valves, had been striking the pistons**. By a process of deduction, it is therefore evident that **the only possible reason for the exhaust valves to have been striking the pistons is that the valve timing was far enough retarded for this to happen.**

13. I asked Tim Smithson to remove the idler gear from the timing gear train and re-assemble the timing gear train with the timing marks in the correct places according to their Volvo factory markings.

14. I held the rocker arm of the no. 1 piston's exhaust valve and asked Tim Smithson to rotate the crankshaft. When I held the exhaust valve stem so that the head was hard up against its valve seat, I was satisfied that the clearance between the top of the exhaust valve stem and the rocker tappet (the tappet clearance) was approximately 0.4 mm, as recommended by Volvo. Holding the rocker arm in the same position, I then pushed the exhaust valve stem downwards until the exhaust valve was resting on the piston, and rotated the crankshaft until the piston was at top dead centre. The clearance between the top of the exhaust valve stem and the rocker tappet was approximately 3.6 mm. This showed that with the timing gear train set up according to the factory markings, and the tappet clearance set at Volvo's recommended 0.4 mm, there could not possibly have been any contact between the pistons and the exhaust valves.

15. I asked Tim Smithson to remove the idler gear from the timing gear train and re-assemble the timing gear train with the camshaft timing gear's timing marks **one** tooth retarded from the correct places according to their Volvo factory markings.

16. I held the rocker arm of the no. 1 piston's exhaust valve and asked Tim Smithson to rotate the crankshaft. I was satisfied that there was still clearance, albeit much less than the previous 3.6 mm, between the piston and the exhaust valve as the crankshaft was rotated. At this stage it was evident to me that with the timing gear train set up with the camshaft timing gear's timing marks one tooth retarded from the factory markings, there could have been no contact between the pistons and the exhaust valves.

17. I asked Tim Smithson to remove the idler gear from the timing gear train and re-assemble the timing gear train with the camshaft timing gear's timing marks **two** teeth retarded from the correct places according to their Volvo factory markings.

18. I held the rocker arm of the no. 1 piston's exhaust valve and again asked Tim Smithson to rotate the crankshaft. I was satisfied that there was a slight interference between the piston and the exhaust valve as the crankshaft was rotated. At this stage it was evident to me that with the timing gear train set up with the camshaft timing gear's timing marks two teeth retarded from the factory markings, there was contact between the pistons and the exhaust valves, consistent with the markings on the pistons. It was evident to me that this is the only possible position of the camshaft timing gear that could cause the pistons and the exhaust valves to collide as the evidence showed they had been doing, whilst still being in a position where the engine would actually run, even if a little down on power. It was evident to me that the amount of interference was quite small, and could be accommodated by the pushrod and valve stem and rocker arm being elastically deformed each time it occurred, namely once for every two revolutions of the crankshaft, for each of the six exhaust valves in turn, each valvetrain component returning to its original dimension before the next occurrence. This would have caused three bending and torsional shock loads on the camshaft for every revolution of the crankshaft. Not surprisingly, this continual shock loading eventually caused the camshaft to develop a crack, and eventually the camshaft broke in two, in what is commonly called a fatigue fracture.

19. In paragraph 89 of Edward Eric Stevens' Brief of Evidence he states:
"89. ….. on the 27th June 2005, I carried out a number of tests to determine the minimum clearance between the valves and the pistons in a nearly new Volvo KAD43P engine. We did this by placing malleable packing material on the top of the pistons and measuring the thickness to which it was squashed by the approach of the valves. We did this with

the valve gear correctly timed, then with the valve gear set two gear teeth retarded as alleged by Mr Smithson, and finally two gear teeth advanced. After turning the engine over by hand, the clearance between the valves and the piston was determined by measuring the thickness of the flattened packing material. The results are set out in the following table:

	Inlet Valve	*Exhaust Valve*
Correct Timing	*1.7 mm*	*1.87 mm*
Timing Retarded	*1.6 mm*	*0.7 mm*
Timing Advanced	*0.75 mm*	*2.0 mm*

These measurements show that even when the valve timing is set two teeth out in either direction, in a nearly new engine, the valves still remain clear of the pistons.

This was clearly an attempt by Edward Eric Stevens to show that on Silver Wing's port engine, the exhaust valves' striking the pistons could not possibly have been caused by the camshaft timing gear being retarded by two teeth. However, for this examination on "a nearly new KAD43P engine" to have any credibility, Edward Eric Stevens would have had to have first established that this engine's valve seats were recessed into the cylinder head by precisely the same distance as in the Silver Wing's port engine. This he clearly did not do. It would have been much more sensible for Edward Eric Stevens to have done what I did and ***examine the actual port engine from Silver Wing***.

20. I noted that some of the teeth of Silver Wing's port engine's top three driven gears of the camshaft and injector pump gear train had been marked with black ink and white paint. Not wanting to be influenced by these markings, I cleaned them off the gears before conducting my own examination of all the teeth on all four gears.

21. I put a white paint mark on the middle contact tooth of the camshaft timing gear when the crankshaft was in the position where the no. 1

cylinder's piston impacted its exhaust valve. I asked Tim Smithson to rotate the crankshaft so that I could check to see if the ink mark was in the middle of a group of damaged teeth, and found that as I expected, this was the case.

22. I asked that the rocker spindle, rocker arms, valve springs, caps and retainers, and pedestal mounts be reassembled and fitted to the cylinder head along with all of the valves and pushrods so that I could find out what the tappet clearance had been for each and every valve of cylinders 2, 3, 4, and 5 when the engine had last been running. When the cylinder head had been removed for this purpose, I was able to observe the indentation made by the exhaust valve on the number 1 piston. Once the cylinder head with its gasket had been refitted to the engine block I asked Tim Smithson to rotate the crankshaft so that I could observe all 12 of the rocker arms opening and closing their respective valves. I assisted in this procedure, and having observed the relative movement of all 12 of the rocker arms, I was completely satisfied that the camshaft pieces are now in the same angular position relative to each other as they were before the fracture occurred. I was stunned to observe that the tappet clearance on the exhaust valve of piston no. 3, the piston that had the most severe indentation on its crown from being struck by its exhaust valve, looked to be more than 4 mm, which is 10 times what it should have been. Tim Smithson went and got a 4.75 mm drill and to our amazement it slid through the gap, showing that the tappet clearance had been set to 4.75 mm, which is almost 12 times the clearance of 0.4 mm recommended by Volvo. Because the 4.75 mm diameter drill would not quite slide through the inlet valve tappet gap, I estimated the tappet clearance on the inlet valve of no. 3 cylinder as 4.5 mm – the actual measurement being irrelevant – it had obviously been set at more than 10 times the factory recommendation. Cylinders 2, 4, 5 and 6 also had tappet clearances very substantially more than the recommended 0.4 mm. With such excessive tappet clearances, the engine could run without the exhaust valves impacting the pistons.

I then asked both Dave Rickards and Tim Smithson if either of them had altered the tappet settings since the engine was last running. Dave Rickards said that all he had done was wrap the rocker assembly in 'Gladwrap', store it in his farm garage and then bring it to Assessco's workshop. He added that all such service work had been performed by authorised Volvo service personnel. Tim Smithson said that all he had done was to install the rocker assembly on the cylinder head with only the valves and pushrods for the number one cylinder, and that he had not touched the tappet settings for any of the remaining five cylinders, with the possible exception of cylinder no. 6.

I recalled that in the vessel's log had been recorded the fact that the cylinder head gaskets had leaked water and that the cylinder head had been removed on two separate occasions to rectify this problem. I referred to the vessel's log and found that the engine hours readings on these occasions were 607 hours on 7 December 1998 and 1212 hours on 24 December 2000. It would have been possible for the mechanic who removed the port engine's cylinder head to see the indentations in the piston crowns, particularly on the no.3 piston, and as a consequence for him to have set the tappet clearance so large as to prevent the exhaust valves from hitting the pistons. I cannot imagine that a competent and prudent mechanic would do this, without first referring the matter to his service manager or employer, and then, having being ordered by his employer to set tappet clearances so large as to prevent the valves from hitting the pistons, and being fearful of being sacked if he refused, complying with the order. Dave Rickards said that on both occasions, the vessel had been serviced by Mercury Bay Motors Ltd, which company was then an authorised service agent for Volvo. Dave Rickards added that he had not been present on either occasion. In no way is this to be construed as an allegation – rather, it is simply me wondering in writing as to how the tappet clearances had come to be set so ridiculously large.

23. Edward Eric Stevens states, in paragraph 96 of his Brief of Evidence:

My measurements on the 19th August 2005 showed that Mr Smithson was not right when he said that the valve clearance was set to 2 mm. Apart from that, the condition of the valve gear is not consistent with the valves having been set to such a clearance.

Evidently, there was mis-communication between Edward Eric Stevens and Tim Smithson on 19 August 2005. Had Edward Eric Stevens been prepared to listen to what Tim Smithson had to say, he would have learned that Tim Smithson had found that when he re-assembled the no. 1 piston and valve gear, without valve springs, for the purpose of doing his examination in an effort to discover why the camshaft had failed, he found that the tappet clearance had been set to 2 mm or so. Subsequently, when he set the tappet clearance to 0.4 mm and also retarded the 66-tooth camshaft and injector pump driving gears by two teeth, he found that the exhaust valve hit the piston. Of course, when Edward Eric Stevens measured the tappet clearance, he measured it at what Tim Smithson had last had it set, namely 0.34 mm. In fact, the only tappet clearances measured by Edward Eric Stevens were on the valves of cylinder no. 1, which had been set by Tim Smithson in his investigation to determine why the exhaust valves had been hitting the pistons. Had Edward Eric Stevens done a thorough examination of the port engine, he would have done what I did, namely asked for the whole of the valvetrain to be reassembled so that he could measure **all** of the tappet clearances for cylinders 2, 3, 4, and 5, as they had been just before the camshaft had broken.

24. Edward Eric Stevens states, in paragraph 99 of his Brief of Evidence:

On the 7th September 2005 I visited Mr Smithson once again. After that visit I made the following file note:

Called on Smithson to collect #5 piston and repeat photographs of the valves. He gave me a little address on the subject of how it would be better if the experts agreed with each other when they got to court. He also drew my attention to the valve gear on the port engine. He told me that the reason that the clearance on the #1 cylinder valves was 0.013"-0.014" rather than 2mm was that he had adjusted the clearance during

the course of his timing trials. He insisted that all the rest had not been touched except, possibly, #6 which he might also have fiddled with. I was tempted to ask him why he had not remembered this during our previous meeting.

This was another opportunity for Edward Eric Stevens to have asked for **the whole of the valvetrain** to be reassembled so that he could measure **all** of the tappet clearances for cylinders 2, 3, 4, and 5, as they had been just before the camshaft had broken, but he neglected to avail himself of it.

25. In Edward Eric Stevens' Brief of Evidence that he signed on 16 November 2005, paragraph 95 states:

When Mr Smithson received the engine it had already been partly dismantled and the camshaft timing gear had of course fallen off when the camshaft broke. Therefore, with respect to camshaft timing, Mr Smithson had no way of knowing exactly how it had been assembled before it failed. That the timing was set incorrectly is merely his hypothesis by means of which he explained the valve marks in the pistons.

I beg to differ. In a geartrain that has been subjected to regular shock loading sufficient to cause damage to groups of teeth, the physical damage is the evidence which makes it possible to reassemble the geartrain in ***exactly*** the same way as it had been when running. ***This fact is well understood by competent forensic mechanical engineers***.

26. I asked Tim Smithson to remove all four gears of the engine's timing geartrain so that I could mark the damaged teeth and set out the gears as they are in the engine, with the gears meshing as they had been when the engine had been running.

I observed that on the 66-tooth gear driving the camshaft, there were six equispaced groups of badly pitted and worn teeth, coinciding with the positions where an exhaust valve would come closest to the top of its cylinder's piston, there being six pistons and the throws on the crankshaft arranged to make the engine even-firing, once every 120° of

crankshaft rotation, coinciding with every 60° of camshaft rotation. The only possible reason for regular groups of teeth to be damaged in such a fashion is for there to have been a suddenly applied impact force opposing the circular motion of the crankshaft, every 120° of its rotation. From the indentations made by the exhaust valves on the tops of the pistons, it was evident that these regular impact forces had been generated by the exhaust valves striking the tops of the pistons.

I put white marker paint on four teeth of each of the six groups of damaged teeth on the camshaft driving wheel. There were seven unpainted teeth between each pair of four painted teeth.

The facts that the idler gear has 41 teeth and the camshaft gear has 66 teeth mean that all 41 of the teeth on the idler gear will come into contact with all six groups of damaged teeth on the camshaft gear, becoming damaged themselves in the process, not from the damaged teeth, but from the shock load being transmitted while in contact with the damaged teeth. Upon inspection, this proved to be the case.

I observed that on the 66-tooth gear driving the fuel injector pump, there were also six equispaced groups of badly pitted and worn teeth. These must necessarily have been meshing with the six equispaced groups of badly pitted and worn teeth on the camshaft driving gear and so absorbed the shock load being transmitted. I put a white paint mark on the centre of each of these groups of teeth. There were 11 unpainted teeth between each pair of painted teeth.

27. I observed that the crankshaft gear has three groups of damaged teeth, equispaced 120° apart, and the fact that these coincide with the six groups of damaged teeth equispaced 60° apart on the camshaft timing gear only when the camshaft gear is in the ‘two teeth retarded’ position, is ***incontrovertible evidence*** that the port engine’s valve timing had been retarded by 21.8° of crankshaft rotation and that the exhaust valves had been impacting the pistons, for the whole time it had been in the boat, ***except*** for whatever time this impacting had been alleviated by a servicing mechanic increasing the tappet clearances without Dave Rickards’ knowledge.

28. To illustrate the relative position of each of the four gears of the timing geartrain, I placed a large sheet of white paper on a piece of plywood, placed the cast aluminium timing gear cover on the paper, and traced around the cover with a black pen. I marked the paper with crosses on the centres of the crankshaft gear and the fuel injection pump gear. I used a straightedge on the engine to measure the amount by which the centre of the camshaft gear was offset from the line between the centres of the crankshaft gear and the fuel injection pump gear. I lifted the timing cover off the sheet of white paper, and marked this line on the paper. Using appropriate spacers to make up for the varying heights of the different gears' teeth above the sheet of white paper, I placed the gears with their teeth meshing as they were when the exhaust valves were impacting the pistons. This established the fact that the fuel injection had been timed to the crankshaft according to the factory specifications when the engine was running, and was not retarded by 21.8°. Only the camshaft had been retarded by 21.8° when the engine was running. It was thus evident that Tim Smithson had not been quite correct in his assumption that when the motor was running the fuel injector timing gear had been meshed to the camshaft gear according to the factory markings on each gear. I intend to take the white paper and all four gears of the geartrain into the Court so that if the judge so wishes, he may see for himself that the damaged teeth all meshed each time an exhaust valve impacted its cylinder's piston.

29. Edward Eric Stevens states, in paragraph 106 of his Brief of Evidence:

There is no doubt that the valves have been hitting the pistons. The valves are fitted with a rotator *mechanism which causes them to sit on their seats in a slightly different position each time they are operated. This rotation has caused the valves to leave clear evidence of their impacts on the piston.*

In my examination of the engine, I could find no such rotator mechanism. I can only conclude that Silver Wing's KAD 43 P engines have no rotator mechanism. If the valves have rotated it will have been

caused by a combination of the rocker arm striking the top of the valve stem slightly off-centre and the gas flow turning the valve, much as the airflow over a car causes rotation of the wheels of a bicycle mounted on a carrier bracket fixed to the car's tow ball.

30. Edward Eric Stevens stated in his Summary of Conclusions:

150. The ultimate failure of the camshaft was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.

Edward Eric Stevens is **absolutely wrong** in this conclusion, simply because it is a **fact** that none of the valve rockers were ever seized on their mounting shaft when the engine was running.

31. Edward Eric Stevens also stated in his Summary of Conclusions:

152. The chemical additives in the oil were exhausted as a result of the plaintiff operating a program of extended oil change intervals which significantly exceeded the oil change intervals recommended by Volvo.

In my opinion, only after having received the results of a chemical analysis performed by a reputable laboratory, that showed that the chemical additives in the oil were indeed exhausted, should any professional engineer make such a statement, and to make it without being in receipt of such a report in my opinion ***brings no credit to the profession of mechanical engineering***. The fact that the valve rocker arms were not seized to their spindle **completely destroys** Edward Eric Stevens' explanation as to the cause of failure of the camshaft.

Further, paragraph 49 of Grant Allen's Brief of Evidence states:

"*The oil change intervals for the KAD43P engines are required at 100-hour intervals or one year which ever comes first. After examining the records I have established that the oil and filter changes should have been a minimum of 22. The records show that 14 actual oil changes occurred.*"

Further, paragraph 50 of Grant Allen's Brief of Evidence states:

"The oil change intervals were extended on eight separate occasions beyond the 100-hour requirement."

Further, paragraph 50 of grant Allen's Brief of Evidence states:

"The hours overrun on these eight occasions past the 100 hours were, 39, 119, 80, 232, 95, 28, 9."

In my opinion it is wild speculation to claim that the additives in the oil were depleted below a safe level after 332 hours of operation, because the oil companies and engine manufacturers, including Volvo, have much wider safety margins than that!

More importantly, and sticking strictly to the facts, rather than unsubstantiated, ill-informed opinions, the vessel's log shows that the oil was changed on 13 April 2003 at 2090 engine hours, and that the camshaft broke in two on 23 May 2003 at 2130 engine hours, just 40 engine hours after the oil change. The rockers were not seized to their shaft at the time that the engine was 232 hours past the due hours for an oil change. The rockers were not seized to their shaft at 2090 hours, and nor were they seized to their shaft 40 hours later when the catastrophic failure of the camshaft occurred. The rockers were not seized to their shaft when I examined them. Clearly, Edward Eric Stevens' statement in Clause 152 of his Summary of Conclusions, repeated above, is nonsense and is without merit.

32. **SUMMARY AS TO THE CAUSE OF FAILURE OF THE PORT ENGINE'S CAMSHAFT**

The explanation I have given in this Brief of Evidence as to the cause of failure of the camshaft is incontrovertible. Every step follows in logical sequence from the physical evidence. There is **no guesswork** and there is **no conjecture**. The history of the engine's operation is recorded in the indentations on the pistons from their having been repeatedly impacted by the exhaust valves, in the carbon having been deposited on top of these indentations to the point where they are no longer bright and shiny, and in the equispaced groups of damaged teeth on the crankshaft timing gear, the camshaft driving/timing gear and the injector

pump driving/timing gear. The damaged teeth on the crankshaft gear, the camshaft driving/timing gear and the injector pump driving/timing gear coincide precisely with the exhaust valves striking the piston crowns, which happens only when the camshaft gear is retarded by two teeth from the factory timing marks and the tappet clearance has ***not*** been set at a figure well in excess of that recommended by Volvo. The damaged teeth on the injector pump driving/timing gear, when aligned with the damaged teeth on the camshaft driving/timing gear, also prove that the injector pump timing gear was in the correct orientation relative to the keyed crankshaft gear when the port engine was installed in Silver Wing. The fact that cylinders 2, 3, 4, and 5 still had their tappet clearances set at gaps approximately 10 times the clearance recommended by Volvo, coupled with the fact that the ***indentations*** made by the exhaust valves impacting the pistons were covered in carbon, is incontrovertible evidence that the engine had been run for some time after having had its tappets adjusted to outrageously large clearances. On the no. 3 cylinder the tappet clearance on the exhaust valve had been set to almost 12 times that recommended by Volvo.

These are established facts, in the same way as it is a fact that in the base 10 number system with which we are all familiar, 2 + 3 = 5. They are most certainly not opinions. Neither are they allegations, for the Oxford Dictionary defines the word "allege" and its derivatives as follows:

allege /@"lEdZ/

? ?**v.** claim that someone has done something wrong, typically without proof.

– DERIVATIVES **allegation n. alleged adj. allegedly adv.**

– ORIGIN ME (in the sense 'declare on oath'): from OFr. *esligier*, based on L. *lis*, *lit-* 'lawsuit'; confused in sense with L. *allegare* 'allege'.

I have a copy of the Settlement Agreement that Dave Rickards signed on 23 November 2005, clause 2.3 of which states that "Rickards Bros Ltd agrees that it will file an amended statement of claim in which any reference to Volpower and Ovlov and any allegations against them are

deleted. Any reference to alleged latent defects of the engine will also be deleted."

Having just named these two companies, I should like to point out firstly that a *Brief of Evidence* is an entirely separate and distinct document from a statement of claim, and secondly that an "alleged latent defect" is one that remains to be proven, which is quite different from an actual, proven, latent defect.

33. **The engine from the Matakana vessel owned by Tom Callagher:**

This engine is the identical model to Silver Wing's engines and sterndrives, and has a serial number just 799 higher than Silver Wing's port engine. It had been installed in an 8m single-engine catamaran water taxi operating in the vicinity of Kawau Island in the Hauraki Gulf. It had never had its cylinder head removed. It too suffered a broken camshaft, at approximately 1200 hours.

In paragraph 138 of Edward Eric Stevens' Brief of Evidence that he signed on 16 November 2005, he stated as follows:

While I have seen the Gallagher (sic) engine I have not made more than a casual examination of the parts. Nevertheless I would agree that it does appear to exhibit symptoms very similar, if not identical, to those of Mr Rickard's (sic) engine. I have also spoken to Mr Aaron Sanders (sic) of Matakana Marine Ltd, who first dismantled the engine after the failure. Mr Sanders (sic) has confirmed that, in this engine also, the valve rockers were so tight on their shaft that instead of being able to be slid off, they had to be driven off with a hammer. I know the operating history of the Gallagher (sic) engine only by repute but I expect that it will have elements in common with the engines from Silver Wings (sic).

In my opinion the failure of both engines was brought about by the seizing of valve-rockers on their mounting shaft.

At the time of each of my visits to Assessco General & Marine, the Callagher engine was sitting in the workshop in a semi-dismantled state. All 12 of the valve rockers and the rocker spindle, dis-assembled, were sitting beside the block. I examined the valve rockers and the rocker shaft from the Callagher engine and could see no signs that the valve

rockers had been seized on the rocker spindle. I should like to point out that it is common practice to tap rocker arms off their spindles with a hammer. The reason for this is that rocker spindles are commonly ground to the same diameter throughout their length, and after a thousand hours or so of running, a spindle becomes slightly worn on the rocker arms' bearing surfaces, so that when trying to slide a rocker arm off its spindle, it first must be got past a slight lip on the spindle, no matter in which direction one tries to slide it. I am assured by a reputable engine reconditioner with more than 30 years' experience that this is perfectly normal and is definitely not an indication that a rocker arm had been seized on its spindle. I am further assured that a rocker arm being seized on a spindle is an exceedingly rare event, and when such a thing does happen, there is invariably very serious damage to other bearing surfaces within the engine concerned, to the point where the big end bearings and the gudgeon pin bearings have also seized.

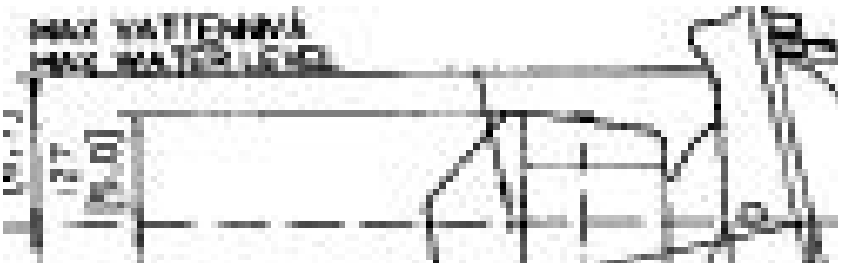
The pistons in the Callagher engine have indentations showing that they have been repeatedly impacted by the exhaust valves. All four of the gears on the Callagher engine's timing geartrain have similar wear and degradation marks to their counterparts in Silver Wing's port engine, although not so pronounced, owing to the Callagher engine's having run for approximately 1200 hours only, before its camshaft broke in two. I placed all four of the Callagher engine's timing gears on top of the Silver Wing's timing gears on the marked white paper referred to in paragraph 22 of this Brief, and all the damaged teeth lined up just as they had for the Silver Wing's port engine. It is therefore an established fact that the Callagher engine's camshaft has failed for exactly the same reason as the camshaft from Silver Wing's port engine.

34. One can only speculate as to how it could possibly have come about that the port engine had its valve timing **two teeth retarded** from the correct place according to the Volvo factory markings, i.e. by 21.8° of crankshaft rotation.

I have heard over the years that occasionally, an engine importer is caught in a 'stockout' situation, where a service agent needs a spare part

to get an engine back into service, but finds that the importer is out of stock. The service agent asks if the importer has any identical engines in stock, and if the answer is yes, the service agent will plead with the importer to 'rob' an engine for the required part, saying that it can easily be replaced when the next shipment of parts arrives from the manufacturer. I asked Mr Len Gilbert, whom I have known since the 1960s when he was a diesel engine sales specialist with Clyde Engineering, the Detroit Diesel agents, if this sort of thing had ever happened when he was with Clyde Engineering. He assured me that he had observed just such a thing on several occasions, but it was company policy that it could be done only with the express permission of the directors. I asked a former parts manager at a general Motors vehicle dealership if this sort of thing had ever happened when he was parts manager, and he assured me that it did happen, reasonably often. I am sure that when this sort of thing happens, it is possible that an employee of the importer or dealer could inadvertently reassemble incorrectly an engine that had been so 'robbed' of a part or parts. In no sense is this to be construed as an allegation. Rather, it is simply the writer bringing a possible scenario to the reader's attention.

35. When Silver Wing had a full load of 16 divers and their gear, for which it was *supposed* to have been surveyed, the engines sat more than 100 mm too low in relation to the load waterline, according to the load waterline calculated by Alan Walker (which is some 800 mm above the bottom of each hull at the transom) and the level stipulated by Volvo (namely for the top of either sterndrive's upper gearcase housing to be no more than 43 mm under water – this is illustrated in a pdf file on Volvo's website, the URL for which is:
http://www.volvo.com/NR/rdonlyres/BFEFD45C-0009-4614-9A5E-567CAA039572/0/KAD42PA_PD_SLD_DP_1994_en.pdf)
Here is the relevant piece of the drawing, copied and pasted from the pdf file:



The inevitable result was that salt water found its way into the turbochargers. It is, in my opinion, only a matter of luck that both engines did not self-destruct from water ingress, in a phenomenon commonly known as “hydraulicing”.

36. The facts established by the writer prove that the following defects existed in the vessel at the time of launching:

a) The camshaft timing gear was mis-timed, retarded by two teeth. This caused the exhaust valves to strike the pistons, with the catastrophic result that eventually the camshaft broke cleanly in two. This is a proven latent defect. It is factual. It is definitely not an alleged latent defect.

b) The engines were too low in the hulls, by more than 100 mm, according to the maximum depth stipulated by Volvo. This too is an established fact. It is definitely not an opinion, nor an allegation. It is a latent defect in the design and construction of the vessel itself, in that its effects are not immediately apparent, and will not manifest themselves until such time as the vessel is carrying its full load of 16 divers and their gear, plus a full load of fuel and water, in rough seas. I am at a loss to understand how Volvo could be so remiss as not to insist that its dealers not make the appropriate measurements, with an appropriate allowance for added loads, on launching day before signing off an installation for warranty purposes.

In addition, the cylinder head gaskets leaked water and were replaced under warranty.

37. I examined the remainder of the main working parts of Silver Wing's port engine and saw no sign of excessive wear caused by oil degradation. Rather, the parts gave every indication that the engine had been overloaded and often overheated. This was particularly evidenced by the cylinder head cracks and warping, and the condition of the underside of the pistons, which had obviously been subjected to temperatures well in excess of those intended by Volvo.

38. I examined the starboard engine and saw no sign of excessive wear caused by oil degradation. The starboard engine too gave every indication that it had been overloaded and often overheated. This was particularly evidenced by the cylinder head cracks and warping. The cylinder head had obviously been subjected to temperatures well in excess of those intended by Volvo. However, despite this, there was no evidence of excessive wear on any component or any evidence of the engine having been operated with insufficient lubrication. The turbocharger spun freely. Had there been insufficient lubrication from oil degradation, it could have been expected that the turbocharger bearings would have failed prematurely. That the starboard engine had been overloaded and subsequently overheated is not surprising, given that the all-up weight of the vessel when carrying 16 divers and their gear, plus a full load of fuel and water, was 1700 kg (i.e. 19%) more than the 9000 kg Volvo recommends as a maximum for a pair of these engines and Duoprop sterndrives. It is evident from reading the relevant briefs of evidence that Greg Shine and Bladerunner Boats were negligent in not making sufficient effort to calculate the weight of Silver Wing before it was built, and to monitor its weight using load cells while it was being built.

Every designer and builder of non-trailerable planing craft ought to know that they need to have sufficient power so as to leave a margin so that they can still cruise properly even when their bottoms are slightly fouled. From reading the relevant briefs of evidence, and knowing the weight and propellershaft power (shp) (161 kW / 0.7457 = 216 shp for each engine – the power quoted by Grant Allen in paragraph 23 of his

Brief of Evidence is 230 hp, but this is crankshaft power, before transmission losses are deducted, and the conversion factor that Volvo uses to convert kW to horsepower is that for metric horsepower, not the more commonly used conversion factor for the original British horsepower that I used above – a metric horsepower is slightly smaller than a traditional British horsepower, which is defined as being equal to 550 foot-pounds per second) and the relatively small diameter of the propellers that Silver Wing had (approximately 14 inches), it is not at all surprising to me that the vessel could not perform properly when 16 divers and their gear were on board, plus a full load of fuel and water, and the bottoms of the hulls were slightly fouled with marine growth. An adequate margin of power, and much larger diameter propellers, which incidentally cannot be greater than 16 inches on a Volvo Duoprop sterndrive, (which in itself puts a severe limitation on the load that each unit can get up on plane) would have been beneficial. By way of comparison, a MerCruiser Bravo II sterndrive swings a 20 inch diameter propeller, but it must be borne in mind that this is a single propeller, not a pair of concentric counter-rotating propellers as on a Volvo Duoprop.

39. It is plainly evident to me that Silver Wing was certainly not fit for the purpose for which it was intended, because:

(a) The port engine had a latent defect as outlined in paragraphs 32 and 36 above.

(b) The propellers had insufficient diameter, for the actual loaded weight and design of the vessel. This in turn meant that the Volvo duoprop sternlegs were not fit for the purpose, and

(c) The engines had insufficient power, for the weight and design of the vessel, and

(d) Given that the engines had insufficient power for the purpose, they were cruised at a load that caused them to overheat, as at such a load and reduced vessel speed, the internal surface area of the heat exchangers, coupled with the resulting reduced flow rate of the cooling

water circulating pumps, proved insufficient to prevent the engines from overheating, and

(e) There was a latent defect in that when operating in reverse, the sternlegs' exhausts exiting through the back of the cavitation plates interfered with the sternlegs' cooling water intakes, aerating the flow to the point where heat transfer in the heat exchangers was impaired, resulting in rapid overheating of the engines, and

(f) The engines' installation had a latent defect, in that the exhaust manifolds were too low relative to the load waterline by at least 100 mm, greatly increasing the chances of the engines catastrophically ingesting salt water.

In my opinion, Greg Shine ought to have been knowledgeable enough and honest enough to have been able to say to Dave Rickards, before he placed his order for Silver Wing, that the Volvo KAD 43 P motors and Duoprop sterndrive units would not be up to Dave Rickards' desired commercial tasks.

Peter J. Morgan 6 March 2006

Appendix 5 - Letter to Eugene St John - 10 March 2006

Peter J. Morgan **B.E. (Mech.), Dip. Teaching**
Consulting Engineer - Marine Designer - Technical Editor - Technical Writer
13 Stratford Avenue
Milford
AUCKLAND ph 09 489 4972 email tlco@xtra.co.nz

10 March 2006

Eugene St John
Barrister
3 Shortland Street
AUCKLAND
email: eugene.john@xtra.co.nz

Good morning, Eugene.

In my dealings with you and Nigel Cook, neither you nor Nigel Cook ever told me that Nigel Cook does not hold a current practising certificate.

I note that in the Code of Conduct of the New Zealand Law Society, commentary to Rule 2.02 says:

(4) A firm must ensure that the public, and other practitioners dealing with a principal or an employee of the firm, should know the name and status of the person with whom they are dealing.

You will recall that I was in your office on Friday 3 March 2006. I asked you a simple question: "Have you read paragraph 27 of Grant Allen's Brief of Evidence?" You did not give me a meaningful answer, and when I repeated the question started yelling at me and accused me of cross-examining you. I repeated the question several more times and you lost your temper and I never got the simple "yes" or "no" answer that I believe such a simple question deserved. You eventually got so exasperated with me that you handed me over to Nigel Cook, without telling me of his status in your firm.

Nigel Cook acted as and addressed me as if he were a lawyer, and proceeded to spout forth as to what the law said in regard to the liability of Bladerunner Boats Ltd for supplying a boat to Rickards Brothers Ltd that had a latent defect in one of its engines. I might add that what he said was contrary to my understanding, as a former boat manufacturer, of what the law says. He told me that as Bladerunner Boats Ltd did not manufacture the engines, it could not be held liable for a latent defect in one of them.
Nigel Cook also told me that Mr Rickards paid for the motors in Silver Wing with a cheque made out directly to Ovlov Marine Ltd and that was why Bladerunner could not be held liable for the fact that the port motor had a latent defect. I have checked with Mr Rickards and am assured that Mr Rickards' company bought Silver Wing including its propulsion units directly from Bladerunner Boats.
In addition, Nigel Cook had previously sent me an email in which he wrote as if he were a lawyer, without first advising me that he does not hold a current practising certificate. On the next page is the email, copied and pasted:

----- Original Message -----
From: Peter J. Morgan
To: 'Nigel Cook'
Sent: Wednesday, March 01, 2006 3:13 PM

Subject: Rickards vs Bladerunner

Hello Nigel
I am at a loss to understand as to why my Brief of Evidence should just be in reply to Grant Allen. Nevertheless, I'm not sure that the Grant Allen Brief of Evidence I have is the correct one, so please email me a fresh copy.
Thanks in anticipation.
Peter J. Morgan

From: Nigel Cook [dixiek@ihug.co.nz]
Sent: Wednesday, 1 March 2006 3:21 p.m.
To: Peter J. Morgan
Subject: Re: Rickards vs Bladerunner
Hi Peter

It is an unusual situation. Effectively, the case for Rickards has already been put in November. So we are not allowed to introduce new evidence. But because the defence filed the Allen Brief late we are able to comment on it. I have attempted in the draft brief to use the Allen Brief as a justification for commenting on the Stevens brief which you had done to such good effect.

Unfortunately the rules of evidence and court procedures can at times be a barrier.

Allens Brief is attached.

Nigel

There were several other emails, and I have them all on file.

Nigel Cook certainly gave me the impression, and in my view acted as if he were, a practising lawyer. Suspicious, I checked the register, on-line, as soon as I got home on that Friday afternoon, and this confirmed that indeed, Nigel Cook does not hold a current practising certificate. Maybe he once did so – perhaps you can enlighten me.

It is my opinion that your conduct has been most unprofessional in regard to this matter.

Before I make a formal complaint to the Auckland District Law Society, I ask that you explain yourself.

However, should I decide to make a formal complaint, I reserve the right to send your explanation to the Auckland District Law Society.

Sincerely
Peter J. Morgan

Appendix 6 - 60610 - Letter to Eric Stevens

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
Consulting Engineer, Technical Writer, Sub-editor & Technical Editor
13 Stratford Avenue
Milford
Auckland
NEW ZEALAND
ph +64 9 489 4972 email tlco@xtra.co.nz

10 June 2006

Eric Stevens
Consultant Mechanical Engineer
28A Rame Road
Greenhithe
Auckland

Dear Eric

As you may know, I was engaged as an expert witness for the plaintiff in the case Rickards vs Bladerunner et al, for which you were an expert witness for the defence.

I have read your brief of evidence, and it is plainly evident to me that you have performed abysmally – so badly, in my opinion, that in my brief of evidence I was moved to make the observation that you have brought no credit to the profession of mechanical engineering. However, it should be possible to forgive you, so long as you accept that the primary duty of an expert witness is to report to the best of his ability to the Court, not to the person or company who is paying his fee. It is my opinion that largely because of your brief of evidence, critically flawed though it was, Mr Rickards was denied justice.

Before I take the matter further, I should like to give you the opportunity of making amends to Mr Rickards, the person most affected by your failure to properly ascertain the cause of the catastrophic failure of Silver Wing's port engine's camshaft. I have enclosed the brief of evidence I prepared for the Court. Unfortunately, Mr Rickard's lawyer, unbeknown to me, had previously done a deal with the lawyer acting for Ovlov and Volpower, to drop those two companies from the case, because they both believed that Tim Smithson was incompetent. Consequently, Mr Rickards' lawyer refused to use my brief of evidence, and refused to call me as a witness.

After you have read the enclosed brief, I ask that you either contact me to arrange to revisit the engines so that you may satisfy yourself that my diagnosis is correct, or accept my diagnosis and send a letter of apology to Mr Rickards, and a copy to me, so that he may forward it to his insurance company in support of his claim for recompense because of the latent defect in his vessel's port engine. So far, his insurance company is rejecting his claim, largely I believe because of the contents of your brief of evidence.

Mr Rickards' postal address is as follows:

David Rickards
Rickards Bros Ltd
P.O. Box 365
Whangamata

I hope to hear from you very soon.

Sincerely

Peter J. Morgan

Appendix 7 - Formal Letter of Complaint to IPENZ

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
Consulting Engineer, Marine Designer, Technical Writer, Sub-editor & Technical Editor
13 Stratford Avenue
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NEW ZEALAND
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4 July 2006

Andrew Cleland
CEO
IPENZ
PO Box 12 241
Wellington

Dear Andrew

This is a formal letter of complaint about what I consider to be the professional negligence, or incompetence – it matters not to me which one it is – of Edward Eric Stevens, Fellow of IPENZ.
Mr Stevens was engaged as an expert witness in CIV No. 2004 404 816 in the High Court of New Zealand Auckland Registry between Rickards Bros Limited (First Plaintiff) and Bladerunner Boats Limited (First Defendant) and Gregory John Shine (Second Defendant) and Volpower NZ Limited (Third Defendant) and Ovlov Marine Limited (Fourth Defendant).
As a direct result of the 'investigation' performed by Mr Stevens on a Volvo diesel engine that had suffered a broken camshaft while carrying fare-paying passengers, the third and fourth defendants' barrister, Paul Dale, wrote a letter (attached) to the plaintiff's barrister, Eugene St John, threatening to sue the plaintiff to recover costs well in excess of $100,000 if the plaintiff did not remove Volpower NZ Limited and Ovlov Marine Limited from the case. Under extreme pressure from his barrister to do so, Dave Rickards, director of Rickards Bros Limited, succumbed and signed a settlement agreement dated 23 November 2005 (attached). I should point out that the mechanical failure investigator Mr Rickards had engaged, Tim Smithson, had previously advised both Mr Rickards and Eugene St John that if Mr St John believed that his (Tim Smithson's) report did not reveal the true cause of failure of the engine then Mr St John should engage a professionally qualified mechanical engineer (Mr Smithson put forward the names of two professional engineers with whom he had previously worked – Mr Bob Nelligan and Mr Christopher Marks) to conduct an examination of the engine and write a report on it. I believe that the fact that Mr St John did not engage the services of a professionally qualified mechanical engineer, preferring to believe Mr Paul Dale's assertion that Tim Smithson was incompetent, before getting Mr Rickards to sign the Settlement Agreement on 23 November 2005, was an act of professional negligence on Mr St John's part, which severely disadvantaged his client Mr Rickards. I further believe that the findings contained in Mr Stevens' Brief of Evidence are the major reason why Mr Rickards' insurance company. Mariner Underwriters, has repeatedly turned down his insurance claim.
A few weeks after signing the Settlement Agreement, in December 2005, Mr Rickards engaged me as an expert witness, on the recommendation of Mr Len Gilbert, a well-known and recognised expert on the performance of diesel engines in marine craft. I conducted my own examination and prepared a Brief of

Evidence (attached), and was subsequently highly annoyed when Mr Rickards' barrister Eugene St John refused to submit it unless I took out all references to the failure of the diesel engine. Until this refusal, I had absolutely no idea that the parties had signed a Settlement Agreement, and when I was subsequently given a copy by Mr Rickards, I was incensed at what I believed to be the incompetent behaviour of Mr St John. I subsequently altered my Brief of Evidence to include the fact that I knew that there had been a Settlement Agreement, and explained in my Brief of Evidence that I believed that what I had written was not in breach of the Settlement Agreement. To the best of my knowledge, Mr St John used none of my evidence and refused to call me as a witness at a subsequent Court-arranged meeting of the parties.

I have not included a copy of Mr Stevens' Brief of Evidence, as I do not have an electronic copy of it, but I believe that my quotations from it are sufficient to make my case. However, should you wish to have a copy, I am sure that Mr Stevens will be willing to supply one. Should that not be the case, I shall oblige.

On 10 June 2006 I hand-delivered a letter (attached) to Eric Stevens' letter box, pointing out what had happened and gave him an opportunity to correct his mistakes and apologise. No response has been forthcoming.

In order to conclusively prove that my conclusion as to the reason for the failure of the engine's camshaft is the correct one, I respectfully suggest that the quickest, surest and simplest way would be for IPENZ to arrange to have a suitable professional member examine the engine in question, which apart from the four timing gears, which are still in my possession, is still held by Mr Tim Smithson at his workshop, Assessco General & Marine, 63 Mahana Road, Te Rapa, Hamilton.

I should like to point out that Mr Stevens' first duty as an expert witness is to act as an expert working for the Court, not the person who pays his fee, to present the truth to the Court. Members of the public are entitled to expect nothing less from a Professional Member, let alone a Fellow, of IPENZ.

I look forward to hearing from you soon.

Sincerely

Peter J. Morgan

Appendix 8 - 70522 - Letter from IPENZ enclosing decision of Investigating Committee

IPENZ
ENGINEERS NEW ZEALAND

55070502

22 May 2007

Mr Peter J. Morgan
Consulting Engineer
13 Stratford Avenue
Milford
Auckland

Dear Mr Morgan

COMPLAINT AGAINST MR ERIC STEVENS

I wish to advise that in respect of the complaint from you against Mr Stevens, outlined in your correspondence dated 4 July 2007, has been investigated and the Investigating Committee has reached a decision.

As shown in their report, the Investigating Committee formed the view that Mr Stevens has conducted his enquiry in a generally professional manner and Mr Stevens's report represents a reasonable analysis of the failure based on the evidence available to him at the time.

Hence, the Investigating Committee has decided under IPENZ Regulations for Investigation and Determination of Complaints against Members April 2005, Regulation 8(c) the alleged breach of Rule 4 is insufficiently grave to warrant further investigation. Therefore the complaint is dismissed.

Yours sincerely

Andrew Cleland
Chief Executive

Encl: Investigating Committee Report

Appendix 9 - 70510 - IPENZ Investigating Committee Report

Investigating Committee Report

Morgan vs Stevens

In accordance with:

IPENZ Regulations for Investigation and Determination of Complaints against Members April 2005

Prepared by:

Neville Beach Dist. FIPENZ
Chairman of Investigating Committee

Date 10 May 2007

INTRODUCTION

Mr Peter Morgan wrote to the Institution lodging a formal complaint against Mr Eric Stevens. The complaint alleges that Mr Stevens was incompetent in the preparation of a report on the failure of a Volvo marine engine. Mr Morgan alleges that Mr Stevens's incompetence and the resulting inaccurate report he prepared persuaded legal council to drop a case against one of the defendants in a court case concerning the engine failure. This lead to, in Mr Morgan's view, a failure of the justice system and the incompetent report by Mr Stevens which caused it was a breach of the obligations on Members as set out in Rule 4.

It is not explained what Mr Morgan's involvement or interest was in this case. He prepared a Brief of Evidence as an Expert Witness for one of the court cases but was not called to present it.

THE NATURE OF THE COMPLAINT

Mr Stevens was instructed by Grove Darlow & Partners (Solicitors) to prepare a Brief of Evidence, as an Expert Witness, on the reasons for the engine failure to be used in the Court case established to resolve liability in this matter. Mr Stevens stated that the engine failed because the valve rockers had seized on the rocker shaft leading to a catastrophic failure of the camshaft. From the evidence available to him Mr Stevens concluded that the seizing of the valve rockers to the rocker shaft was the result of the lubricating oil not being changed regularly and in accordance with the recommendations of the manufacturer.

Mr Morgan does not agree with Mr Stevens's analysis. In his view the problem was caused by the camshaft timing gear being "two teeth out". This would presumably have been a fault at the factory. Mr Morgan does not agree that the valve rockers seized on the rocker shaft.

This difference in professional opinion lead to the complaint. Mr Morgan alleges that Mr Stevens's analysis of the reasons for the motor failure were wrong and that he was incompetent to the degree that Mr Morgan considered that Mr Stevens had breached the obligation on Members. The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one.

THE COMMITTEE'S VIEW OF THE TECHNCIAL MATTERS

Mr Morgan's complaint is basically that Mr Stevens's analysis was wrong and incompetent. This view is based on Mr Morgan's analysis being correct and therefore Mr Stevens must be wrong.

Mr Morgan's view is that the engine's camshaft timing gear was "two teeth out" and that this lead eventually to the engine failure. Based on the evidence available to the Committee they do not accept that this is a plausible theory. There is evidence to show that this engine did usually perform satisfactorily and the Committee contends that it could not have done so under the conditions that Mr Morgan alleges.

THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT

The role of the Committee was to examine Mr Stevens's behaviour, not review the cause of the failure. The test on Mr Stevens was the quality of the work he performed, The Committee consider that Mr Stevens has conducted his enquiry in a generally professional manner.

The Committee is, however, critical of some aspects of his report. Given his late involvement in the case, Mr Stevens was forced to rely on the testimony of other persons. He placed great weight on the evidence that the valve rockers had seized on the rocker shaft. This evidence was that of three engineers who examined the motor after the failure. Mr Stevens does not make it sufficiently clear in his report that he was unable to witness the seized valve rockers for himself.

Mr Stevens stated also that the oil was faulty, which lead to the failure. This may well have been correct but there was no evidence to support this contention.

Despite these reservations about Mr Stevens report the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time.

THE COMMITTEES DECISION

The Committee dismisses the complaint laid by Mr Morgan on the grounds of Regulation 8(c) the alleged breach is insufficiently grave to warrant further pursuit because the shortcomings as outlined above were small.

THE COMMITTEE'S GENERAL COMMENT ON THE COMPLAINT.

The Committee were concerned that the complainant may not have fully disclosed his interest in the matters, and that he requested that IPENZ take actions that lay outside the regulated process for hearing complaints. These matters were put to the side by the Committee, but it wishes to state them for the record.

Neville Beach Dist. FIPENZ
Chairman

Dated 16/5/07

Appendix 10 - 71002 - Formal Letter of Complaint to IPENZ

Peter J. Morgan B.E. (Mech.) Dip. Teaching

Consulting Engineer, Marine Designer, Technical Writer, Sub-editor & Technical Editor

13 Stratford Avenue
Milford
Auckland
NEW ZEALAND
ph +64 9 489 4972 email tlco@xtra.co.nz

2 October 2007

Andrew Cleland
CEO
IPENZ
PO Box 12 241
Wellington

Dear Andrew

This is a formal letter of complaint about what I consider to be the flagrant breach by the three members of the Investigating Committee, Neville Beach, Neil Rogers and Kelvin Barclay, who investigated and wrote the report on the formal complaint I made on 4 July 2006 regarding the work of IPENZ Fellow Edward Eric Stevens, of their obligation to IPENZ and the public under Rule 4.3 and Clause 45 of the IPENZ Code of Ethical Conduct for Chartered Professional Engineers:

> 4.3 Competence obligation
>
> Members in the classes Distinguished Fellow, Fellow, Professional Member, Technical Member, Associate Member and Graduate Member must perform their engineering activities in a careful and competent manner, commensurate with their Membership class within the Institution (the "competence obligation").
>
> 45 Act with honesty, objectivity, and integrity
>
> A chartered professional engineer must act honestly and with objectivity and integrity in the course of his or her engineering activities.

It is my considered opinion that their report is a dishonest and unethical 'whitewash' by which IPENZ has attempted to dismiss the dishonest performance of one of its Fellows. If ever there was evidence to show that a professional body ought not to be self-policing, their report surely contains it.

It is plainly evident to me that if my complaint and their report and my comments on it, as contained in this letter, were given sufficient publicity, the profession of engineering would be brought into considerable public disrepute, and the public would rank professional engineers right down there with the likes of real estate and used car salespeople.

It beggars belief that the members of the Investigating Committee acted with "honesty, objectivity, and integrity" in investigating my complaint and in writing their report.

I have reproduced their report in full, with my comments inserted in the appropriate places in bold red text, on the following seven pages.

As IPENZ is the annual recipient of very large sums of public money, this matter is extremely serious and will be brought to the attention of many IPENZ members, investigative journalists, the appropriate authorities and Members of Parliament, some of whom I am sure will take steps to coerce you, and the other people who run IPENZ, into the "Age of Accountability".

Sincerely

Peter J. Morgan

INTRODUCTION **(Comments by Peter J. Morgan have been added in bold red text.)**

Mr Peter Morgan wrote to the Institution lodging a formal complaint against Mr Eric Stevens. The complaint alleges that Mr Stevens was incompetent in the preparation of a report on the failure of a Volvo marine engine. **This is not quite a true statement. The first sentence of my letter of complaint was as follows: "This is a formal letter of complaint about what I consider to be the professional negligence, or incompetence – it matters not to me which one it is – of Edward Eric Stevens, Fellow of IPENZ." When the facts are taken into account I do not believe that Mr Stevens could possibly be considered to have been merely incompetent. Rather, it is my considered opinion that he deliberately set out to get his clients "off the hook" and was prepared to be rather creative with the truth, in the process ignoring what the Court's Code of Conduct for Expert Witnesses and the IPENZ Code of Conduct required of him.** Mr Morgan alleges that Mr Stevens's incompetence and the resulting inaccurate report he prepared persuaded legal council **(sic)** to drop a case against one of the defendants in a court case concerning the engine failure. This lead to, in Mr Morgan's view, a failure of the justice system and the incompetent report by Mr Stevens which caused it was a breach of the obligations on Members as set out in Rule 4.

It is not explained what Mr Morgan's involvement or interest was in this case. He prepared a Brief of Evidence as an Expert Witness for one of the court cases but was not called to present it. **My interest is purely that of a truth-seeker and justice-seeker, behaving in the ethical manner in which, up until I became involved in this case, I took it for granted that all Expert Witnesses behaved.**

THE NATURE OF THE COMPLAINT

Mr Stevens was instructed by Grove Darlow & Partners (Solicitors) to prepare a Brief of Evidence, as an Expert Witness, on the reasons for the engine failure to be used in the Court case established to resolve liability in this matter. Mr Stevens stated that the engine failed because the valve rockers had seized on the rocker shaft leading to a catastrophic failure of the camshaft. From the evidence available to him Mr Stevens concluded that the seizing of the valve rockers to the rocker shaft was the result of the lubricating oil not being changed regularly and in accordance with the recommendations of the manufacturer. **The evidence that the valve rockers were not seized to the rocker shaft was right there in Eric Stevens' hands when he was handed two of the valve rockers from the engine on 19 August 2005 when he 'examined' it at the premises of Assessco General & Marine at Mahana Road, Hamilton, in the presence of Tim Smithson. The fact that Eric Stevens chose to make the statements that he did in his Brief of Evidence is I believe a grave breach of his duty to the Court as an Expert Witness, never mind his obligation to IPENZ under Rule 4.3 and Clause 45 of the IPENZ Code of Ethical Conduct for Chartered Professional Engineers:**

> **4.3 Competence obligation**
>
> **Members in the classes Distinguished Fellow, Fellow, Professional Member, Technical Member, Associate Member and Graduate Member must perform their engineering activities in a careful and competent manner, commensurate with their Membership class within the Institution (the "competence obligation").**
>
> **45 Act with honesty, objectivity, and integrity**
>
> **A chartered professional engineer must act honestly and with objectivity and integrity in the course of his or her engineering activities.**

Mr Morgan does not agree with Mr Stevens's analysis. In his view the problem was caused by the camshaft timing gear being "two teeth out". This would presumably have been a fault at the factory. Mr Morgan does not agree that the valve rockers seized on the rocker shaft. **And neither do Neil Rogers and Kelvin Barclay, the two members of the IPENZ Investigating Committee who examined the port engine at the premises of Assessco General & Marine on 19 November 2006, witnessed by Tim Smithson and Dave Rickards, but nowhere in this report is this fact stated. It is my considered opinion that the fact that this sentence in the report is written in the way it is implies that the writer of the report agrees with Mr Stevens "that the valve rockers seized on the rocker shaft."**

This difference in professional opinion lead to the complaint. **Whether or not the valve rockers were seized on the rocker shaft is definitely not a matter of professional opinion. Rather, it is a matter of fact that they were not and never had been. This was pointed out to IPENZ in one of my letters to its CEO, Andrew Cleland. I would never have spent so much time and effort arguing over a mere matter of professional opinion.** Mr Morgan alleges that Mr Stevens's analysis of the reasons for the motor failure were wrong and that he was incompetent to the degree that Mr Morgan considered that Mr Stevens had breached the obligation on Members. The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one.

THE COMMITTEE'S VIEW OF THE TECHNCIAL MATTERS

Mr Morgan's complaint is basically that Mr Stevens's analysis was wrong and incompetent. This view is based on Mr Morgan's analysis being correct and therefore Mr Stevens must be wrong. **This statement by the Committee is absolutely not true. My complaint against Edward Eric Stevens had nothing to do with whether or not my analysis of the engine's failure is correct. Rather, my statement that Mr Stevens' analysis is wrong is based purely on the facts that**

1. **the valve rockers were not, and never had been, seized to the rocker shaft, and**
2. **the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines.**
3. **The Volvo factory-recommended oil change interval is 100 hours, or once each year if the motor has not run 100 hours in a year.**

Mr Morgan's view is that the engine's camshaft timing gear was "two teeth out" and that this lead eventually to the engine failure. Based on the evidence available to the Committee they do not accept that this is a plausible theory. There is evidence to show that this engine did usually perform satisfactorily and the Committee contends that it could not have done so under the conditions that Mr Morgan alleges. **The Committee, in my opinion, has no basis for this contention. Besides, the Committee in the very next paragraph of its report states that its role is not to "review the cause of the failure". In my professional opinion, a compression ignition 4-stroke diesel engine will indeed run when its valves are mis-timed as described, as both valves are closed when the piston is at or near top dead centre and the fuel is injected. However, its fuel economy will suffer a little and it will smoke more than it should. Both of these traits were evident in the engine in question, which always smoked more and used more fuel than its counterpart on the starboard side.**

My Brief of Evidence does not contain a 'theory'. Rather, it sets out a carefully thought through analysis of all of the material evidence, which still exists, and establishes the fact that for the whole of the time that the port engine had been running in the vessel, its camshaft timing gear had been two teeth retarded.

THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT

The role of the Committee was to examine Mr Stevens's behaviour, not review the cause of the failure. **This sentence completely contradicts the last sentence of the previous section, namely** "The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one." **One statement precludes the other. The only valid method of assessing Mr Stevens' competence is by the members of the Investigating Committee themselves determining the cause of the failure.** The test on Mr Stevens was the quality of the work he performed. **The only valid test of the quality of the work Mr Stevens performed is whether he correctly identified the cause of the failure in a manner consistent with sound engineering principles (as opposed, for example, to just guessing). Before the members of the Committee can determine whether Mr Stevens correctly identified the cause of the failure, they must first determine for themselves the cause of the failure. This they have clearly failed to do.** The Committee consider that Mr Stevens has conducted his enquiry in a generally professional manner. **It beggars belief that the Investigating Committee could make this last statement, when two of its three members had been witnessed seeing for themselves that the valve rockers were not, and never had been, seized to the rocker shaft. The same two members had also had the opportunity to see for themselves the vessel's log, which clearly shows that the port engine's camshaft snapped in two only 40 hours past the engines' (yes, the apostrophe is in the correct place, as both the port and starboard engines had their oil changed at the same time) previous oil change, proving conclusively that the oil could not possibly have been faulty. For the members of the Investigating Committee to write that they** "consider that Mr Stevens has conducted his enquiry in a generally professional manner" **shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as IPENZ professional engineers.**

The Committee is, however, critical of some aspects of his report. Given his late involvement in the case, Mr Stevens was forced to rely on the testimony of other persons. He placed great weight on the evidence that the valve rockers had seized on the rocker shaft. **There was no evidence that "the valve rockers had seized on the rocker shaft." and Neil Rogers and Kelvin Barclay both know it. For them to imply that there was shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as IPENZ professional engineers.** This evidence was that of three engineers who examined the motor after the failure. **I have checked with two members of IPENZ, one a former president of IPENZ, who have both said that it is well accepted within the engineering profession that when members of the profession refer to people as being engineers they mean other professional engineers. I have previously asked Andrew Cleland, CEO of IPENZ to ask the members of the Investigating Committee to confirm that the three 'engineers' mentioned are actually professional engineers, and they have not been able to do so, presumably because they are not. I should add that to the best of the combined knowledge of Dave Rickards, Tim Smithson and myself, only three members of IPENZ have inspected the engine in question, namely Eric Stevens, Neil Rogers and Kelvin Barclay. However, we know that three other people, namely Grant Allen, Peter Jacobs, and John Booker, have inspected the engine. According to their respective Briefs of Evidence, Grant Allen qualified as an automotive technician and Peter Jacobs qualified as a fitter and turner, and most certainly neither holds a qualification entitling him to professional membership of IPENZ. Neither does John Booker, who witnessed for himself soon**

after the original failure that the rocker arms were free to move on the rocker shaft. The motor was dismantled in his workshop.
Mr Stevens does not make it sufficiently clear in his report that he was unable to witness the seized valve rockers for himself. **It is my contention that this last sentence misleadingly implies that the members of the Investigating Committee agree that the valve rockers *were* seized on the rocker shaft. In my opinion, the statement by the Investigating Committee that "Mr Stevens was forced to rely on the testimony of other persons" in regard to the valve rockers' being seized on the rocker shaft is not only a gross distortion of the facts, but also patently untrue. Mr Stevens was definitely not forced to rely on the testimony of other persons. Rather, he was engaged as a professional Expert Witness in a very serious Court case and he had a professional obligation both to his professional body (IPENZ) and to the Court to conduct his examination of the engine in a thoroughly professional manner. This he clearly failed to do. The facts are as follows:**

1 **In his Brief of Evidence dated 22 November 2005, Grant Allen, the National Service Manager for Volpower New Zealand Limited and an expert witness for the third and fourth defendants in Rickard Bros. vs Bladerunner et al, said in clause 86: "On 19 November 2003 I travelled to Mr Smithson's workshop in Hamilton to view the failed engine." In clause 101 he goes on to say: "….. On inspecting the rocker shaft assembly, I found that all rocker arms were very tight to move on the shaft. An employee of Mr Smithson's assisted me with a big hammer and removed two rocker arms for me to inspect."**

2 **The fact that Grant Allen described the rocker arms as being "very tight to move on the shaft" and the fact that Mr Smithson's employee removed two rocker arms for him to inspect are very clear illustrations that Grant Allen saw for himself on 19 November 2003 that the rocker arms were not "seized to the rocker shaft."**

3 **The first two clauses in the Summary of Conclusions in Edward Eric Stevens' Brief of Evidence dated 18 November 2005 contradict the aforegoing first-hand observation of Grant Allen, as follows:**

"150 The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.
151 The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely."

4 **Edward Eric Stevens, Grant Allen, the National Service Manager for Volpower New Zealand Limited, the Volvo Penta importer/distributor, and Peter Jacobs, the managing director of Ovlov Marine Limited, the Volvo Penta dealer in Auckland, were present at the premises of Assessco General & Marine at Mahana Road, Hamilton, on 19 August 2005 in the presence of Tim Smithson. Two valve rockers were removed from the rocker shaft and handed to Edward Eric Stevens, who inspected them and passed them on to Grant Allen and Peter Jacobs in turn for their inspection. Just as the two members of the IPENZ Investigating Committee, Messrs Neil Rogers and Kelvin Barclay, did when they inspected the engine at Assessco on 18 November 2006, Mr Stevens, Mr Allen and Mr Jacobs could see for themselves that the plain bearing surfaces**

were in extremely good condition, with no sign of their ever having been seized. Both of these events were witnessed by Tim Smithson.

Whether or not Mr Stevens had a 'guilty mind' when he wrote as an Expert Witness in his Brief of Evidence that "The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft." remains for a Judge of the Court to determine.

The explanation as to how it came to be that when I inspected the rocker shaft and rocker arms during the three visits I made to Tim Smithson's workshop in early 2006, the rocker arms were in fact not "very tight" but very free to move on the rocker shaft, is detailed in clause 11 of my Brief of Evidence, a copy of which I forwarded to IPENZ with my original complaint on 4 July 2006, as follows:

11. As mentioned in paragraph 3 above, the engine components were partially assembled, without valve springs. Recalling that I had read in Edward Eric Stevens' brief of evidence that the valve rockers were seized on the rocker spindle, I tried rotating each of the 12 rocker arms on the rocker spindle and found them to rotate freely. This is contrary to the statement contained in the Brief of Evidence of Edward Eric Stevens at paragraph 151, which I quote in full as follows:
"151. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft."
I removed a rocker arm from each end of the rocker spindle. In each instance the rocker arm slid off easily, with light finger force only. I was completely satisfied that there was no evidence of their having been seized on the rocker spindle, and there was no evidence of excessive wear.
I asked Tim Smithson and Dave Rickards to explain what had happened that Edward Eric Stevens could state that the rocker arms were seized to their rocker spindle and yet they were now not seized but moved freely. Dave Rickards replied that on 23 May 2003, soon after Silver Wing's port engine had broken down and the vessel was tied up at the wharf at Tairua, he had removed the rocker cover and had observed that the rocker arms and spindle had been covered in oil, and that he had checked a few of the rocker arms and had found them to move freely on the rocker spindle. He asked his daughter to operate the starter while he observed the rocker shaft, and from this he concluded that the camshaft had broken between no. 1 and no. 2 cylinders. He said that at his request Pacific Coast Marine had removed the port engine from the boat and that he had been present when John Booker, proprietor of Pacific Coast Marine, partially dismantled it in Pacific Coast Marine's workshop, in order to observe the reason for failure and to assess the cost of repairs. When the timing cover was removed, the short front piece of the camshaft fell out. John Booker then made a fairly long telephone call, after which he told him that 'the reason for the camshaft failure was overloading causing overheating, this causing stretching of the valves to the extent that they hit the pistons'. Dave Rickards submitted an insurance claim, and the assessor Chris Laird inspected the engine on 3 July 2003. The insurance company's letter of rejection was received by Dave on 21 July 2003. The engine was stored at Pacific Coast Marine in Whitianga until 23 July 2003, on which date Dave

Rickards took it to his farm at Hikuai where he wrapped some of the components in Gladwrap. He said that Tim Smithson had come to his farm workshop on 5 November 2003 and two days later the engine components were transported to the workshop of Assessco General & Marine in Hamilton.

Tim Smithson said that when the rocker spindle assembly had been delivered to his workshop the parts were devoid of oil, as if they had been soaked in a degreasing chemical, and that was the condition they were in on both of the occasions when Edward Eric Stevens had visited. Tim Smithson said that on 21 November 2003 when he took the photo (marked AB-14 in his report dated 20 December 2003) of the rocker shaft with the rockers mounted on it and made the caption, he thought that the rocker arms were, as his photo caption says, "*seized to the rocker shaft*". I should point out here that the rocker spindle assembly had been soaked in a degreasing solvent and had been left to dry for many months before Edward Eric Stevens' first inspection on 19 August 2005. He said that since Edward Eric Stevens' last visit on 7 September 2005, he, Tim Smithson, had occasionally dribbled engine oil down the lubricating hole on the top of each rocker arm, with the result that all 12 of the rocker arms now move freely, just as they are designed to do. Given that it takes a force of approximately 300 newtons (equivalent to a weight of about 30 kg) to compress one of the valve springs, which force is transferred on to the rocker arm, and the present good state of the bearing surfaces between the two end rocker arms and the relevant parts of the rocker spindle on which they pivot, I can unequivocally state that the rocker arms cannot possibly have been seized to the point where the rockers would not move as they are supposed to. It is my opinion that for this to have happened there would have to have been metal to metal transfer between the bronze bearings of the rocker arms and the rocker spindle bearing surfaces on which the rocker arms sit, and that the mating surfaces would have to have been fused together almost as if they had been friction welded. Further, it is my opinion that had this been the case, no amount of degreasing solvent and no subsequent amount of lubrication would have freed them.

I asked Tim Smithson to remove the rocker spindle from the cylinder head, and assisted him to do this. I personally removed four more rocker arms, two from each end of the rocker spindle, and did this quite easily with finger force only, and it is more than likely that in doing so the bronze bushes in the rocker arms suffered some scratching. The rocker spindle is held in place by a total of six pedestals. I removed two more pedestals from the rocker spindle, again needing finger force only, despite the fact that the surfaces of the spindle that were revealed, where it had been cradled in the pedestals, were badly pitted by being impacted when the exhaust valves hit the pistons. It was plainly evident to me that all 12 of the rocker arms' bronze bushes were in excellent order, consistent with the engine having had over 2000 hours of running.

It is important to note here that Edward Eric Stevens' explanation of the cause of the breakage of the camshaft is predicated on his statement that the valve rockers had seized on the rocker spindle, and therefore his explanation and subsequent conclusion are erroneous. Therefore, there must be some other explanation as to the cause of the exhaust valves striking the pistons and hence to the cause of the failure of the camshaft.

Mr Stevens stated also that the oil was faulty, which lead to the failure. This may well have been correct but there was no evidence to support this contention. **The Committee knows very well that the engine's log shows that the camshaft failed only 40 engine hours after the engines' previous oil change. For the Committee to state that "This may well have been correct but there was no evidence to support this contention." is in my view grossly misleading and is a deliberate avoidance of the truth. The Committee had available to it evidence in the form of the vessel's log to decisively refute the contention that "the oil was faulty". It is my considered opinion that the fact that the members of the Committee neglected to mention this, preferring instead to carefully contrive the words "there was no evidence to support this contention" shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as IPENZ professional engineers.**

Despite these reservations about Mr Stevens **(sic)** report the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time. **In my considered opinion, given the facts that I have outlined above, it beggars belief that the members of the Investigating Committee could write that Mr Stevens' "report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

THE COMMITTEES **(sic)** DECISION

The Committee dismisses the complaint laid by Mr Morgan on the grounds of Regulation 8(c) the alleged breach is insufficiently grave to warrant further pursuit because the shortcomings as outlined above were small. **It is my considered opinion that the shortcomings were major and caused a denial of real and natural justice to Mr and Mrs Rickards, ultimately costing them well in excess of $500,000.**

THE COMMITTEE'S GENERAL COMMENT ON THE COMPLAINT.

The Committee were concerned that the complainant may not have fully disclosed his interest in the matters, and that he requested that IPENZ take actions that lay outside the regulated process for hearing complaints. These matters were put to the side by the Committee, but it wishes to state them for the record. **It is noted that despite my asking in various emails for the Committee to put in writing that two of its members had examined the valve rockers and found that they were not seized to the rocker shaft, and the Committee's refusal to do so, the Committee has still not acknowledged this fact in this report. Had the Committee done so in this report, in my professional opinion it beggars belief that the Committee could contend that "the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

Neville Beach Dist. FIPENZ
Chairman

Dated

Appendix 11 - 71122 - Letter from IPENZ enclosing decision of Chairman of Investigating Committee

IPENZ
ENGINEERS NEW ZEALAND

80071105

22 November 2007

Mr Peter Morgan
13 Stratford Avenue
Milford
Auckland

Dear Mr Morgan

Complaint against Messrs Beach, Rogers and Barclay

I wish to advise that the complaint outlined in your correspondence dated 2 October 2007, has been investigated under IPENZ Regulations for Investigation and Determination of Complaints against Members April 2005.

The Chairperson of Investigating Committees decided under Clause 9 that the complaint is dismissed on ground (d) of Clause 8, the complaint is frivolous or vexatious or is not made in good faith.

From our viewpoint this is the end of the matter and no further correspondence will be entered into.

Yours sincerely

Andrew Cleland FIPENZ
Chief Executive

Encl: Decision of Chairman of Investigating Committee

Appendix 12 - 71122 - Decision of Chairman of Investigating Committees

DECISION
OF
CHAIRMAN
OF
INVESTIGATING COMMITTEES

MORGAN
VS
BEACH, ROGERS AND BARCLAY

In accordance with:

IPENZ Regulations for Investigation and Determination of Complaints against Members April 2005

Prepared by:

Brian Hasell
Chairman of Investigating Committee

Date: 22 November 2007

1.0 BACKGROUND

1.1 I have reviewed the file on this complaint, received by letter dated 2 October 2007 and the report of the Complaints Research Officer dated 5 November.

1.2 Mr Morgan's complaint concerns the actions of all three members of an Investigating Committee set up by IPENZ to consider Mr Morgan's previous complaint against Mr Stevens FIPENZ. The complaint concerned Mr Stevens' work as an expert witness in a court case about a marine engine failure. The Investigating Committee acting under the IPENZ Regulations decided that that complaint be dismissed and not be referred to a Disciplinary Committee.

1.3 Mr Morgan alleges that the Committee has not acted with honesty, objectivity and integrity in investigating his complaint and in writing their report and that the members have not performed their duties in a careful and competent manner. He refers to Clause 4.3 of the IPENZ Rules and Rule 45 of the Chartered Professional Engineers of New Zealand Rules (No 2) 2002.

1.4 In support of his complaint Mr Morgan has annotated a copy of the Investigating Committee's report. These annotations restate his arguments presented previously to the Investigating Committee which he alleges should have been fully adopted by them, resulting in a decision in his favour and the matter proceeding to a Disciplinary Committee. Comments are also made concerning the visit made by two members of the Committee, Neil Rogers and Kelvin Barclay, to a workshop as part of their enquiries into the way Mr Stevens had carried out his task. Mr Morgan alleges that it should have been apparent from their visit that Mr Stevens had not carried out an adequate investigation as the basis for his professional opinion on the engine failure.

1.5 IPENZ has also received a copy of an email which Mr Morgan has sent to some 45 Professional Engineers attaching his complaint and soliciting their support for his views. He also offers them copies of his original complaint and the Brief of Evidence he had prepared on the engine failure that was the focus of that complaint, a Brief was not used at that time. A similar email was sent to ACENZ member firms.

1.6 IPENZ has also received a request from Mr Morgan that he cross examine members of the Committee, through the Chief Executive, regarding their actions and conclusions.

1.7 In response to the complaint Mr Neville Beach states that their investigation was thorough and complete, and detailed in their report.

2.0 DECISION

2.1 In considering whether or not to refer this complaint to an Investigating Committee I note that, while the complainant has indicated his desire for support for his view as to the cause of the engine failure, this cannot be the topic of any investigation. Rather the matter concerns the way the members of the previous committee carried out their duties, relevant to accepted IPENZ guidelines and practice in such matters. Mr Beach has offered to supply further information as to the process followed if requested.

2.2 I have concluded that, in terms of the complaint as stated above, it does concern the obligations of members and therefore IPENZ has jurisdiction over it under Rule 4.

2.3 I have considered grounds (a) to (g) for dismissal under Clause 8 of the IPENZ Disciplinary Regulations 2005. There is an applicable ground for discipline, the matter is not trivial and is a grave assertion by a person who, as a party to the previous complaint, does have a personal interest in the matters complained of. The complaint has not been withdrawn and the passage of time is not an issue.

2.4 This takes me to consideration of ground (d) "The complaint is frivolous or vexatious or is not made in good faith". The complainant has vigorously pursued the matter of the engine failure. He is obviously disappointed that his Brief of Evidence was not used and that of Mr Stevens was. He sees that as being financially unfair to other parties and continues to blame Mr Stevens for that. Now that the Investigating Committee has failed to agree with his views he has transferred some of his wrath to them and formulated a formal complaint. In parallel, he is continuing to press his views elsewhere and alludes to the future possibility of a decision by a Judge on the matter of the engine failure.

2.5 It is clear to me that the complaint is an attempt to relitigate issues already decided. It is *prima facie* vexatious and an abuse of process (i.e. in bad faith). It should not proceed any further.

2.6 I have therefore decided that the complaint be dismissed under the provisions of Clause 9 of the IPENZ Disciplinary Regulations 2005, on the grounds of Clause 8 (d).

Brian Hasell FIPENZ
Chair Investigating Committees

Date: 22 November 2007

List of Documents

IPENZ Ref No.	Dated	Description	Date Received/ Sent
80071001	2/10/07	Letter of Complaint	2/10/07
80071002	3/10/07	Letter to acknowledge receipt	3/10/07
80071003	3/10/07	Letter requesting a response	3/10/07
80071004	15/10/07	Email response to Morgan	15/10/07
80071005	2/10/07	Email to ACENZ	17/10/07
80071006	4/10/07	Email to Ardmore Classmates	17/10/07
80071007	16/10/07	Stevens Lawyer's letter to Morgan	17/10/07
80071008	17/10/07	Letter from Stevens	17/10/07
80071009	29/10/07	Response from Beach IC Chairman	29/10/07
80071101	3/11/07	Letter from Morgan	5/11/07
80071102	5/11/07	CRO Report	6/11/07

Appendix 13 - 71207 - Complaint to Registration Authority for CPEs

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
Consulting Engineer, Marine Designer, Technical Writer, Sub-editor & Technical Editor
13 Stratford Avenue
Milford
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NEW ZEALAND
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7 December 2007

Andrew Cleland
Chief Executive
Registration Authority for Chartered Professional Engineers of New Zealand
Email acleland@ipenz.org.nz

Dear Andrew

This is a formal letter of complaint, under the Chartered Professional Engineers of New Zealand Act 2002, against Neville Beach, Neil Rogers and Kelvin Barclay, all of whom are Chartered Professional Engineers who investigated and wrote the report on the formal complaint I made to IPENZ on 4 July 2006 regarding the work of IPENZ Fellow Edward Eric Stevens. I honestly believe that their report dated 10 May is in breach of their obligation under Clause 45 of the Code of Ethical Conduct for Chartered Professional Engineers:

> **45 Act with honesty, objectivity, and integrity**
>
> A chartered professional engineer must act honestly and with objectivity and integrity in the course of his or her engineering activities.

It is my considered opinion that their report is a dishonest and unethical 'whitewash' by which they have attempted to dismiss the dishonest or incompetent performance of an IPENZ Fellow. This matter is extremely serious. I am absolutely adamant that I am in no way being vexatious or frivolous in making this complaint, and for it to be dismissed for this reason would in my honestly held opinion show conclusively that the Registration Authority for Chartered Professional Engineers of New Zealand has no interest in protecting the public of New Zealand from Chartered Professional Engineers failing to act honestly and with objectivity and integrity in the course of their engineering activities.

I honestly believe that it beggars belief that the members of the Investigating Committee acted with "honesty, objectivity, and integrity" in investigating my complaint and in writing their report.

I have reproduced their report in full, with my comments inserted in the appropriate places in bold red text, on the following seven pages. It is my honestly held belief that the comments with which I have annotated their report truthfully and adequately explain, with neither frivolity nor vexation, why I believe that each one of them has failed to "act honestly and with objectivity and integrity in the course of his engineering activities."

Further, I note that Section 25 (b) of the Chartered Professional Engineers of New Zealand Act 2002 requires the Authority to "observe the rules of natural justice". These are set out in the Bill of Rights Act 1990, which applies to the activities of the Registration Authority for Chartered Professional Engineers. In particular, Section 27(1) requires a decision-maker to be impartial or disinterested in the outcome of the decision-making process. Also, natural justice generally requires the right of a person to cross-examine or test the evidence of the other side, especially in circumstances where credibility is an issue.

Accordingly, I wish to exercise my right under the Bill of Rights Act 1990 to cross examine the members about whom I am complaining. My first five cross examination questions for Messrs Barclay and Rogers are as follows:

I begin by asking that the following be emailed to both Neil Rogers and Kelvin Barclay and I seek a yes or no answer from each of them to each of the five questions. Given the simple nature of the questions and my very reasonable requirement that they answer either yes or no to each question, I believe that a fair and reasonable time-frame for their answers to be sent to me, **at the email address given on my letterhead**, is before 4pm on Friday 14 December 2007.

1. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, do you agree that the valve rockers were not seized to the rocker shaft on the day that you examined them?

2 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards using a micrometer to measure the diameter of the rocker shaft to determine if it had been machined to hide any evidence that the rocker arms had been seized to the rocker shaft, do you agree that there was no evidence that the rocker shaft had been machined or polished after the camshaft had snapped in two?

3 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arm bearing surfaces had been machined or polished after the camshaft had snapped in two?

4 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arms had ever been seized on the rocker shaft?

5. Given that you examined the engine components and the vessel's log on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and that you had previously read Eric Stevens' Brief of Evidence, do you agree that the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines?

I look forward to receiving, by email, their replies as yes or no answers (no other answers will be acceptable) before 4pm on Friday 14 December 2007.

Sincerely

Peter J. Morgan

The report of the Investigating Committee is reproduced in full, with my comments annotated in the appropriate places in bold red text, on the following eight pages:

INTRODUCTION **(Comments by Peter J. Morgan have been added in bold red text.)**

Mr Peter Morgan wrote to the Institution lodging a formal complaint against Mr Eric Stevens. The complaint alleges that Mr Stevens was incompetent in the preparation of a report on the failure of a Volvo marine engine. **This is not quite a true statement. The first sentence of my letter of complaint was as follows: "This is a formal letter of complaint about what I consider to be the professional negligence, or incompetence – it matters not to me which one it is – of Edward Eric Stevens, Fellow of IPENZ." When the facts are taken into account I do not believe that Mr Stevens could possibly be considered to have been merely incompetent. Rather, it is my considered opinion that he deliberately set out to get his clients "off the hook" and was prepared to be rather creative with the truth, in the process ignoring what the Court's Code of Conduct for Expert Witnesses and the IPENZ Code of Conduct required of him.** Mr Morgan alleges that Mr Stevens's incompetence and the resulting inaccurate report he prepared persuaded legal council **(sic)** to drop a case against one of the defendants in a court case concerning the engine failure. This lead to, in Mr Morgan's view, a failure of the justice system and the incompetent report by Mr Stevens which caused it was a breach of the obligations on Members as set out in Rule 4. **I am not at all sure that Mr Stevens was merely incompetent. I find it difficult to believe that a lay person could be that incompetent, let alone a Fellow of IPENZ. Whether or not Mr Stevens had a 'guilty mind' when he wrote as an Expert Witness in his Brief of Evidence that "The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft." or whether he was merely incompetent, remains for a Judge of the Court to determine.**

It is not explained what Mr Morgan's involvement or interest was in this case. He prepared a Brief of Evidence as an Expert Witness for one of the court cases but was not called to present it. **My interest is purely that of a truth-seeker and justice-seeker, behaving in the ethical manner in which, up until I became involved in this case, I took it for granted that all Expert Witnesses behaved. The reason I was not called to present my Brief of Evidence is that the Plaintiffs' barrister had previously succumbed to a demand from the third and fourth defendants' barrister that the Plaintiffs pay the third and fourth defendants the sum of $25,000 in a Settlement Agreement dated 23 November 2005 which removed them from the case, on the implied threat that if the Plaintiffs did not pay this sum the third and fourth defendants would be seeking to recover costs well in excess of $100,000. The Plaintiffs' barrister, realising that having rejected the evidence and findings of the plaintiffs' first Expert Witness, which was in support of his clients' case, it was his professional duty to have sought a second expert opinion before he persuaded his clients to sign the settlement agreement, asked the Plaintiffs to seek a second expert opinion. Consequently, in December 2005 I was engaged by the Plaintiffs as an Expert Witness and asked to prepare a Brief of Evidence. In January 2006 I became aware that what Mr Stevens had written in his Brief of Evidence as the cause of the catastrophic failure of the engine's camshaft was simply not true, as the valve rockers were not, and never had been, seized to their shaft. It was not until after I had had my Brief of Evidence rejected by the Plaintiffs' barrister that I learned that they had signed a Settlement Agreement the previous year. It later became apparent to me that the Plaintiffs' barrister was expecting me to produce a Brief of Evidence that agreed with Mr Stevens' findings as to the cause of catastrophic failure of the engine's camshaft. Of course, the plaintiffs' barrister is now at risk of being sued by the plaintiffs. It is my honestly held opinion that Mr Stevens was more interested in "getting his clients off the hook" than in performing his professional duties in accordance with the Code of Conduct for Expert Witnesses, and seeking to establish the truth in order to assist the Court.**

THE NATURE OF THE COMPLAINT

Mr Stevens was instructed by Grove Darlow & Partners (Solicitors) to prepare a Brief of Evidence, as an Expert Witness, on the reasons for the engine failure to be used in the Court case established to resolve liability in this matter. Mr Stevens stated that the engine failed because the valve rockers had seized on the rocker shaft leading to a catastrophic failure of the camshaft. From the evidence available to him Mr Stevens concluded that the seizing of the valve rockers to the rocker shaft was the result of the lubricating oil not being changed regularly and in accordance with the recommendations of the manufacturer. **The evidence that the valve rockers were not seized to the rocker shaft was right there in Eric Stevens' hands when he was handed two of the valve rockers from the engine on 19 August 2005 when he 'examined' it at the premises of Assessco General & Marine at Mahana Road, Hamilton, in the presence of Tim Smithson. The fact that Eric Stevens chose to make the statements that he did in his Brief of Evidence is I believe a grave breach of his duty to the Court as an Expert Witness, never mind his obligation to IPENZ under Rule 4.3:**

> **4.3 Competence obligation**
>
> **Members in the classes Distinguished Fellow, Fellow, Professional Member, Technical Member, Associate Member and Graduate Member must perform their engineering activities in a careful and competent manner, commensurate with their Membership class within the Institution (the "competence obligation").**

Mr Morgan does not agree with Mr Stevens's analysis. In his view the problem was caused by the camshaft timing gear being "two teeth out". This would presumably have been a fault at the factory. Mr Morgan does not agree that the valve rockers seized on the rocker shaft. **And neither do Neil Rogers and Kelvin Barclay, the two members of the IPENZ Investigating Committee who examined the port engine at the premises of Assessco General & Marine on 19 November 2006, witnessed by Tim Smithson and Dave Rickards, but nowhere in this report is this fact stated. It is my considered opinion that the fact that this sentence in the report is written in the way it is implies that the writer of the report agrees with Mr Stevens "that the valve rockers seized on the rocker shaft."**

This difference in professional opinion lead to the complaint. **Whether or not the valve rockers were seized on the rocker shaft is definitely not a matter of professional opinion. Rather, it is a matter of fact that they were not and never had been. This was pointed out to IPENZ in one of my letters to its CEO, Andrew Cleland. I would never have spent so much time and effort arguing over a mere matter of professional opinion.** Mr Morgan alleges that Mr Stevens's analysis of the reasons for the motor failure were wrong and that he was incompetent to the degree that Mr Morgan considered that Mr Stevens had breached the obligation on Members. The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one.

THE COMMITTEE'S VIEW OF THE TECHNCIAL MATTERS

Mr Morgan's complaint is basically that Mr Stevens's analysis was wrong and incompetent. This view is based on Mr Morgan's analysis being correct and therefore Mr Stevens must be wrong. **This statement by the Committee is absolutely not true. My complaint against**

Edward Eric Stevens had nothing to do with whether or not my analysis of the engine's failure is correct. Rather, my statement that Mr Stevens' analysis is wrong is based purely on the facts that

1. **the valve rockers were not, and never had been, seized to the rocker shaft, and**
2. **the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines.**
3. **The Volvo factory-recommended oil change interval is 100 hours, or once each year if the motor has not run 100 hours in a year.**

Mr Morgan's view is that the engine's camshaft timing gear was "two teeth out" and that this lead eventually to the engine failure. Based on the evidence available to the Committee they do not accept that this is a plausible theory. There is evidence to show that this engine did usually perform satisfactorily and the Committee contends that it could not have done so under the conditions that Mr Morgan alleges. **The Committee, in my opinion, has no basis for this contention. Besides, the Committee in the very next paragraph of its report states that its role is not to "review the cause of the failure". In my professional opinion, a compression ignition 4-stroke diesel engine will indeed run when its valves are mis-timed as described, as both valves are closed when the piston is at or near top dead centre and the fuel is injected. However, its fuel economy will suffer a little and it will smoke more than it should. Both of these traits were evident in the engine in question, which always smoked more and used more fuel than its counterpart on the starboard side.**
My Brief of Evidence does not contain a 'theory'. Rather, it sets out a carefully thought through analysis of all of the material evidence, which still exists, and establishes the fact that for the whole of the time that the port engine had been running in the vessel, its camshaft timing gear had been two teeth retarded.

THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT

The role of the Committee was to examine Mr Stevens's behaviour, not review the cause of the failure. **This sentence completely contradicts the last sentence of the previous section, namely** "The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one." **One statement precludes the other. The only valid method of assessing Mr Stevens' competence is by the members of the Investigating Committee themselves determining the cause of the failure.** The test on Mr Stevens was the quality of the work he performed. **The only valid test of the quality of the work Mr Stevens performed is whether he correctly identified the cause of the failure in a manner consistent with sound engineering principles (as opposed, for example, to just guessing). Before the members of the Committee can determine whether Mr Stevens correctly identified the cause of the failure, they must first determine for themselves the cause of the failure. This they have clearly failed to do.** The Committee consider that Mr Stevens has conducted his enquiry in a generally professional manner. **It beggars belief that the Investigating Committee could make this last statement, when two of its three members had been witnessed seeing for themselves that the valve rockers were not, and never had been, seized to the rocker shaft. The same two members had also had the opportunity to see for themselves the vessel's log, which clearly shows that the port engine's camshaft snapped in two only 40 hours past the engines' (yes, the apostrophe is in the correct place, as both the port and starboard engines had their oil changed at the same time) previous oil change, proving conclusively that the oil could not possibly have been faulty. For the members of the Investigating Committee to write that they** "consider that Mr Stevens

has conducted his enquiry in a generally professional manner" **shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.**

The Committee is, however, critical of some aspects of his report. Given his late involvement in the case, Mr Stevens was forced to rely on the testimony of other persons. He placed great weight on the evidence that the valve rockers had seized on the rocker shaft. **There was no evidence that "the valve rockers had seized on the rocker shaft." and Neil Rogers and Kelvin Barclay both know it. For them to imply that there was shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.** This evidence was that of three engineers who examined the motor after the failure. **I have checked with two members of IPENZ, one a former president of IPENZ, who have both said that it is well accepted within the engineering profession that when members of the profession refer to people as being engineers they mean other professional engineers. I have previously asked the CEO of IPENZ to ask the members of the Investigating Committee to confirm that the three 'engineers' mentioned are actually professional engineers, and they have not been able to do so, presumably because they are not. I should add that to the best of the combined knowledge of Dave Rickards, Tim Smithson and myself, only three members of IPENZ have inspected the engine in question, namely Eric Stevens, Neil Rogers and Kelvin Barclay. However, we know that three other people, namely Grant Allen, Peter Jacobs, and John Booker, have inspected the engine. According to their respective Briefs of Evidence, Grant Allen qualified as an automotive technician and Peter Jacobs qualified as a fitter and turner, and most certainly neither holds a qualification entitling him to professional membership of IPENZ. Neither does John Booker, who witnessed for himself soon after the original failure that the rocker arms were free to move on the rocker shaft. The motor was dismantled in his workshop.**
Mr Stevens does not make it sufficiently clear in his report that he was unable to witness the seized valve rockers for himself. **It is my contention that this last sentence misleadingly implies that the members of the Investigating Committee agree that the valve rockers *were* seized on the rocker shaft. In my opinion, the statement by the Investigating Committee that "Mr Stevens was forced to rely on the testimony of other persons" in regard to the valve rockers' being seized on the rocker shaft is not only a gross distortion of the facts, but also patently untrue. Mr Stevens was definitely not forced to rely on the testimony of other persons. Rather, he was engaged as a professional Expert Witness in a very serious Court case and he had a professional obligation both to his professional body (IPENZ) and to the Court to conduct his examination of the engine in a thoroughly professional manner. This he clearly failed to do. The facts are as follows:**

1 In his Brief of Evidence dated 22 November 2005, Grant Allen, the National Service Manager for Volpower New Zealand Limited and an expert witness for the third and fourth defendants in Rickard Bros. vs Bladerunner et al., said in clause 86: "On 19 November 2003 I travelled to Mr Smithson's workshop in Hamilton to view the failed engine." In clause 101 he goes on to say: "….. On inspecting the rocker shaft assembly, I found that all rocker arms were very tight to move on the shaft. An employee of Mr Smithson's assisted me with a big hammer and removed two rocker arms for me to inspect."

2 The fact that Grant Allen described the rocker arms as being "very tight to move on the shaft" and the fact that Mr Smithson's employee removed two

rocker arms for him to inspect are very clear illustrations that Grant Allen saw for himself on 19 November 2003 that the rocker arms were not "seized to the rocker shaft."

3 The first two clauses in the Summary of Conclusions in Edward Eric Stevens' Brief of Evidence dated 18 November 2005 contradict the aforegoing first-hand observation of Grant Allen, as follows:

> **"150 The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.**
> **151 The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely."**

4 Edward Eric Stevens, Grant Allen, the National Service Manager for Volpower New Zealand Limited, the Volvo Penta importer/distributor, and Peter Jacobs, the managing director of Ovlov Marine Limited, the Volvo Penta dealer in Auckland, were present at the premises of Assessco General & Marine at Mahana Road, Hamilton, on 19 August 2005 in the presence of Tim Smithson. Two valve rockers were removed from the rocker shaft and handed to Edward Eric Stevens, who inspected them and passed them on to Grant Allen and Peter Jacobs in turn for their inspection. Just as the two members of the IPENZ Investigating Committee, Messrs Neil Rogers and Kelvin Barclay, did when they inspected the engine at Assessco on 18 November 2006, Mr Stevens, Mr Allen and Mr Jacobs could see for themselves that the plain bearing surfaces were in extremely good condition, with no sign of their ever having been seized. Both of these events were witnessed by Tim Smithson.

Whether or not Mr Stevens had a 'guilty mind' when he wrote as an Expert Witness in his Brief of Evidence that "The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft." or whether he was merely incompetent, remains for a Judge of the Court to determine.

The explanation as to how it came to be that when I inspected the rocker shaft and rocker arms during the three visits I made to Tim Smithson's workshop in early 2006, the rocker arms were in fact not "very tight" but very free to move on the rocker shaft, is detailed in clause 11 of my Brief of Evidence, a copy of which I forwarded to IPENZ with my original complaint on 4 July 2006, as follows:

> **11. As mentioned in paragraph 3 above, the engine components were partially assembled, without valve springs. Recalling that I had read in Edward Eric Stevens' brief of evidence that the valve rockers were seized on the rocker spindle, I tried rotating each of the 12 rocker arms on the rocker spindle and found them to rotate freely. This is contrary to the statement contained in the Brief of Evidence of Edward Eric Stevens at paragraph 151, which I quote in full as follows:**
> ***"151. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft."***

I removed a rocker arm from each end of the rocker spindle. In each instance the rocker arm slid off easily, with light finger force only. I was completely satisfied that there was no evidence of their having been seized on the rocker spindle, and there was no evidence of excessive wear.
I asked Tim Smithson and Dave Rickards to explain what had happened that Edward Eric Stevens could state that the rocker arms were seized to their rocker spindle and yet they were now not seized but moved freely. Dave Rickards replied that on 23 May 2003, soon after Silver Wing's port engine had broken down and the vessel was tied up at the wharf at Tairua, he had removed the rocker cover and had observed that the rocker arms and spindle had been covered in oil, and that he had checked a few of the rocker arms and had found them to move freely on the rocker spindle. He asked his daughter to operate the starter while he observed the rocker shaft, and from this he concluded that the camshaft had broken between no. 1 and no. 2 cylinders. He said that at his request Pacific Coast Marine had removed the port engine from the boat and that he had been present when John Booker, proprietor of Pacific Coast Marine, partially dismantled it in Pacific Coast Marine's workshop, in order to observe the reason for failure and to assess the cost of repairs. When the timing cover was removed, the short front piece of the camshaft fell out. John Booker then made a fairly long telephone call, after which he told him that 'the reason for the camshaft failure was overloading causing overheating, this causing stretching of the valves to the extent that they hit the pistons'. Dave Rickards submitted an insurance claim, and the assessor Chris Laird inspected the engine on 3 July 2003. The insurance company's letter of rejection was received by Dave on 21 July 2003. The engine was stored at Pacific Coast Marine in Whitianga until 23 July 2003, on which date Dave Rickards took it to his farm at Hikuai where he wrapped some of the components in Gladwrap. He said that Tim Smithson had come to his farm workshop on 5 November 2003 and two days later the engine components were transported to the workshop of Assessco General & Marine in Hamilton.
Tim Smithson said that when the rocker spindle assembly had been delivered to his workshop the parts were devoid of oil, as if they had been soaked in a degreasing chemical, and that was the condition they were in on both of the occasions when Edward Eric Stevens had visited. Tim Smithson said that on 21 November 2003 when he took the photo (marked AB-14 in his report dated 20 December 2003) of the rocker shaft with the rockers mounted on it and made the caption, he thought that the rocker arms were, as his photo caption says, "*seized to the rocker shaft*". I should point out here that the rocker spindle assembly had been soaked in a degreasing solvent and had been left to dry for many months before Edward Eric Stevens' first inspection on 19 August 2005. He said that since Edward Eric Stevens' last visit on 7 September 2005, he, Tim Smithson, had occasionally dribbled engine oil down the lubricating hole on the top of each rocker arm, with the result that all 12 of the rocker arms now move freely, just as they are designed to do. Given that it takes a force of approximately 300 newtons (equivalent to a weight of about 30 kg) to compress one of the valve springs, which force is transferred on to the rocker arm, and the present good state of the bearing surfaces between the two end rocker arms and the relevant parts of the rocker spindle on which they pivot, I can unequivocally state that the rocker arms cannot possibly have been seized to the point where the rockers would not move as they are supposed to. It is my opinion that for this to have happened there would have

to have been metal to metal transfer between the bronze bearings of the rocker arms and the rocker spindle bearing surfaces on which the rocker arms sit, and that the mating surfaces would have to have been fused together almost as if they had been friction welded. Further, it is my opinion that had this been the case, no amount of degreasing solvent and no subsequent amount of lubrication would have freed them.

I asked Tim Smithson to remove the rocker spindle from the cylinder head, and assisted him to do this. I personally removed four more rocker arms, two from each end of the rocker spindle, and did this quite easily with finger force only, and it is more than likely that in doing so the bronze bushes in the rocker arms suffered some scratching. The rocker spindle is held in place by a total of six pedestals. I removed two more pedestals from the rocker spindle, again needing finger force only, despite the fact that the surfaces of the spindle that were revealed, where it had been cradled in the pedestals, were badly pitted by being impacted when the exhaust valves hit the pistons. It was plainly evident to me that all 12 of the rocker arms' bronze bushes were in excellent order, consistent with the engine having had over 2000 hours of running.

It is important to note here that Edward Eric Stevens' explanation of the cause of the breakage of the camshaft is predicated on his statement that the valve rockers had seized on the rocker spindle, and therefore his explanation and subsequent conclusion are erroneous. Therefore, there must be some other explanation as to the cause of the exhaust valves striking the pistons and hence to the cause of the failure of the camshaft.

Mr Stevens stated also that the oil was faulty, which lead to the failure. This may well have been correct but there was no evidence to support this contention. **The Committee knows very well that the engine's log shows that the camshaft failed only 40 engine hours after the engines' previous oil change. For the Committee to state that "This may well have been correct but there was no evidence to support this contention." is in my view grossly misleading and is a deliberate avoidance of the truth. The Committee had available to it evidence in the form of the vessel's log to decisively refute the contention that "the oil was faulty". It is my honestly held opinion that the fact that the members of the Committee neglected to mention this, preferring instead to carefully contrive the words "there was no evidence to support this contention" shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.**

Despite these reservations about Mr Stevens **(sic)** report the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time. **It is my honestly held opinion that, given the facts that I have outlined above, it beggars belief that the members of the Investigating Committee could write that Mr Stevens' "report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

THE COMMITTEES **(sic)** DECISION

The Committee dismisses the complaint laid by Mr Morgan on the grounds of Regulation 8(c) the alleged breach is insufficiently grave to warrant further pursuit because the shortcomings as outlined above were small. **It is my honestly held opinion that the**

shortcomings were major and caused a denial of real and natural justice to Mr and Mrs Rickards, ultimately costing them well in excess of $500,000.

THE COMMITTEE'S GENERAL COMMENT ON THE COMPLAINT.

The Committee were concerned that the complainant may not have fully disclosed his interest in the matters, and that he requested that IPENZ take actions that lay outside the regulated process for hearing complaints. These matters were put to the side by the Committee, but it wishes to state them for the record. **It is noted that despite my asking in various emails for the Committee to put in writing that two of its members had examined the valve rockers and found that they were not seized to the rocker shaft, and the Committee's refusal to do so, the Committee has still not acknowledged this fact in this report. Had the Committee done so in this report, in my honestly held opinion it beggars belief that the Committee could contend that "the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

Neville Beach Dist. FIPENZ
Chairman

Dated

Appendix 14 - 80325 - Letter from IPENZ enclosing decision of Investigating Committee

IPENZ
ENGINEERS NEW ZEALAND

90080302

25 March 2008

Mr Peter Morgan
13 Stratford Avenue
Milford
Auckland

Dear Mr Morgan

Complaint against Messrs Beach, Rogers and Barclay

I wish to advise that the complaint from you against Messrs Beach, Rogers and Barclay outlined in your correspondence dated 7 December 2007, has been investigated.

Mr Beach is not a Chartered Professional Engineer, and we have no jurisdiction to investigate his actions under the CPEng Act. Concerning the complaints against Messrs Rogers and Barclay, the Alternate Chairperson of the Investigating Committee has determined as follows: under Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Rule 57(c) the complaints are frivolous or vexatious. Therefore the complaints are dismissed.

Upon considering the documentation that had been submitted by all parties the Chairperson did not consider that an existence of a difference of opinion can be taken as a lack of objectivity of one party and that there was no evidence that might substantiate a lack of honesty or integrity of Messrs Rogers and Barclay.

If you disagree with the decision of the Alternative Chairperson of the Investigating Committee you have an opportunity to appeal the decision. Appeals must be lodged with the Chairperson of the CPEng Council in accordance with the enclosed regulations within 28 days of notification of the decision to be appealed.

The contact address for the CPEng Council is:

The Chairperson
Chartered Professional Engineers Council
PO Box 3058
WELLINGTON

Yours sincerely

Charles Willmot FIPENZ CPEng
Director - Engineering

Encl: Chairman of Investigating Committee Decision
Section 35 - 38 of the Chartered Professional Engineers of New Zealand Act 2002
Chartered Professional Engineers of New Zealand (Appeals) Regulations 2002

This letter is issued by IPENZ in partial fulfilment of its roles as the Registration Authority under the Chartered Professional Engineers of New Zealand Act 2002

Appendix 15 - 80317 - Decision of Chairman of Investigating Committees

CHAIRMAN
OF
INVESTIGATING COMMITTEES
DECISION

PETER J MORGAN
VS
NEIL ROGERS AND KELVIN BARCLAY

In accordance with:

Chartered Professional Engineers of New Zealand Rules (No 2) 2002

Prepared by:

Graham Ramsay FIPENZ CPEng

Alternative Chair of Investigating Committee

Date: 17 March 2008

1. INTRODUCTION

1.1 Peter J Morgan in a letter dated 7 December 2007to the Chief Executive of IPENZ brought a complaint against Neville Beach FIPENZ, Kelvin Barclay CPEng FIPENZ and Neil Rogers CPEng alleging that, in preparing an IPENZ Investigating Committee report on the complaint Peter Morgan vs. Edward Stevens FIPENZ, they were in breach of their obligations under Clause 45 of the Code of Ethical Conduct for Chartered Professional Engineers.

1.2 Andrew Clark IPENZ Complaints Research Officer (CRO) has completed and Initial Investigation Report dated 28 February 2008.

1.3 The Initial Investigation Report noted that as Neville Beach was not CPEng a complaint could not be brought against Mr Beach under the CPEng Rules.

1.4 In a telephone conversation with IPENZ Director – Engineering Charles Willmot on 7 March 2008 I was asked whether I was prepared to be assigned as Investigation Committee Chairman to the complaint Peter Morgan vs. Neil Rogers and Kelvin Barclay.

1.5 After reviewing the Complaint and Initial Investigation Report I advised Mr. Willmot of my willingness to be assigned to the complaint.

2. ANALYSIS OF THE COMPLAINT

2.1 In clause 1.8 of the Initial Investigation Report the CRO refers to Mr Morgan's first complaint against the members of the Investigating Committee and states "This was investigated under the IPENZ Regulations 2005 and dismissed on the grounds of clause 8(d) the complaint is frivolous or vexatious or not made in good faith".

2.2 This report relates to the second complaint by Mr. Morgan against the members of the Investigating Committee and in particular to the complaints against both Mr. Barclay and Mr. Rogers.

2.3 Clause 45 of the Code of Ethical Conduct for Chartered Professional Engineers contained with the Chartered Professional Engineers of New Zealand Rules (No 2) 2002 states

> 45 Act with honesty, objectivity and integrity
>
> A chartered professional engineer must act honestly and with objectivity and integrity in the course of his or her engineering activities

2.4 Having reviewed Mr. Morgan's complaint of 7 December 2007 my conclusion is that he has not produced any evidence to show that the Investigating Committee or Messrs Barclay and Rogers individually acted dishonestly, without objectivity or without integrity. He has not provided any evidence of conflicts of interest on the part of Mr Barclay and Mr Rogers which might substantiate a lack of honesty or integrity.

2.5 I note the statement of the CRO at clause 3.8 of the Initial Investigation Report that

> "I have reviewed the documentation in the file of the previous complaint and have found no evidence that the Investigating Committee have performed their role other than with honesty, objectivity and integrity."

2.6 Mr. Morgan's complaint of 7 December 2007 on the basis of lack of objectivity by Messrs Barclay and Roger's appears to arise from Mr. Morgan's holding different opinions from the Investigating Committee both on Mr. Steven's original report and on their conclusions from their investigations.

2.7 I do not have the expertise to consider the technical aspects of the annotations made by Mr. Morgan on the Investigating Committee's Report in his complaint. However, I do not consider that the existence of a difference of opinion can be taken as evidence of a lack of objectivity of one party.

2.8 Further, with regard to the alleged breach by Messrs Barclay and Rogers of Rule 45, I note the discussion of Clause 3.7 of the Initial Investigation Report where the CRO states

> "It is my view "that the [sic] Mr. Rogers and Mr. Barclay were not acting "in the course of [their] engineering activities", but rather they were acting in a quasi-judicial capacity...

2.9 I have been provided with the legal opinion obtained by IPENZ on which the CRO's view quoted in 2.8 is based.

3. DECISION

3.1 I concur with the Recommendation at Clause 4 of the Initial Investigation Report

3.2 Accordingly, as required under Rule 58 (d) of the Chartered Professional Engineers of New Zealand Rules (No 2) 2002, I have made a decision.

3.3 My decision is that the complaints Morgan vs. Barclay and Morgan vs. Rogers should be dismissed on the grounds of:

i. Rule 57 (a) as there is no applicable ground of discipline under section 21 (1) (a) to (d) of the Act; and that even if there was an applicable ground under 21 (1) :

ii. Under Rule 57(c) the complaints are frivolous or vexatious.

Graham Ramsay
Alternate Chair of Investigating Committee
17 March 2008

Documentation

IPENZ Ref No.	Dated	Description	Date Received/ Sent
90071201	7/12/07	Complaint from Mr Morgan	7/12/07
90080101	15/01/08	Letter to Mr Rogers	15/01/08
90080200	4/02/08	Response from Mr Rogers	8/02/08
90080201	28/2/08	CRO Report	28/2/08

IPENZ Ref No.	Dated	Description	Date Received/ Sent
91071201	7/12/07	Complaint from Mr Morgan	7/12/07
91080101	15/01/08	Letter to Mr Barclay	15/01/08
91080200	4/02/08	Response from Mr Barclay	8/02/08
90080201	28/2/08	CRO Report	28/2/08

Appendix 16 - 80428 - Letter to Registration Authority for CPEngs

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28 April 2008

Dr Andrew Cleland
Chief Executive
Registration Authority for Chartered Professional Engineers of New Zealand
Email acleland@ipenz.org.nz

Dear Dr Cleland

As you are aware, the Registration Authority for Chartered Professional Engineers of New Zealand has rejected my formal complaint, dated 7 December 2007, under the Chartered Professional Engineers of New Zealand Act 2002, against Neil Rogers and Kelvin Barclay, who investigated and together with the chairman of the investigating committee wrote the report on the formal complaint I made to IPENZ on 4 July 2006 regarding the work of IPENZ Fellow Edward Eric Stevens. The rejection was notified to me in a letter dated 25 March 2008 in a letter signed by Charles Willmot, in which he stated:

> "Concerning the complaints against Messrs Rogers and Barclay, the Alternate Chairperson of the Investigating Committee has determined as follows: under Chartered Professional Engineers of New Zealand Rules (No 2) 2002, Rule 57C the complaints are frivolous and vexatious. Therefore the complaints are dismissed.
>
> On considering the documentation that had been submitted by all parties the Chairperson did not consider that an existence of a difference of opinion can be taken as a lack of objectivity of one party and that there was no evidence that might substantiate a lack of honesty or integrity of Messrs Rogers and Barclay."

With respect, the Registration Authority for Chartered Professional Engineers of New Zealand is not yet entitled to make such a ruling, because it has failed to observe the rules of natural justice, as required of it in Part 2 Section 25 of the Chartered Professional Engineers of New Zealand Act 2002 and set out in the Ministry of Justice guidelines to the Bill of Rights Act 1990 on this URL: http://www.justice.govt.nz/pubs/reports/2004/bill-of-rights-guidelines/section27.html#section27.1 Copied and pasted from this web page is this guideline:

Cross-examination – natural justice generally requires the right of a person to cross-examine or test the evidence of the other side, especially in circumstances where credibility is an issue.

In this case, it is my contention that credibility is most certainly an issue – Messrs Rogers and Barclay were observed to experience for themselves that the operational movement of the engine's rocker arms on the rocker shaft was and still is perfectly normal and that their plain bearing surfaces were and still are in pristine condition, and yet any reader of their report could be forgiven for believing

that the rocker arms ***were and still are*** seized to the rocker shaft, as stated by Mr Stevens in his Brief of Evidence. It is my considered opinion therefore, that their report is an orchestrated litany of deceit. That is precisely why I insist on exercising my right under the Bill of Rights Act 1990 to cross-examine Messrs Rogers and Barclay, through the Chief Executive Officer or through the Alternate Chairperson of the Investigating Committee – it matters not to me which one of them performs this function, as long as the five cross-examination questions are answered with honesty and integrity, under oath as in a Court. A denial of natural justice can never be considered to be a frivolous matter and I am most certainly not being vexatious – vigorously seeking truth and justice, yes, but definitely not vexatious.

The Bill of Rights Act 1990 takes precedence over any and all rules and procedures that the Registration Authority for Chartered Professional Engineers of New Zealand may wish to apply to the way in which it deals with any formal complaint.

With respect, it is simply not credible for the Alternate Chairperson of the Investigating Committee to make the claim that "there was no evidence that might substantiate a lack of honesty or integrity of Messrs Rogers and Barclay" The evidence was contained in my five cross-examination questions. All the Alternate Chairperson of the Investigating Committee had to do was put my five questions to Messrs Rogers and Barclay. It is my contention that the fact that neither Mr Rogers nor Mr Barclay has answered any of my five cross-examination questions is proof that they have not acted with honesty and integrity. It is also my contention that when they do answer my five cross-examination questions with honesty and integrity they will prove that they previously, in signing off on the report of their investigation, did not act with honesty and integrity.

You will recall that in my letter of formal complaint, dated 7 December 2007, was the following:

> "Accordingly, I wish to exercise my right under the Bill of Rights Act 1990 to cross examine the members about whom I am complaining. My first five cross examination questions for Messrs Barclay and Rogers are as follows:
>
> I begin by asking that the following be emailed to both Neil Rogers and Kelvin Barclay and I seek a yes or no answer from each of them to each of the five questions. Given the simple nature of the questions and my very reasonable requirement that they answer either yes or no to each question, I believe that a fair and reasonable time-frame for their answers to be sent to me, **at the email address given on my letterhead**, is before 4pm on Friday 14 December 2007.
>
> 1. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, do you agree that the valve rockers were not seized to the rocker shaft on the day that you examined them?
> 2 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards using a micrometer to measure the diameter of the rocker shaft to determine if it had been machined to hide any evidence that the rocker arms had been seized to the rocker shaft, do you agree that there was no evidence that the rocker shaft had been machined or polished after the camshaft had snapped in two?
> 3 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arm bearing surfaces had been machined or polished after the camshaft had snapped in two?

4 Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arms had ever been seized on the rocker shaft?

5. Given that you examined the engine components and the vessel's log on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and that you had previously read Eric Stevens' Brief of Evidence, do you agree that the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines?

I look forward to receiving, by email, their replies as yes or no answers (no other answers will be acceptable) before 4pm on Friday 14 December 2007."

Please note that no response whatsoever was forthcoming to the formal request under the Bill of Rights Act 1990 to exercise my right to cross-examine the persons about whom I had complained.

Further, please note that only when the Registration Authority for Chartered Professional Engineers of New Zealand has received the answers to my five cross-examination questions and considered them, is it legally entitled to decide whether or not my complaints were frivolous or vexatious.

Further, please note that my complaints did not arise merely from "an existence of a difference of opinion". Rather, they arose from a difference between what Mr Stevens said was fact and what I said was fact – as explained in my comments and annotations to the report of the first Investigating Committee that investigated my complaint against Mr Stevens, reproduced below in full. This is why it is imperative that Messrs Barclay and Rogers answer the five cross-examination questions that I have put to them. This will dispel any doubt as to whether or not they agree with Mr Stevens that the valve rockers are seized to the rocker shaft. Only if they do agree with Mr Stevens that the valve rockers are seized to the rocker shaft can they state with honesty and integrity that "Mr Stevens has conducted his enquiry in a generally professional manner" as they did in their report. Should they agree with me, as they were witnessed so to do at the time that they made their examination of the engine components, that the valve rockers are free to move on the rocker shaft as they would in normal operation of the engine, then it would not be possible for any Chartered Professional Engineer to be acting with honesty and integrity while stating that "Mr Stevens has conducted his enquiry in a generally professional manner". Also, Mr Stevens stated in his Brief of Evidence that the engine oil lubricating properties had deteriorated to the point that the valve rockers progressively seized to the rocker shaft and that this happened because the operator had pursued a policy of extended oil change intervals, past the factory recommended "use by" period of 100 hours of engine operation. The vessel's log book shows that the engine's camshaft suffered a catastrophic failure by breaking in two at only 40 hours past the previous oil change. On this point, Mr Stevens and I are quite clearly not arguing over a matter of opinion. Rather, we are in effect arguing over a matter of fact – Mr Stevens is in effect arguing that 40 is a number that is more than 100 and I am arguing that 40 is a number that is less than 100. Nothing could be further from an opinion than this, and there are no prizes for being able to figure out which one of us is correct!

Sincerely
Peter J. Morgan

The report by Messrs Barclay and Rogers and signed off by Neville Beach, together with my comments on it, are reproduced as Appendix A on the following 8 pages:

APPENDIX A

INTRODUCTION (Comments by Peter J. Morgan have been added in bold red text.)

Mr Peter Morgan wrote to the Institution lodging a formal complaint against Mr Eric Stevens. The complaint alleges that Mr Stevens was incompetent in the preparation of a report on the failure of a Volvo marine engine. **This is not quite a true statement. The first sentence of my letter of complaint was as follows: "This is a formal letter of complaint about what I consider to be the professional negligence, or incompetence – it matters not to me which one it is – of Edward Eric Stevens, Fellow of IPENZ." When the facts are taken into account I do not believe that Mr Stevens could possibly be considered to have been merely incompetent. Rather, it is my considered opinion that he deliberately set out to get his clients "off the hook" and was prepared to be rather creative with the truth, in the process ignoring what the Court's Code of Conduct for Expert Witnesses and the IPENZ Code of Conduct required of him.** Mr Morgan alleges that Mr Stevens's incompetence and the resulting inaccurate report he prepared persuaded legal council **(sic)** to drop a case against one of the defendants in a court case concerning the engine failure. This lead to, in Mr Morgan's view, a failure of the justice system and the incompetent report by Mr Stevens which caused it was a breach of the obligations on Members as set out in Rule 4. **I am not at all sure that Mr Stevens was merely incompetent. I find it difficult to believe that a lay person could be that incompetent, let alone a Fellow of IPENZ. Whether or not Mr Stevens had a 'guilty mind' when he wrote as an Expert Witness in his Brief of Evidence that "The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft." or whether he was merely incompetent, remains for a Judge of the Court to determine.**

It is not explained what Mr Morgan's involvement or interest was in this case. He prepared a Brief of Evidence as an Expert Witness for one of the court cases but was not called to present it. **My interest is purely that of a truth-seeker and justice-seeker, behaving in the ethical manner in which, up until I became involved in this case, I took it for granted that all Expert Witnesses behaved. The reason I was not called to present my Brief of Evidence is that the Plaintiffs' barrister had previously succumbed to a demand from the third and fourth defendants' barrister that the Plaintiffs pay the third and fourth defendants the sum of $25,000 in a Settlement Agreement dated 23 November 2005 which removed them from the case, on the implied threat that if the Plaintiffs did not pay this sum the third and fourth defendants would be seeking to recover costs well in excess of $100,000. The Plaintiffs' barrister, realising that having rejected the evidence and findings of the plaintiffs' first Expert Witness, which was in support of his clients' case, it was his professional duty to have sought a second expert opinion before he persuaded his clients to sign the settlement agreement, asked the Plaintiffs to seek a second expert opinion. Consequently, in December 2005 I was engaged by the Plaintiffs as an Expert Witness and asked to prepare a Brief of Evidence. In January 2006 I became aware that what Mr Stevens had written in his Brief of Evidence as the cause of the catastrophic failure of the engine's camshaft was simply not true, as the valve rockers were not, and never had been, seized to their shaft. It was not until after I had had my Brief of Evidence rejected by the Plaintiffs' barrister that I learned that they had signed a Settlement Agreement the previous year. It later became apparent to me that the Plaintiffs' barrister was expecting me to produce a Brief of Evidence that agreed with Mr Stevens' findings as to the cause of catastrophic failure of the engine's camshaft. Of course, the plaintiffs' barrister is now at risk of being sued by the plaintiffs. It is my honestly held opinion**

that Mr Stevens was more interested in "getting his clients off the hook" than in performing his professional duties in accordance with the Code of Conduct for Expert Witnesses, and seeking to establish the truth in order to assist the Court.

THE NATURE OF THE COMPLAINT

Mr Stevens was instructed by Grove Darlow & Partners (Solicitors) to prepare a Brief of Evidence, as an Expert Witness, on the reasons for the engine failure to be used in the Court case established to resolve liability in this matter. Mr Stevens stated that the engine failed because the valve rockers had seized on the rocker shaft leading to a catastrophic failure of the camshaft. From the evidence available to him Mr Stevens concluded that the seizing of the valve rockers to the rocker shaft was the result of the lubricating oil not being changed regularly and in accordance with the recommendations of the manufacturer. **The evidence that the valve rockers were not seized to the rocker shaft was right there in Eric Stevens' hands when he was handed two of the valve rockers from the engine on 19 August 2005 when he 'examined' it at the premises of Assessco General & Marine at Mahana Road, Hamilton, in the presence of Tim Smithson. The fact that Eric Stevens chose to make the statements that he did in his Brief of Evidence is I believe a grave breach of his duty to the Court as an Expert Witness, never mind his obligation to IPENZ under Rule 4.3:**

> **4.3 Competence obligation**
>
> **Members in the classes Distinguished Fellow, Fellow, Professional Member, Technical Member, Associate Member and Graduate Member must perform their engineering activities in a careful and competent manner, commensurate with their Membership class within the Institution (the "competence obligation").**

Mr Morgan does not agree with Mr Stevens's analysis. In his view the problem was caused by the camshaft timing gear being "two teeth out". This would presumably have been a fault at the factory. Mr Morgan does not agree that the valve rockers seized on the rocker shaft. **And neither do Neil Rogers and Kelvin Barclay, the two members of the IPENZ Investigating Committee who examined the port engine at the premises of Assessco General & Marine on 19 November 2006, witnessed by Tim Smithson and Dave Rickards, but nowhere in this report is this fact stated. It is my considered opinion that the fact that this sentence in the report is written in the way it is implies that the writer of the report agrees with Mr Stevens "that the valve rockers seized on the rocker shaft."**

This difference in professional opinion lead to the complaint. **Whether or not the valve rockers were seized on the rocker shaft is definitely not a matter of professional opinion. Rather, it is a matter of fact that they were not and never had been. This was pointed out to IPENZ in one of my letters to its CEO, Andrew Cleland. I would never have spent so much time and effort arguing over a mere matter of professional opinion.** Mr Morgan alleges that Mr Stevens's analysis of the reasons for the motor failure were wrong and that he was incompetent to the degree that Mr Morgan considered that Mr Stevens had breached the obligation on Members. The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one.

THE COMMITTEE'S VIEW OF THE TECHNCIAL MATTERS

Mr Morgan's complaint is basically that Mr Stevens's analysis was wrong and incompetent. This view is based on Mr Morgan's analysis being correct and therefore Mr Stevens must be wrong. **This statement by the Committee is absolutely not true. My complaint against Edward Eric Stevens had nothing to do with whether or not my analysis of the engine's failure is correct. Rather, my statement that Mr Stevens' analysis is wrong is based purely on the facts that**

1. **the valve rockers were not, and never had been, seized to the rocker shaft, and**
2. **the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines.**
3. **The Volvo factory-recommended oil change interval is 100 hours, or once each year if the motor has not run 100 hours in a year.**

Mr Morgan's view is that the engine's camshaft timing gear was "two teeth out" and that this lead eventually to the engine failure. Based on the evidence available to the Committee they do not accept that this is a plausible theory. There is evidence to show that this engine did usually perform satisfactorily and the Committee contends that it could not have done so under the conditions that Mr Morgan alleges. **The Committee, in my opinion, has no basis for this contention. Besides, the Committee in the very next paragraph of its report states that its role is not to "review the cause of the failure". In my professional opinion, a compression ignition 4-stroke diesel engine will indeed run when its valves are mis-timed as described, as both valves are closed when the piston is at or near top dead centre and the fuel is injected. However, its fuel economy will suffer a little and it will smoke more than it should. Both of these traits were evident in the engine in question, which always smoked more and used more fuel than its counterpart on the starboard side.**
My Brief of Evidence does not contain a 'theory'. Rather, it sets out a carefully thought through analysis of all of the material evidence, which still exists, and establishes the fact that for the whole of the time that the port engine had been running in the vessel, its camshaft timing gear had been two teeth retarded.

THE COMMITTEE'S VIEW OF MR STEVENS'S REPORT

The role of the Committee was to examine Mr Stevens's behaviour, not review the cause of the failure. **This sentence completely contradicts the last sentence of the previous section, namely** "The Committee interpreted the nature of the complaint as being under the competence obligation, rather than the ethical one." **One statement precludes the other. The only valid method of assessing Mr Stevens' competence is by the members of the Investigating Committee themselves determining the cause of the failure.** The test on Mr Stevens was the quality of the work he performed. **The only valid test of the quality of the work Mr Stevens performed is whether he correctly identified the cause of the failure in a manner consistent with sound engineering principles (as opposed, for example, to just guessing). Before the members of the Committee can determine whether Mr Stevens correctly identified the cause of the failure, they must first determine for themselves the cause of the failure. This they have clearly failed to do.** The Committee consider that Mr Stevens has conducted his enquiry in a generally professional manner. **It beggars belief that the Investigating Committee could make this last statement, when two of its three members had been witnessed seeing for themselves that the valve rockers were not, and never had been, seized to the rocker shaft. The same two members had also had the opportunity to see for themselves the vessel's log, which clearly shows that the port engine's camshaft snapped in two**

only 40 hours past the engines' (yes, the apostrophe is in the correct place, as both the port and starboard engines had their oil changed at the same time) previous oil change, proving conclusively that the oil could not possibly have been faulty. For the members of the Investigating Committee to write that they "consider that Mr Stevens has conducted his enquiry in a generally professional manner" **shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.**

The Committee is, however, critical of some aspects of his report. Given his late involvement in the case, Mr Stevens was forced to rely on the testimony of other persons. He placed great weight on the evidence that the valve rockers had seized on the rocker shaft. **There was no evidence that "the valve rockers had seized on the rocker shaft." and Neil Rogers and Kelvin Barclay both know it. For them to imply that there was shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.** This evidence was that of three engineers who examined the motor after the failure. **I have checked with two members of IPENZ, one a former president of IPENZ, who have both said that it is well accepted within the engineering profession that when members of the profession refer to people as being engineers they mean other professional engineers. I have previously asked the CEO of IPENZ to ask the members of the Investigating Committee to confirm that the three 'engineers' mentioned are actually professional engineers, and they have not been able to do so, presumably because they are not. I should add that to the best of the combined knowledge of Dave Rickards, Tim Smithson and myself, only three members of IPENZ have inspected the engine in question, namely Eric Stevens, Neil Rogers and Kelvin Barclay. However, we know that three other people, namely Grant Allen, Peter Jacobs, and John Booker, have inspected the engine. According to their respective Briefs of Evidence, Grant Allen qualified as an automotive technician and Peter Jacobs qualified as a fitter and turner, and most certainly neither holds a qualification entitling him to professional membership of IPENZ. Neither does John Booker, who witnessed for himself soon after the original failure that the rocker arms were free to move on the rocker shaft. The motor was dismantled in his workshop.**
Mr Stevens does not make it sufficiently clear in his report that he was unable to witness the seized valve rockers for himself. **It is my contention that this last sentence misleadingly implies that the members of the Investigating Committee agree that the valve rockers *were* seized on the rocker shaft. In my opinion, the statement by the Investigating Committee that "Mr Stevens was forced to rely on the testimony of other persons" in regard to the valve rockers' being seized on the rocker shaft is not only a gross distortion of the facts, but also patently untrue. Mr Stevens was definitely not forced to rely on the testimony of other persons. Rather, he was engaged as a professional Expert Witness in a very serious Court case and he had a professional obligation both to his professional body (IPENZ) and to the Court to conduct his examination of the engine in a thoroughly professional manner. This he clearly failed to do. The facts are as follows:**

1 In his Brief of Evidence dated 22 November 2005, Grant Allen, the National Service Manager for Volpower New Zealand Limited and an expert witness for the third and fourth defendants in Rickard Bros. vs Bladerunner et al., said in clause 86: "On 19 November 2003 I travelled to Mr Smithson's workshop in Hamilton to view the failed engine." In clause 101 he goes on to say: "….. On inspecting the rocker shaft assembly, I found that all rocker arms were very

tight to move on the shaft. An employee of Mr Smithson's assisted me with a big hammer and removed two rocker arms for me to inspect."

2 The fact that Grant Allen described the rocker arms as being "very tight to move on the shaft" and the fact that Mr Smithson's employee removed two rocker arms for him to inspect are very clear illustrations that Grant Allen saw for himself on 19 November 2003 that the rocker arms were not "seized to the rocker shaft."

3 The first two clauses in the Summary of Conclusions in Edward Eric Stevens' Brief of Evidence dated 18 November 2005 contradict the aforegoing first-hand observation of Grant Allen, as follows:

> **"150 The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft.**
> **151 The valve rockers seized as a result of lubrication problems arising from the exhaustion in service of the chemical additives upon which all modern engine oils rely."**

4 Edward Eric Stevens, Grant Allen, the National Service Manager for Volpower New Zealand Limited, the Volvo Penta importer/distributor, and Peter Jacobs, the managing director of Ovlov Marine Limited, the Volvo Penta dealer in Auckland, were present at the premises of Assessco General & Marine at Mahana Road, Hamilton, on 19 August 2005 in the presence of Tim Smithson. Two valve rockers were removed from the rocker shaft and handed to Edward Eric Stevens, who inspected them and passed them on to Grant Allen and Peter Jacobs in turn for their inspection. Just as the two members of the IPENZ Investigating Committee, Messrs Neil Rogers and Kelvin Barclay, did when they inspected the engine at Assessco on 18 November 2006, Mr Stevens, Mr Allen and Mr Jacobs could see for themselves that the plain bearing surfaces were in extremely good condition, with no sign of their ever having been seized. Both of these events were witnessed by Tim Smithson.

Whether or not Mr Stevens had a 'guilty mind' when he wrote as an Expert Witness in his Brief of Evidence that "The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft." or whether he was merely incompetent, remains for a Judge of the Court to determine.

The explanation as to how it came to be that when I inspected the rocker shaft and rocker arms during the three visits I made to Tim Smithson's workshop in early 2006, the rocker arms were in fact not "very tight" but very free to move on the rocker shaft, is detailed in clause 11 of my Brief of Evidence, a copy of which I forwarded to IPENZ with my original complaint on 4 July 2006, as follows:

> **11. As mentioned in paragraph 3 above, the engine components were partially assembled, without valve springs. Recalling that I had read in Edward Eric Stevens' brief of evidence that the valve rockers were seized on the rocker spindle, I tried rotating each of the 12 rocker arms on the rocker spindle and found them to rotate freely. This is contrary to the statement contained**

in the Brief of Evidence of Edward Eric Stevens at paragraph 151, which I quote in full as follows:

"151. The ultimate failure of the camshaft and hence of the engine was brought about by the increased camshaft driving loads arising from the progressive seizing of the valve rockers on their mounting shaft."

I removed a rocker arm from each end of the rocker spindle. In each instance the rocker arm slid off easily, with light finger force only. I was completely satisfied that there was no evidence of their having been seized on the rocker spindle, and there was no evidence of excessive wear.

I asked Tim Smithson and Dave Rickards to explain what had happened that Edward Eric Stevens could state that the rocker arms were seized to their rocker spindle and yet they were now not seized but moved freely. Dave Rickards replied that on 23 May 2003, soon after Silver Wing's port engine had broken down and the vessel was tied up at the wharf at Tairua, he had removed the rocker cover and had observed that the rocker arms and spindle had been covered in oil, and that he had checked a few of the rocker arms and had found them to move freely on the rocker spindle. He asked his daughter to operate the starter while he observed the rocker shaft, and from this he concluded that the camshaft had broken between no. 1 and no. 2 cylinders. He said that at his request Pacific Coast Marine had removed the port engine from the boat and that he had been present when John Booker, proprietor of Pacific Coast Marine, partially dismantled it in Pacific Coast Marine's workshop, in order to observe the reason for failure and to assess the cost of repairs. When the timing cover was removed, the short front piece of the camshaft fell out. John Booker then made a fairly long telephone call, after which he told him that 'the reason for the camshaft failure was overloading causing overheating, this causing stretching of the valves to the extent that they hit the pistons'. Dave Rickards submitted an insurance claim, and the assessor Chris Laird inspected the engine on 3 July 2003. The insurance company's letter of rejection was received by Dave on 21 July 2003. The engine was stored at Pacific Coast Marine in Whitianga until 23 July 2003, on which date Dave Rickards took it to his farm at Hikuai where he wrapped some of the components in Gladwrap. He said that Tim Smithson had come to his farm workshop on 5 November 2003 and two days later the engine components were transported to the workshop of Assessco General & Marine in Hamilton.

Tim Smithson said that when the rocker spindle assembly had been delivered to his workshop the parts were devoid of oil, as if they had been soaked in a degreasing chemical, and that was the condition they were in on both of the occasions when Edward Eric Stevens had visited. Tim Smithson said that on 21 November 2003 when he took the photo (marked AB-14 in his report dated 20 December 2003) of the rocker shaft with the rockers mounted on it and made the caption, he thought that the rocker arms were, as his photo caption says, "*seized to the rocker shaft*". I should point out here that the rocker spindle assembly had been soaked in a degreasing solvent and had been left to dry for many months before Edward Eric Stevens' first inspection on 19 August 2005. He said that since Edward Eric Stevens' last visit on 7 September 2005, he, Tim Smithson, had occasionally dribbled engine oil down the lubricating hole on the top of each rocker arm, with the result that all 12 of the rocker arms now move

freely, just as they are designed to do. Given that it takes a force of approximately 300 newtons (equivalent to a weight of about 30 kg) to compress one of the valve springs, which force is transferred on to the rocker arm, and the present good state of the bearing surfaces between the two end rocker arms and the relevant parts of the rocker spindle on which they pivot, I can unequivocally state that the rocker arms cannot possibly have been seized to the point where the rockers would not move as they are supposed to. It is my opinion that for this to have happened there would have to have been metal to metal transfer between the bronze bearings of the rocker arms and the rocker spindle bearing surfaces on which the rocker arms sit, and that the mating surfaces would have to have been fused together almost as if they had been friction welded. Further, it is my opinion that had this been the case, no amount of degreasing solvent and no subsequent amount of lubrication would have freed them.

I asked Tim Smithson to remove the rocker spindle from the cylinder head, and assisted him to do this. I personally removed four more rocker arms, two from each end of the rocker spindle, and did this quite easily with finger force only, and it is more than likely that in doing so the bronze bushes in the rocker arms suffered some scratching. The rocker spindle is held in place by a total of six pedestals. I removed two more pedestals from the rocker spindle, again needing finger force only, despite the fact that the surfaces of the spindle that were revealed, where it had been cradled in the pedestals, were badly pitted by being impacted when the exhaust valves hit the pistons. It was plainly evident to me that all 12 of the rocker arms' bronze bushes were in excellent order, consistent with the engine having had over 2000 hours of running.

It is important to note here that Edward Eric Stevens' explanation of the cause of the breakage of the camshaft is predicated on his statement that the valve rockers had seized on the rocker spindle, and therefore his explanation and subsequent conclusion are erroneous. Therefore, there must be some other explanation as to the cause of the exhaust valves striking the pistons and hence to the cause of the failure of the camshaft.

Mr Stevens stated also that the oil was faulty, which lead to the failure. This may well have been correct but there was no evidence to support this contention. **The Committee knows very well that the engine's log shows that the camshaft failed only 40 engine hours after the engines' previous oil change. For the Committee to state that "This may well have been correct but there was no evidence to support this contention." is in my view grossly misleading and is a deliberate avoidance of the truth. The Committee had available to it evidence in the form of the vessel's log to decisively refute the contention that "the oil was faulty". It is my honestly held opinion that the fact that the members of the Committee neglected to mention this, preferring instead to carefully contrive the words "there was no evidence to support this contention" shows conclusively that they did not act with "impartiality, honesty and integrity" as they are required to do as Chartered Professional Engineers.**

Despite these reservations about Mr Stevens **(sic)** report the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time. **It is my honestly held opinion that, given the facts that I have outlined above, it beggars belief that the members of the Investigating Committee could write that Mr Stevens' "report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

THE COMMITTEES **(sic)** DECISION

The Committee dismisses the complaint laid by Mr Morgan on the grounds of Regulation 8(c) the alleged breach is insufficiently grave to warrant further pursuit because the shortcomings as outlined above were small. **It is my honestly held opinion that the shortcomings were major and caused a denial of real and natural justice to Mr and Mrs Rickards, ultimately costing them well in excess of $500,000.**

THE COMMITTEE'S GENERAL COMMENT ON THE COMPLAINT.

The Committee were concerned that the complainant may not have fully disclosed his interest in the matters, and that he requested that IPENZ take actions that lay outside the regulated process for hearing complaints. These matters were put to the side by the Committee, but it wishes to state them for the record. **It is noted that despite my asking in various emails for the Committee to put in writing that two of its members had examined the valve rockers and found that they were not seized to the rocker shaft, and the Committee's refusal to do so, the Committee has still not acknowledged this fact in this report. Had the Committee done so in this report, in my honestly held opinion it beggars belief that the Committee could contend that "the Committee believes that his report represents a reasonable analysis of the failure based on the evidence available to him at the time."**

Neville Beach Dist. FIPENZ
Chairman

Appendix 17 - 80428 - Letter to IPENZ Board members

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
Consulting Engineer, Marine Designer, Technical Writer, Sub-editor & Technical Editor
13 Stratford Avenue
Milford
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28 April 2008

The IPENZ Board
C/- The President
Email: President@ipenz.org.nz

Wellington

Attention: Mr Bas Walker

Dear Mr Walker

On 4 July 2006, I made a complaint to IPENZ, under IPENZ rules, about the actions of Eric Stevens, FIPENZ, in preparing a Brief of Evidence relating to the catastrophic breaking in two of a marine engine's camshaft. As a consequence of this Brief of Evidence, which I consider grossly wrong in fact, unprofessional and unethical, Mr D. & Mrs R. Rickards who depended on the marine engine for their livelihood, have been severely affected, and have lost approximately $500,000 all told, so far.

The standard of the investigation and report prepared by the Investigating Committee (consisting of Neville Beach, Kevin Barclay and Neil Rogers), which exonerated Eric Stevens, falls far short of what any professional organisation should consider acceptable. As can be seen in the two yellow-highlighted sections of the Investigation Report that are in the appendix attached to my latest letter to Dr Cleland (pages 5 & 6), the Investigating Committee says first that the complaint regards *competence*, then almost immediately says the *cause of the failure* is irrelevant!

In my professional opinion, the only finding a reasonable professional could come to, given the physical evidence of the engine, and its log book, both of which Messrs Barclay and Rogers are known to have witnessed, would have been to *uphold the complaint.*

Subsequently, when I complained under both IPENZ and CPEng rules about Messrs Barclay and Rogers, regarding their performance on the Investigating Committees, these complaints were dismissed as 'frivolous and vexatious,' with the claim that there was no supporting evidence.

If the five questions that I put forward to accompany the CPEng complaint (reproduced on pages 2 & 3 of my latest letter to Dr Cleland, attached) are not evidence, what is? Neither Mr Barclay nor Mr Rogers will answer them. Why?

At no time in this series of 'findings' issued by IPENZ have the crucial physical facts of this case ever been addressed, even though independent witnesses can testify that Messrs Barclay and Rogers are fully aware of them. It is my professional opinion that this is unconscionable behaviour in any process purporting to uphold ethical and professional standards and the public good.

What are you, as an IPENZ Board member, going to do about this blatant disregard for the IPENZ Code of Ethics and natural justice?

Sincerely
Peter J. Morgan

Attached: emailed letter to Dr Cleland of 28 April 2008

Appendix 18 - 80428 - Letter to the Chartered Professional Engineers Council

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
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28 April 2008

The Chartered Professional Engineers of New Zealand Council
C/- Warwick Bishop - EO – CPEC email: sherwick@gmail.com

Attention: Mr Stephen Reindler
Chairman

Dear Mr Reindler

I wish to bring to your attention the actions of the Registration Authority for Professional Engineers in denying me my right to natural justice, as set out in my letter dated 28 April 2008, to the Authority's CEO, Andrew Cleland, a copy of which is attached to the same email as this letter, and which I ask that you take the time to read and consider its implications for the profession of engineering.

I have also written to the IPENZ board and have attached a copy.

The behaviour detailed is in my opinion not the way a professional body should perform in dealing with genuine, serious complaints about members of its profession. The attached letters speak for themselves.

What is the Chartered Professional Engineers of New Zealand Council going to do about it?

Sincerely
Peter J. Morgan

Attached: emailed letter of 28 April 2008 to Dr Cleland
emailed letter of 28 April 2008 to the IPENZ Board

Appendix 19 - 80516 - Letter from Bas Walker, President of IPENZ

IPENZ
ENGINEERS NEW ZEALAND

The Institution of Professional Engineers New Zealand Inc *Pūtahi Kaiwetepanga Ngaio o Aotearoa*
Ground Floor, 158 The Terrace, PO Box 12 241, Wellington 6144, New Zealand
T 64 4 473 9444 F 64 4 474 8933 E ipenz@ipenz.org.nz www.ipenz.org.nz

16 May 2008

Mr Peter Morgan
13 Stratford Avenue
Milford
Auckland

Dear Mr Morgan

I acknowledge your letter of 28 April 2008. Our Chief Executive, Dr Andrew Cleland has briefed me on the extensive investigations that have been carried out in response to your two complaints. I note that in the second case you were informed of the rights of appeal to the Chartered Professional Engineers Council.

In the view of the governing Board, your first complaint under IPENZ jurisdiction against Mr Stevens was properly dealt with according to our disciplinary regulations. In the case of the second under CPEng jurisdiction, the Chartered Professional Engineers Council peruses the files on all closed cases as part of its assessment as to whether we have exercised our responsibilities as Registration Authority correctly. They will notify us if they have any concerns about the investigation carried out.

We appreciate that the outcomes of the investigations are not those you consider should have been arrived at. However, we are confident in the quality and integrity of the people who undertook the investigations on our behalf, and that they provided reasonable opportunity for you to present your concerns about Mr Steven's work to them.

From our viewpoint these matters are now closed.

Yours sincerely

Dr Bas Walker DistFIPENZ
President

Appendix 20 - 80607 - Letter to each IPENZ Board member

Peter J. Morgan **B.E. (Mech.) Dip. Teaching**
Consulting Engineer, Marine Designer, Technical Writer, Sub-editor & Technical Editor
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7 June 2008

The IPENZ Board:
Bas Walker, email: President@ipenz.org.nz
Andrew Wilson, email: deputypresident@ipenz.org.nz
Garry Macdonald, email: vicepresident@ipenz.org.nz
Jeff Jones, email: jonesesn@xtra.co.nz
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Steve Abley, email: christchurch@abley.com
Debbie Scott, email: debbie@onfire.co.nz

Dear Board members

I acknowledge receipt of the letter of 16 May 2008 signed by the President of the Board. A scanned copy of this letter is attached.

How can you, personally, defend any of IPENZ's actions regarding this whole affair?

As a result of a seriously flawed Brief of Evidence prepared by a Fellow of the Institution, a flawed brief that has directly led to an honest, hardworking family losing almost half a million dollars, I laid a complaint under IPENZ's own rules about that Fellow, Eric Stevens.

The complaint was not based on a clash of opinions; it was based solely upon indisputable physical evidence. Yet at no time was this indisputable physical evidence, which the Investigating Committee members Neil Rogers and Kelvin Barclay are known by independent witnesses to be aware of, addressed in the written decision that dismissed the complaint. Why? Because to have addressed this indisputable physical evidence would have forced them to uphold the complaint.

This refusal to address indisputable evidence in any professional investigation is indefensible.

My subsequent complaints under both IPENZ and CPEng rules against these Investigating Committee members for their own unprofessional actions have been dismissed in a high handed and contemptuous manner, again without the slightest regard for the overwhelming, indisputable evidence upon which these subsequent complaints were made.

At every stage of this affair, IPENZ's representatives have been in contempt of due process, natural justice and even the Bill of Rights Act 1990, which guarantees the right to cross-examination.

For Eric Steven's Brief of Evidence to be of an acceptable professional standard, it is my honestly held belief that the valve rockers would have to be seized through friction welding onto the rocker shaft, and I cannot imagine that any competent Mechanical Engineer would think otherwise.

But the valve rockers are not seized onto the rocker shaft. Rather, they move freely, just as they were designed to do, and their bearing surfaces are in pristine condition. Further, the vessel's log shows that both engines had an oil change only 40 hours before the port engine failure.

Both Neil Rogers and Kelvin Barclay know these facts, but make no mention of them in the Investigating Committee reports.

That is why I included the following five straightforward cross-examination questions in my complaint about Neil Rogers and Kelvin Barclay under CPEng rules:

1. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, do you agree that the valve rockers were not seized to the rocker shaft on the day that you examined them?
2. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards using a micrometer to measure the diameter of the rocker shaft to determine if it had been machined to hide any evidence that the rocker arms had been seized to the rocker shaft, do you agree that there was no evidence that the rocker shaft had been machined or polished after the camshaft had snapped in two?
3. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arm bearing surfaces had been machined or polished after the camshaft had snapped in two?
4. Given that you examined the engine components on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and were witnessed by Tim Smithson and Dave Rickards, do you agree that there was no evidence that the rocker arms had ever been seized on the rocker shaft?
5. Given that you examined the engine components and the vessel's log on 15 November 2006 in Tim Smithson's workshop in Mahara Road, Hamilton, and that you had previously read Eric Stevens' Brief of Evidence, do you agree that the vessel's log shows that the port engine's camshaft failed only 40 engine hours after an oil change had been performed on both engines?

These questions clearly show that there is overwhelming evidence to uphold every complaint I have made, yet they were not answered, and my complaints were dismissed with contempt. How can you personally defend these actions by IPENZ's representatives?

A copy of this letter has been sent to the secretary of the Chartered Professional Engineers Council with a request that it be forwarded to each member of the Council.

Sincerely
Peter J. Morgan

Appendix 21 - 80610 - CPEC reply

CPEC Chartered Professional Engineers Council
Kāhui Kaiwetepanga Ngaio Whaimana

Mr. Peter J Morgan
13 Stratford Avenue
Milford
NORTH SHORE CITY - 0620

10 June 2008

Dear Mr. Morgan

Thank you for your letters of 28 April 2008 and 7 June 2008.

The matters raised therein were discussed at last week's Council meeting.

In the case you have raised with the Council an appeal was not received within the 28 days required by statute.

As no appeal was lodged in this matter the Council is unable to consider your complaint in a "quasi-judicial" capacity.

However, the Council does look at the functions of the Registration Authority and reviews their processes on each complaint received after the statutory period for an appeal has passed.

This process will be followed in the case you outline and the issues you have raised will be discussed with the Registration Authority.

Yours sincerely

Warwick Bishop – Executive Officer

Chartered Professional Engineers Council

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Website: www.cpec.org.nz Email: executiveofficer@cpec.org.nz

Appendix 22 – Optimech Report

Optimech International Ltd

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ISO 9001: 2008
Lic QEC 21442
Telarc SAI

Report No: 09-162: Assessment of Silver Wing Port Engine Camshaft Failure

14th September 2010

Client: David Rickards	
Postal Address: P.O. Box 20080 Hamilton	Address: 63 Mahana Road Hamilton 3241
Phone: 07 849-5895	Mob: 027 288-6481
Client Ref No: Claim No 721006833	E-Mail Assessco@xtra.co.nz

1. Introduction

The Silver Wing was a commercial surveyed vessel used for a combination of commercial fishing and recreational diving expeditions. The vessel was owned and operated by Rickards Bros Maramarua (1992) Ltd. The vessel was equipped with twin KAD-43P 230 hp Volvo Penta marine engines, model designation number KAD-43P. The port engine serial number is 2204300968. A failure of the port engine occurred on the 23rd May 2003 after accumulating only 2129 service hours.

Background information on the Silver Wing port engine was as follows:

- A number of mechanical problems had occurred with the port engine prior to catastrophic failure. It has been noted that there was an original coolant leak from the port engine while being sea trialled on Auckland Harbour when the vessel was being given its pre-delivery check prior to being finally signed off. There were also two occasions when the cylinder head had been removed to rectify engine coolant leaks into the crankcase. This occurred after 607 hours on 7/12/98 and 1212 hours on 24/12/00. On 23/5/03 after 2129 engine hours, the port engine camshaft failed.
- The total maximum weight of the Silver Wing vessel was around 13 tonnes. This includes the weight of the vessel, fuel weight, water, two engines, and two stern-drive units. There is an additional weight intermittently comprising of up to 16 divers and associated diving equipment which would add up to an additional 5 tonnes (approximately).
- Approximately 40 hours prior to camshaft failure, the port engine had undergone a full service by an authorised New Zealand Volvo Penta engine service agent.
- The port engine from new, used 25% to 30% more fuel than the starboard engine.
- A report was commissioned from Young Petroleum Consulting on 8/12/2005 to examine the engine parts and prior oil service history. This firm found no evidence that the parts had been damaged by oil depletion or breakdown.

- Rickards Bros Maramarua (1992) Ltd was unable to reach a satisfactory agreement with the New Zealand Volvo Penta and service agent, and this matter eventually went to the High Court for adjudication.
- The defendants' expert Mr Eric Stevens claimed the causation of failure was the seizure of the rocker arms on the rocker shaft and an improper oil change schedule. He argued that the plaintiffs did not follow a proper procedure of oil change intervals as recommended by the Volvo Penta maintenance manual.
- The plaintiffs' expert Mr Timothy H. Smithson concluded that the main reason for failure was a "Latent Defect" due to the engine's valve timing gears being in the 'two teeth retarded" position, which resulted in the exhaust valves impacting the piston crowns. This caused cyclical shock stress on the camshaft, every time a piston reached the top of its stroke.
- The plaintiffs engaged a second expert, Mr Peter J. Morgan, to perform an independent investigation and write a Brief of Evidence. Mr Morgan concluded that the cause of the failure of the camshaft was fatigue in torsion due to a Latent Defect in the assembly of the engine's valve timing gears, these being in the '*two teeth retarded*' position, which resulted in the exhaust valves impacting the piston crowns, causing cyclical torsional shock stress on the camshaft every time a piston reached the top of its stroke.

A second identical engine failure had occurred on a separate vessel. This is referred to as the "Callagher" engine. The background to this failure was as follows:

- This engine is an identical model KAD-43P as the Silver Wing engine.
- This engine serial number is 2204301767 which shows that it was the 799th engine manufactured after the Silver Wing's port engine in that series of engines.
- The Callagher engine had experienced a camshaft failure after only 1200 service hours.
- At the time of failure, the total weight of the Callagher vessel was approximately 4 tonnes. This included the weight of the vessel, full fuel load, water, other equipment, one engine, and a stern-drive unit. The Callagher engine had failed in an identical manner but in a shorter service time than the Silver Wing engine.
- Service history and engine oil analysis were not available for the "Callagher" vessel but it was believed to have been serviced to schedule. The owner is a quadriplegic; so all scheduled services were performed by the service agents.

Optimech International Ltd was commissioned to carry out a detailed review of these two similar engine failures. As part of the review, an additional examination of the key engine parts was to be carried out. Previous reports prepared by Mr Eric Stevens and Dr Joe Gregory on these failures were to be reviewed. Engine valve gear components from two marine vessels, the Silver Wing owned by Rickards Bros Maramarua (1992) Ltd and another engine, the Callagher engine, were subsequently submitted for examination. The parts received from the two engines were the respective timing gears, pistons, pushrods, valves, and complete camshaft and rocker shaft assemblies.

2. Examination and Testing

A visual examination was carried out on the components as received, using stereo bench binoculars up to a magnification of x 50. The results were as follows:

2.1. Silver Wing Engine

The main damaged components of the port engine were found to be the camshaft, rocker arm, camshaft timing gear, crankshaft timing gear, fuel injection pump timing drive gear, idle timing gear and the six pistons.

2.1.1. Camshaft Timing Gear

On the non-driving side of the teeth, examination showed the presence of pitting and spalling (Figure 1). The distribution of damage circumferentially around the gears is non-uniform. However, there is a regular pattern of wear, with seven minor pitted teeth between each group of severely (spalled and pitted) damaged teeth (Figure 2). In total there are six equi-spaced groups of severely damaged teeth (six teeth in each group) on the camshaft timing gear, approximately 60° apart.

On the driving side of the teeth, severe plastic yielding (peening / rolling) damage is present along with pitting and spalling (Figure 4). Burrs are formed on the top and bottom (root area) of the teeth. In locations consistent with the non-driving side, there are also six equi-spaced groups of severely (plastic yielded, pitted and spalled) damaged teeth (six teeth in each group) between each group of minor pitted teeth, approximately 60° apart (Figure 4).

2.1.2. Crankshaft Timing Gear

On the driving side, there is minor pitting present just under the pitch line of the tooth face (Figure 5). The damage is localised at three equi-spaced groups of damaged teeth (three teeth in each group) which are 120° apart (Figure 6). There is no damage observed on the non-driving side of the teeth.

2.1.3. Fuel Injection Pump Timing Gear

Pitting and scoring were present on both sides (driving and non-driving) of the gear teeth, (Figure 7 and Figure 8). The damage distribution pattern is similar to the camshaft timing gear but to a lesser extent. There are six equi-spaced groups of damaged teeth which are in alignment with the severe (plastic yielded, pitted and spalled) damaged teeth on the camshaft gear on the drive side (Figure 9).

2.1.4. Idler Timing Gear (commonly referred to as a Hunting Gear)

Severe spalling had occurred over the entire surface of every single tooth on the driving side (Figure 10). The non-driving side of the teeth showed superficial scratching only (Figure 11).

2.1.5. Camshaft

The camshaft has fractured. Examination showed that the break angle is approximately 15° to 30° to the cross section that is perpendicular to the camshaft axis (Figure 12). Such an angle of fracture clearly shows that the predominant loading was torsional. The position of the break is at the point of expected highest torsional loading.

On the fracture surface, there is a nucleus (crack origin) position identified, (Figure 13). By reassembling the parts, it was found that the likely source of crack origin is adjacent to the attachment lug near the corner. There is a stress concentration in this area from the root radius and this would magnify local stresses. The crack has initiated at this position and progressed into the final rupture zone. The fracture surface is rough. There is no direct evidence of beach marking associated with a fatigue crack mechanism present on the fracture surface but the initiation is likely to be fatigue. Generally, cast iron fatigue failures do not exhibit beach markings. The overall fracture mechanism is classified as torsional fatigue.

2.1.6. Rocker Assembly

The examination showed that the tappet screws on all the exhaust valves' rocker arms were more severely bent than the tappet screws on all the inlet valves' rocker arms. The most severely bent tappet screw was the number 3 exhaust valve tappet screw. After sliding the rocker arms and other components off from the rocker shaft, it can be seen that there is only minor scoring and fretting on the rocker shaft surface. There was no surface damage evidence to suggest that the rocker arms had seized to the rocker shaft. In fact, the rocker arms could be spun freely on the rocker shaft. No damage is visible on the other rocker assembly components.

2.2. Callagher Engine

2.2.1. Camshaft Timing Gear Failure

On both the convex driving and non-driving sides of the teeth there are destructive pitting and spalling features present (Figure 14). The level of damage to the teeth is less severe than that observed for the Silver Wing components (Figure 15). The distribution of damage is similar to that found on the Silver Wing. There is a regular pattern of wear, with seven severely (spalled and pitted) damaged teeth between each group of undamaged teeth. In total there are six equi-spaced groups of severely damaged teeth (six teeth in each group) on the camshaft timing gear which are approximately 60° apart. No plastic yielding was observed on either driving or non-driving sides of the teeth.

2.2.2. Crankshaft Timing Gear

This gear was in good condition with only minor pitting present (Figure 18).

2.2.3. Fuel Injection Pump Timing Gear

Pitting and scoring was present on both sides (driving and non-driving) of the gear teeth, (Figure 19 and Figure 20). The damage distribution pattern is similar to that on the camshaft timing gear but to a lesser extent (Figure 21). There are six equi-spaced groups of teeth severely damaged (spalled and pitted) on their driving side which align with the teeth whose driving sides are severely damaged (spalled and pitted) on the camshaft gear.

2.2.4. Idler Timing Gear (commonly referred to as a Hunting Gear)

Only light superficial scratching is visible on both driving and non-driving sides of the teeth (Figure 22).

2.2.5. Camshaft

The mode of failure of the camshaft was identical to that of the Silver Wing's camshaft. The failure is typical of torsional fatigue (Figure 23 and Figure 24).

2.2.6. Rocker Assembly

It was observed that the tappet screws on all the exhaust valves' rocker arms were bent more than the tappet screws on all the inlet valves' rocker arms. The degree of bending was not as severe when compared to the Silver Wing's tappet screws. After removing the rocker arms and other components from the rocker shaft, light scoring and fretting were observed on the rocker shaft surface. There was no surface damage evidence to suggest that the rocker arms had seized to the rocker shaft. In fact, the rocker arms could be spun freely on the rocker shaft. The degree of damage present on the rocker shaft was less than that found on the Silver Wing's rocker shaft. No damage was visible on the other rocker assembly components.

3. Review of Mr Eric Stevens' Evidence

A review of Mr Stevens' evidence was undertaken. This review was limited to the material failure of the engine and to its oil change history. The design, commissioning and vessel operating aspects of this report were excluded as these issues are beyond the scope of the Optimech International Ltd brief.

The main conclusion from Mr Stevens' assessment was that the failure of the camshaft was caused by the increased camshaft driving loads arising from the progressive seizure of the valve rockers on the rocker shaft as a result of breakdown of the lubricating oil.

This mode of failure can be discounted for the following reasons:

1. The damage distribution across the camshaft timing gears is not uniform and damage cannot be attributed to lack of lubrication or breakdown of inhibitors. Gears that are subjected to lubrication oil breakdown due to excessive load or exhaustion of the oil chemical additives would be expected to produce uniform and even wear patterns on all the gear teeth on the driving side of the timing gears.

2. The presence of abnormal wear on the non-driving side of the gears indicates abnormal loading in service. An engine that is operating correctly would not be expected to have any damage present on the non-driving side of the teeth in the gear train. The presence of this damage can only be caused by repeated engine obstruction over the service life of the engine.

3. There is no direct evidence of lubrication breakdown or additive depletion on the engine components. Young Petroleum Consulting concluded from the Silver Wing engine components that there was no evidence of sludge build up in the engine, carbon build up on piston crowns or pitting on the camshaft lobes which could have indicated that the engine had been operated with degraded oil or that the safety margin of the oil had been exceeded.

4. Examination of oil service records in the Silver Wing's vessel log showed approximately 18 oil changes over 2130 hours. The average oil change interval was 118 hours. This servicing interval average was above the recommended oil change service interval recommended by the Volvo agents of 100 hours. Within this oil change schedule there were periods where oil was changed more frequently and others where oil changes were carried out at nearly double the recommended period. The report undertaken by Young Petroleum Consulting shows that engine lubrication was not a significant contributor to engine failure. Mr Young found no evidence of sludge build up in the engine, carbon build up on the piston crowns or pitting on the camshaft lobes to indicate that the engine had been operated with degraded oil or that the safety margin of the oil had been exceeded. If engine lubrication had been an issue it would have been expected that the starboard engine's camshaft would have experienced a similar demise, as it was always serviced at the same time.

5. The indentation markings on the pistons were visible on the exhaust valve side only. If the rocker arms had seized on the rocker spindle then it would be expected that the valves would be held down, in which case both the inlet and exhaust valves would have impacted the piston crowns. Further, there were no witness marks to show that the rocker arms had seized at any time. The seizure of the rocker arms was not a factor in the failure of the camshaft. Mr Stevens is fundamentally incorrect in his assessment and the forensic evidence does not support his theory on failure mode.

4. Review of the Dr Joe Gregory report

The report by Dr Gregory from Material Engineering reference review is dated 16 August 2006 MESL Project No. 754. The report concluded that the camshaft failure was due to bending overload as a result of engine debris becoming entrapped between the camshaft drive gear and the idler gear. It was also concluded that the wear, gouging and fretting observed on the camshaft drive gear teeth was due to contaminated engine oil.

This mode of failure can be discounted for the following reasons:

1. Engine camshaft failures in normal operational service are very rare. Generally the design of the timing gears is such that camshafts are subjected to only moderate loadings in service. It is highly improbable that abnormal loadings generated by the timing gears as a result of material lodged between the gear teeth would be sufficient to transmit and initiate cracking in the camshaft. In this situation the damage would be isolated to the gear teeth. Bending failure on a camshaft is

impossible because the design and support of the camshaft does not allow a bending load to be applied in the manner proposed by Dr Gregory.

2. A bending overload failure would result in a break angle of 90° to the camshaft axis. This will not generate a sigmoidal breakage as proposed by Dr Gregory. The description of the failure mode by Dr Gregory is in error. Once this report was available to the plaintiffs, Timothy H. Smithson decided to do a destructive bending test on the Callagher camshaft to simulate this failure as proposed by Dr Gregory. This test showed that a bend overload failure generates a fracture at 90° to the camshaft axis. This is shown in Figure 25 from the Nissan Diesel Motor Co. "Classification and Analysis of Metal Part Failures" Pub. No. AMUDA88E/00.

3. All previous investigations show no sign of damage to the camshaft support bearings. The supporting arrangement of the rocker shaft does not allow bending loads to be applied without damage to the bearings occurring.

4. The regular distribution of damage on some gear teeth only cannot be attributed to contaminated oil. This mode of failure would cause uniform wear contact fatigue on the driving side of all teeth. The design of the timing gears is such that any debris present between the gears would impact on every tooth. In the case of contaminated oil or loss of lubrication feed this would cause other engine damage such as shell bearing, oil pump, piston damage and cylinder wear. These features were not found in the failed Silver Wing engine.

5. The Dr Gregory report has not mentioned or investigated what adverse or contributing effect that valve - piston impact may have had on camshaft failure.

5. General Discussion

Optimech's examination of the camshaft on the Silver Wing engine has found that failure has occurred as a result of torsional fatigue failure of the camshaft. A crack initiated in the camshaft and this propagated by fatigue to a depth of approximately 4mm. This crack progressively weakened the camshaft, eventually causing the camshaft to fail by torsional overload.

The high stresses on the camshaft are the result of pulse shock loading caused by engine obstruction from the exhaust valves hitting the pistons. Camshaft failures in diesel and petrol engines are not common failure modes. Torsional fatigue failures of crankshafts can occur as a result of metallurgical abnormalities or poor machine radii resulting in high stress concentrations. There were no metallurgical abnormalities with the camshaft or machining defects that could have assisted in the failure of the Silver Wing or Callagher camshafts.

The failure modes of both the Silver Wing and Callagher engines are identical. In both cases the camshafts have fractured as a result of torsional fatigue in identical positions on the camshaft. The position of breakage is nearest to the drive end which is expected to be the highest torsional loading position on the camshaft.

A camshaft failure is a very unusual engine failure mode. Engines typically fail from crankshaft breakage, main engine bearings wear resulting in loss of oil pressure, big end and gudgeon pin bearing failure, piston failure, or piston ring failure. For a camshaft to fracture, indicates that an unusual event has occurred.

The key factual evidence observed on the Silver Wing engine failure is as follows:

1. In every cylinder, the exhaust valve was hitting the piston crown.
2. The valve timing gear-set shows that there was a considerable amount of contact-fatigue wear present on the gears, especially on the camshaft timing gear, idler timing gear and fuel injection pump timing gear. The damage on these gears is present in the form of pitting, spalling and plastic

yielding (peening/ rolling). The damage on the *camshaft* timing gear and *fuel injection pump* timing gear is not uniform, but is distributed in a regular pattern with sets of severely damaged (spalled, pitted and plastic yielded) teeth and minimally damaged (minor pitted) teeth on the driving side. There was also damage on the non-driving side of the gears. The damage distribution on the gear sets is a clear indication of abnormal loading.

3. Four push rods were bent, which is also a clear indication of abnormal loading.
4. The exhaust valve rocker arm tappet screws were bent more than those on the inlet valves. The level of bending observed clearly indicates that the engine timing was significantly out of specification.
5. The port side engine was using 25 to 30% more fuel than the starboard engine under the same loading conditions. This is further evidence of fault with the engine from new.

There are five factors as to why the exhaust valves could be striking the pistons in these engines:

1. Rocker arm seizure.
2. Valve stems were seized in the valve guides.
3. Abnormal cam lobe wear.
4. Camshaft was not straight.
5. Engine was mistimed.

Item 1 – Rocker arm seizure: On the rocker shaft of the Silver Wing engine, there are some scoring marks and surface fretting on the shaft surface. These scoring marks appear to be normal friction wear. The presence of these marks does not indicate the friction was high enough to cause seizure of the camshaft. Examination and testing of the Silver Wing engine has shown that only finger force was required to move the rocker arm freely. There were no witness marks to show that the rocker arms had seized at any time in operation. Rocker arm seizure can therefore be eliminated as a cause of failure. Mr Stevens raised this factor as the principal factor for failure. When Mr Stevens examined the Silver Wing rocker assembly, these components had been in storage and the rocker assembly was in a totally degreased state. This condition had caused the rocker arm to become very stiff on the rocker shaft. Once re-oiled, the rocker arm was found to rotate freely.

Item 2 – Valve stem seizure: The previous inspections performed by Mr Timothy H. Smithson and Mr Peter J. Morgan found no evidence of valve stem seizure. Mr Stevens did not perform a strip down of the engine to examine these parts. Valve stem seizure can therefore be discounted as the cause of failure.

Item 3 – Abnormal cam lobe wear: Our examination showed no evidence of visible wear on the cam lobes to indicate that this was a factor in the failure. It has been assumed that the cam shape is the correct shape for this engine as Optimech has not been provided with this specification.

Item 4 – Camshaft straightness: The camshaft is broken and it is not possible to verify its straightness. As a general rule after the installation of the camshaft and timing gear in the engine, the camshaft should turn freely with minimal resistance. A bent camshaft would be expected to cause abnormal wear especially in the camshaft bearing. There is no evidence of this having occurred.

Item 5 – Engine mistiming: Visual examination of the valve timing gear-set from the Silver Wing's port engine has shown that there is a considerable amount of contact-fatigue wear present on the gears, especially on the camshaft timing gear, idler timing gear and fuel injection pump timing gear. The damage on these gears is present in the form of pitting, spalling and plastic yielding (peening/ rolling). The damage on the *camshaft* timing gear and *fuel injection pump* timing gears is not uniform, but distributed in a regular pattern with sets of severely (spalled, pitted and plastic yielded) damaged teeth, and sets of teeth with minor (slightly pitted) damage, on the driving side. There is also damage on the non-driving side of the gear teeth. An engine that is correctly operating and timed is not expected to show any wear on the non-driving side of the gear teeth as this area of the teeth is not under load.

The non-uniform damage to the gears on the non-driving side of the teeth in the Silver Wing's port engine is evidence of shock loading generated by an opposing circular motion from one gear to another. Such a pattern of loading could only be caused by some form of engine obstruction generating an impulse reverse thrust loading. Previous inspection of the pistons from the Silver Wing's port engine has found that each piston crown was hitting the exhaust valve when each piston was at the top elevated margin approaching the top dead centre position. Indentation marks can be clearly seen on the exhaust valve side of each piston crown. Subsequently, this impacting force transmitted via the rocker arm to the camshaft and thence to the camshaft timing gear, which induced high stress in these critical components. Further evidence of localised impulsive loading is the localised plastic yielding on the camshaft timing gear teeth in the area of maximum damage to the teeth on both the driving side and non-driving side. This is caused by rolling and peening action occurring simultaneously due to excessive slip or high bending loads from impulsive loading being applied to the teeth. Further evidence of engine obstruction is the bent state of the push rods.

The examination found that the exhaust valve rocker arm tappet screws are bent more than those on the inlet valves and this is further collaboratory evidence of the exhaust valves having been impacting with the piston crowns and also the incorrect timing adjustment of the engine.

The Callagher camshaft shows a torsional fatigue failure identical to that of the Silver Wing's port engine camshaft, caused by the exhaust valves having been impacting with the piston crowns. Compared with the Silver Wing's, the level of damage on the Callagher camshaft timing gear and fuel injection pump timing gear is less severe, as a result of lower vessel overall weight (sustained load) and shorter service time. The underlying cause of the engine's failure is the same as the Silver Wing's, with the engine having a latent defect in its assembly. The engine timing gears had been mistimed which had resulted in the exhaust valves hitting the pistons in service. The reason the Callagher engine failed after a shorter time than the Silver Wing engine was that the valve tappets had never been adjusted from original assembly of the engine. This has resulted in higher continuous impulse forces sustained over the shorter life of the engine. There is clear forensic evidence that both engines were assembled mistimed and this caused the camshaft in each one to fail.

In the Silver Wing's vessel log it had been recorded that the cylinder head gaskets had leaked water and that the cylinder head had been removed on two occasions to rectify this problem. The two occasions were at 607 and 1212 operating hours. It is likely that the mechanic removed the engine's cylinder head and noticed the indentations on the piston crowns. It is likely that as a consequence the mechanic readjusted the tappet clearance to avoid further impact damage. As a result, the effect of impulsive load was all but eliminated for the Silver Wing after that time. At that time the crack had already initiated and was continuing to propagate whenever the engine was running.

Legal Definition of Latent Defect

Most marine insurance policies have a latent defect clause which provides specific coverage for latent defects, while others specifically exclude latent defects from coverage. The term latent defect in maritime use is widely misunderstood, for it is not the same thing as with common law usage. A latent defect is an unknown defect not discoverable by such inspection or test as the law reasonably requires under the circumstances, i.e. reasonable and prudent inspection.

It is a principle of insurance that it does not cover property that is in any way defective because, to do so, would be providing a warranty for the defective product. That, of course, is the responsibility of the manufacturer and would be providing free insurance for the manufacturer. However, marine insurance policies have long provided coverage for loss and damage caused to the vessel as a result of latent defects.

The real problem with a latent defect is in defining this term that is remarkably broad in scope: Latent means not discoverable by such inspection or test as the law reasonably requires under the circumstances. It can also mean a defect that has not become manifest yet; that is, a fault may exist within a material or component which, short of destructive testing, cannot be discovered, but which as time goes on will eventually become apparent as the part begins to fail. The latent defect thus becomes a patent defect.

The kind of inspection necessary would be the one that any reasonable and prudent person or entity would be expected to carry out in order to ensure that the item in question would not harm the vessel's seaworthiness. What the courts have determined does not constitute a latent defect is any kind of wear, normal stress or deterioration. In other words, the natural tendency of nearly every material to age, deteriorate and wear out.

Latent defects include faulty material and faulty workmanship. In the case of both the Silver Wing's port engine and the Callagher engine, it has been conclusively demonstrated that the mistiming of the engines has been caused by faulty workmanship in either the manufacture of the engine, or while it was being warehoused prior to sale by the New Zealand agent Volpower N.Z. Limited, or that company's dealer Ovlov Marine Limited, the supplier of the engines to the boatbuilding company that built the Silver Wing. The forensic evidence is clear and indisputable in both these cases. The failure of the camshaft in both vessels was not caused by incorrect servicing, contaminated oil or a lubrication breakdown. The engines were relatively new and had not accumulated high service hours. Consequently, the total effects of normal wear and tear were not significant at the time of failure. In the case of the Silver Wing's port engine, the oil change history shows that on average the oil had been changed at a service interval of 118 engine hours. There were periods where the oil changes were up to 200 engine hours and there were other times where oil changes were at 40 engine hour intervals. With this type of commercial operation, variation in oil change service intervals would be expected to be normal. The Silver Wing engine had not accumulated high service hours and the effect of extended oil change intervals would not be a significant factor in wear at this time. The starboard engine was in good condition and had been subjected to identical loading in service and had not failed or experienced abnormal wear, despite always having had its oil changed at the same engine hour intervals as the port engine. If servicing was an issue and oil breakdown was a main contributory factor then it would be expected that both engines would be in similar condition. A further factor to note with the Silver Wing is the fuel usage discrepancy between the port and starboard engines from new, with the port engine consuming 25 to 30% more fuel during its service life. Such a discrepancy is further evidence of an underlying fault within the port engine. The key parts of the engine such as the main bearing, big end and gudgeon pin bearing, crankshaft journals, and cylinder bores were all in good condition and this proves indisputably that the engine had not failed from the result of lubrication breakdown or abnormal wear and tear.

The mistiming fault could not reasonably have been detected by the owner of the vessel. The engines are mounted below the floor of the vessel with sound insulation and the abnormal noises from the engine such as noisy tappets and pistons hitting the valves would not have been expected to be detected without removal of the engine hatches. Also, with a twin engine setup the overall sound acoustics are significantly masked by the running of the other engine.

6. Conclusions

1. The failure of the Silver Wing engine was due to torsional fatigue failure of the camshaft. The failure is attributed to abnormal loading on the camshaft generated from the valves impacting upon the piston crowns. This resulted in high impulsive reverse thrust loading that eventually initiated a fatigue crack on the camshaft. The failure mode of the Callagher camshaft was identical to the Silver Wing.

2. There is no evidence of a metallurgical abnormality with the camshaft installed in the Silver Wing or Callagher engines.

3. The Silver Wing valve timing gear-set shows that there was a considerable amount of contact-fatigue wear present on the gears, especially on the camshaft timing gear. The damage on these gears is present in the form of pitting, spalling and plastic yielding (peening/ rolling). The damage on the *camshaft* timing gear and *fuel injection pump* timing gear is not uniform, but is distributed in a regular pattern with sets of severely damaged (spalled, pitted and plastic yielded) teeth and

minimally damaged (minor pitted) teeth on the driving side. There was also damage on the non-driving side of the gears. The damage distribution on the gear sets is a clear indication of abnormal loading in service. The Callagher engine had the same marking and pattern of wear to the gear sets indicating an identical mode of failure to the Silver Wing engine.

4. The pattern of wear on the Silver Wing's port engine timing gears excludes the possibility of a lubrication breakdown being a factor contributing to the failure of the port engine's camshaft. The key parts of the port engine including main bearings, big end and gudgeon pin bearings, crankshaft journals, and cylinder bores, were all in good condition and this would not be expected if the lubrication oil had been inadequate in service. The evidence is conclusive and indisputable that the engine did not fail as a result of extended oil change intervals. The starboard engine was found to be in good condition and had been exposed to the same oil change intervals showed no features of abnormal wear or other damage.

5. The primary root cause of the Silver Wing and Callagher engine camshaft failures can only be attributed to the incorrect assembly of the engine from mistiming of the engine valve timing gears from original manufacture or as installed by the service agent. The mistiming of the gears caused the exhaust valves to hit the piston crowns in service causing premature failure of the engines.

6. The mistiming of the Silver Wing engine is classified as a latent defect of assembly. This could not reasonably have been detected by the owner due to the installation arrangement of the engines masking unusual engine noises. It was not detected by the either the New Zealand agent's representatives or the engine supplier's representatives at the time of the initial sea trials.

7. Collaboratory evidence of engine mistiming of the Silver Wing engine was the extent of the bending of the tappet screws and pushrods that had to accommodate the engine mis-timing and the extraordinarily high fuel consumption of the port engine compared with that of the starboard engine.

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Appendix 1 (Silver Wing)

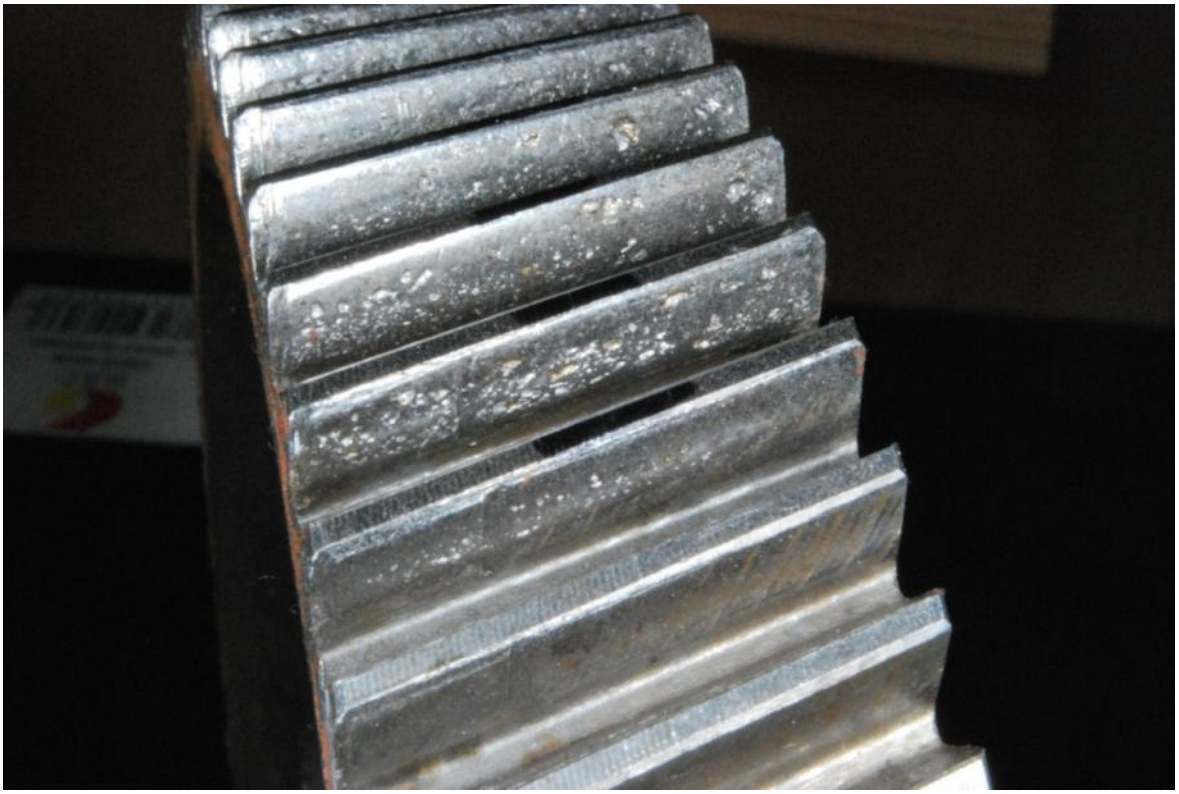

Figure 1: Silver Wing - On the non-driving side of the teeth on the camshaft timing gear, examination showed the presence of pitting and spalling. Damage is non-uniform and localised in bands of teeth.

Figure 2: Silver Wing - On the camshaft timing gear there are six equi-spaced groups of damaged teeth, 60° apart.

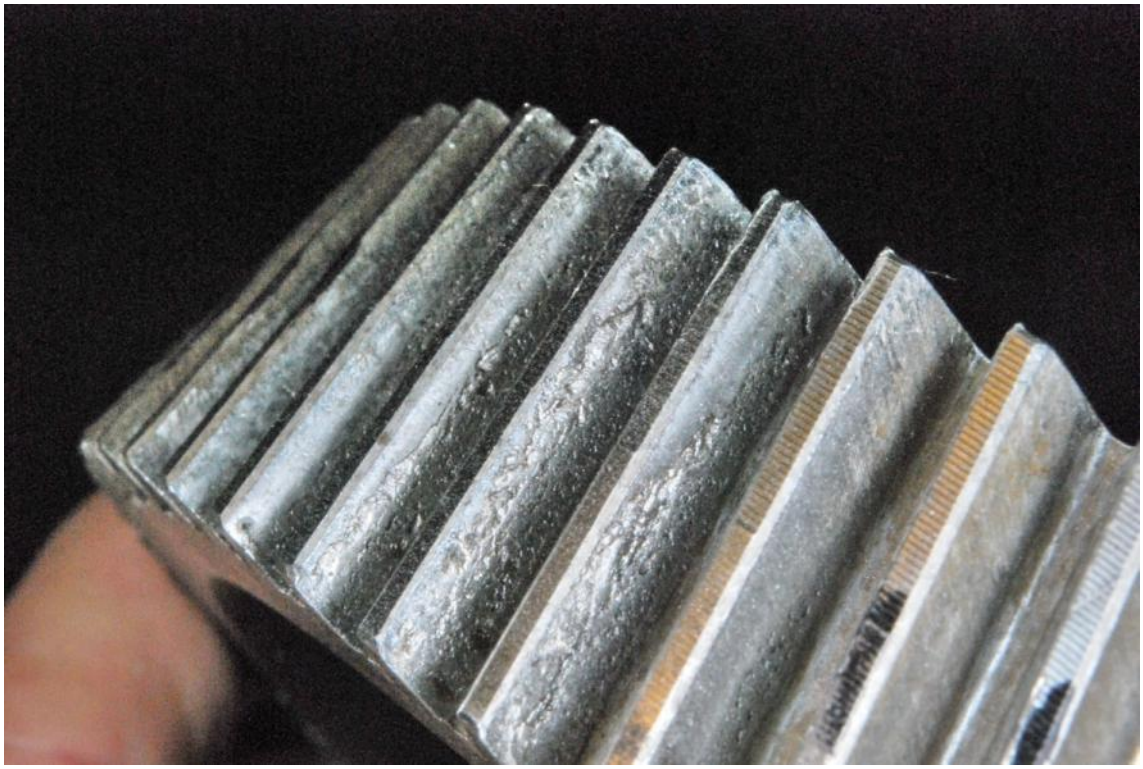

Figure 3: Silver Wing - On the driving side of the camshaft timing gear teeth, severe plastic yielding (peening / rolling) damage is present along with pitting and spalling.

Figure 4: Silver Wing - On the non-driving side of the camshaft timing gear teeth, there are also six equi-spaced groups of severely (plastic yielded, pitted and spalled) damaged teeth (six teeth in each group) between each group of slightly pitted teeth.

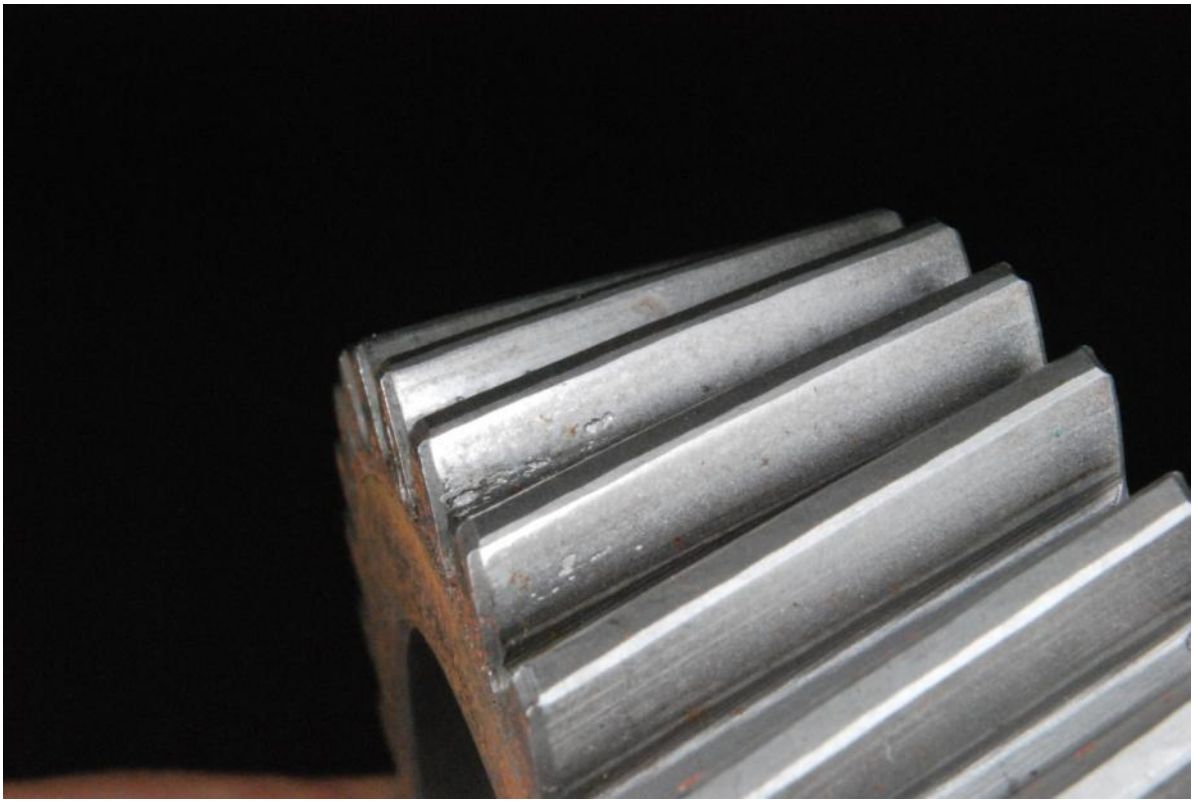

Figure 5: Silver Wing - On the driving side of the camshaft timing gear teeth, there is minor pitting present just under the pitch line of the tooth face.

Figure 6: Silver Wing - On the camshaft timing gear, the damage is localised at three equi-spaced groups of damaged teeth (three teeth in each group), the groups being 120° apart.

Figure 7: Silver Wing - Pitting and scoring are present on the non-driving side of the fuel injection pump timing gear teeth.

Figure 8: Silver Wing - Pitting and scoring were present on the driving side of the fuel injection pump timing gear teeth.

Figure 9: Silver Wing - On the fuel injection pump timing gear, there are six equi-spaced groups of damaged teeth which are in alignment with the severely (plastic yielded, pitted and spalled) damaged teeth on the camshaft gear on the driving side

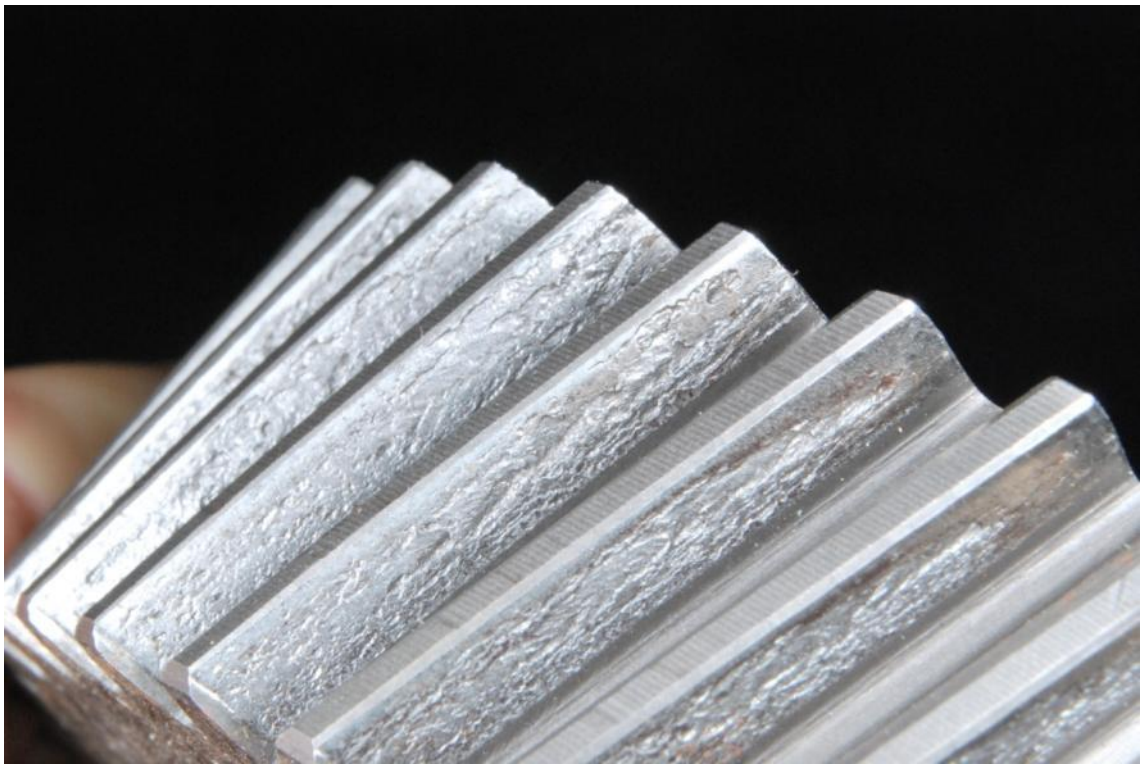

Figure 10: Silver Wing - Severe spalling has occurred over the entire surface of every single tooth on the driving side of the idler timing gear.

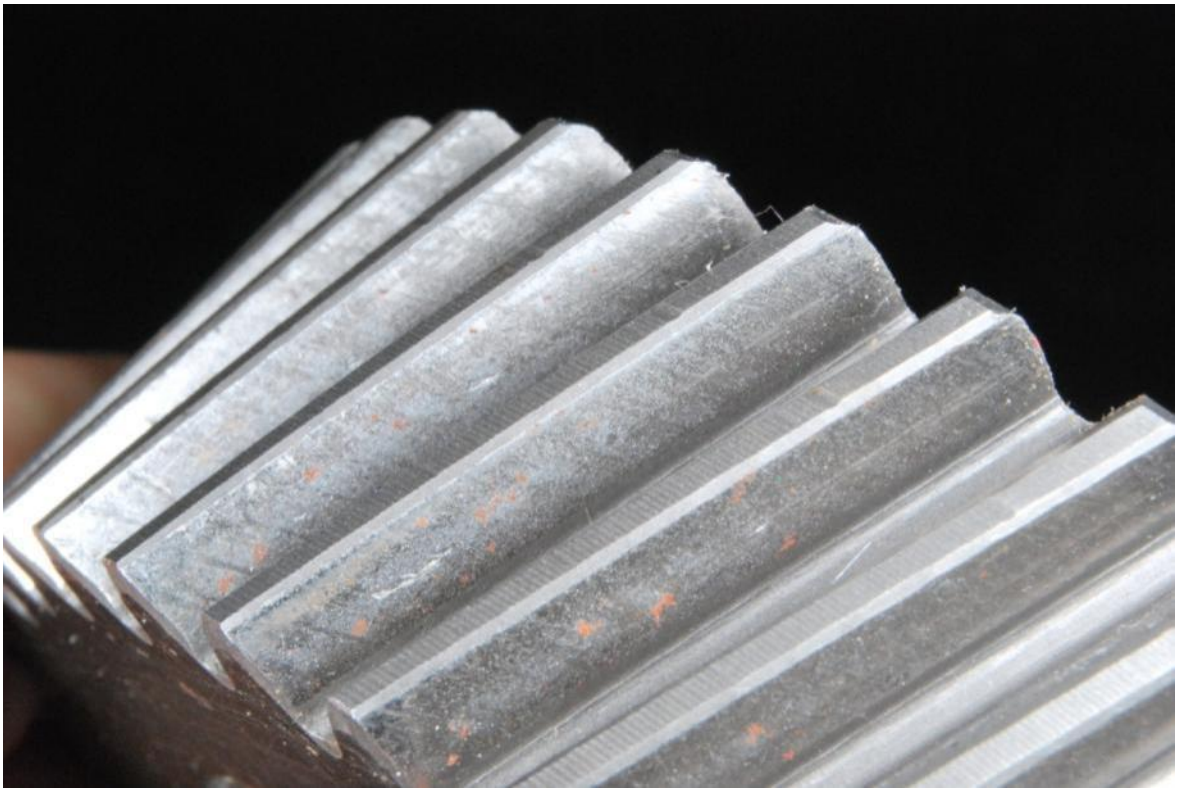

Figure 11: Silver Wing - There is no damage on the non-driving side of the idler gear teeth.

Figure 12: Silver Wing port engine's failed camshaft. The angle of fracture shows that the predominant loading at point of initiation was torsional.

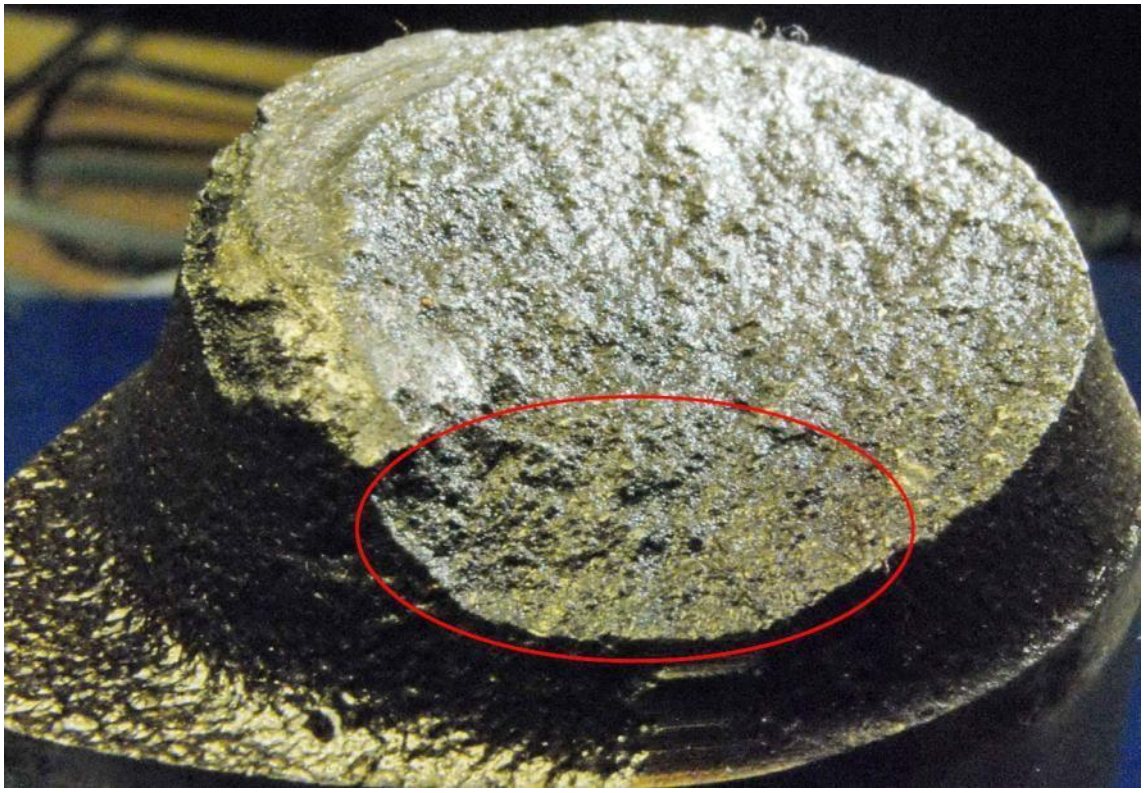

Figure 13: Silver Wing's failed camshaft. The crack initiation area is marked.

Appendix 2 (Callagher Engine)

Figure 14: Callagher - On the non-driving side of the camshaft timing gear teeth, examination showed the presence of pitting and spalling.

Figure 15: Callagher - The non-driving side of the camshaft timing gear. The distribution of damage is similar to that found on the non-driving side of the Silver Wing port engine's camshaft timing gear.

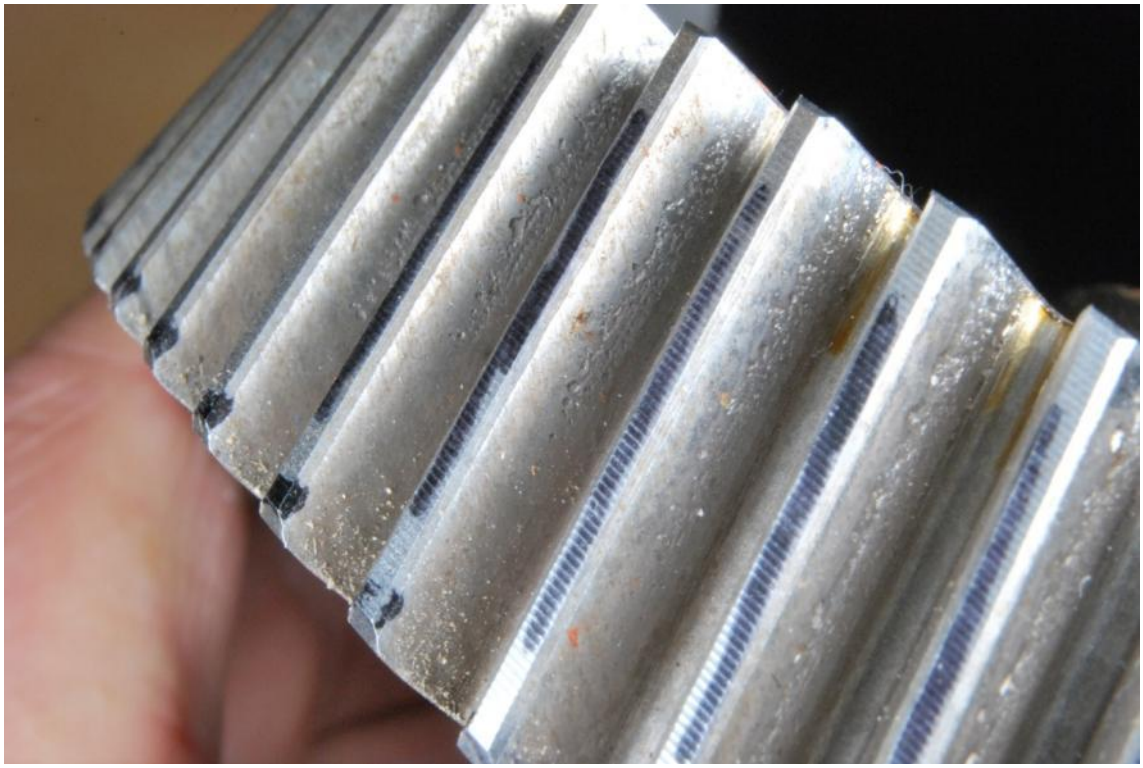

Figure 16: Callagher - On the driving side of the camshaft timing gear teeth, severe plastic yielding (peening/ rolling) damage is present, along with pitting and spalling.

Figure 17: Callagher - On the non-driving side of the camshaft timing gear, there are also six equi-spaced groups of severely (plastic yielded, pitted and spalled) damaged teeth (six teeth in each group) between each group of slightly pitted teeth. The groups are approximately 60° apart.

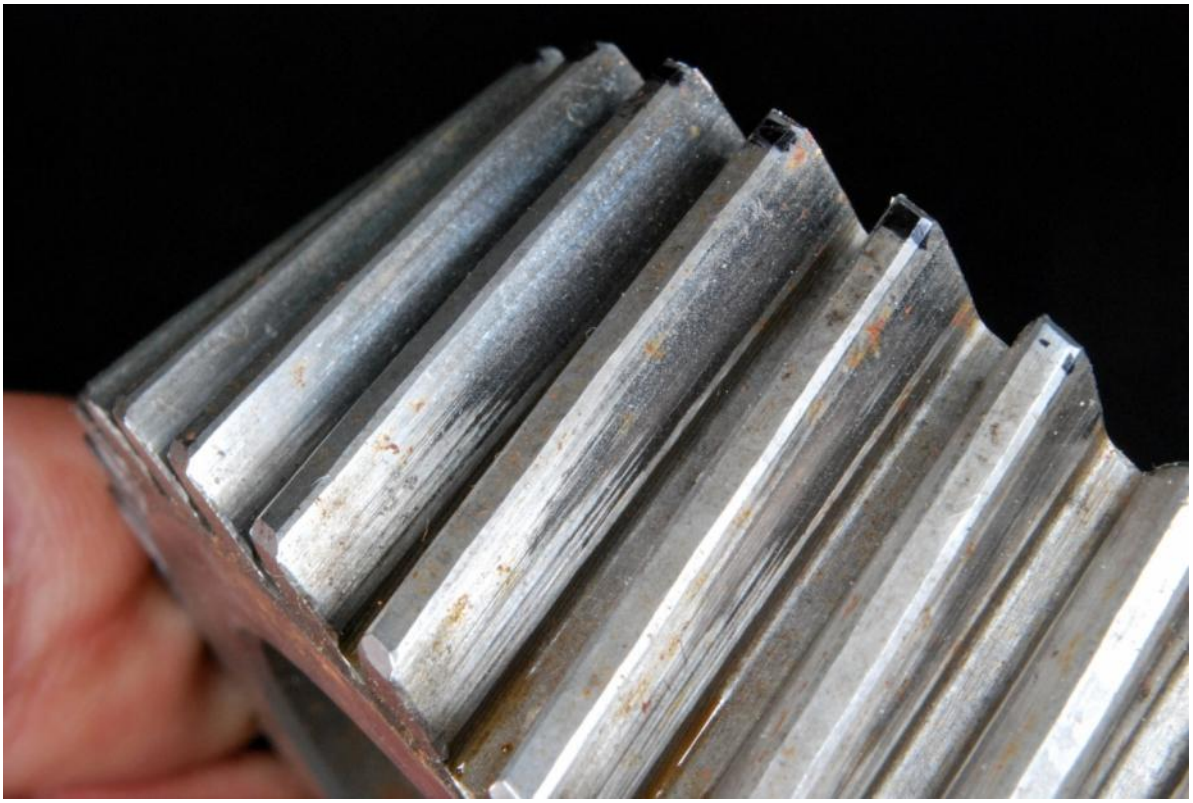

Figure 18: Callagher - The driving side of the crankshaft timing gear teeth are in good condition, with only minor pitting present.

Figure 19: Callagher - Pitting and scoring on the non-driving side of the teeth on the fuel injection pump gear.

Figure 20: Callagher - Pitting and scoring are present on the driving side of the fuel injection pump timing gear teeth.

Figure 21: Callagher - The driving side of the fuel injection pump timing gear teeth. The damage distribution pattern is similar to that on the camshaft timing gear, but to a lesser extent.

Figure 22: Callagher - There is no damage showing on the teeth on the idler timing gear.

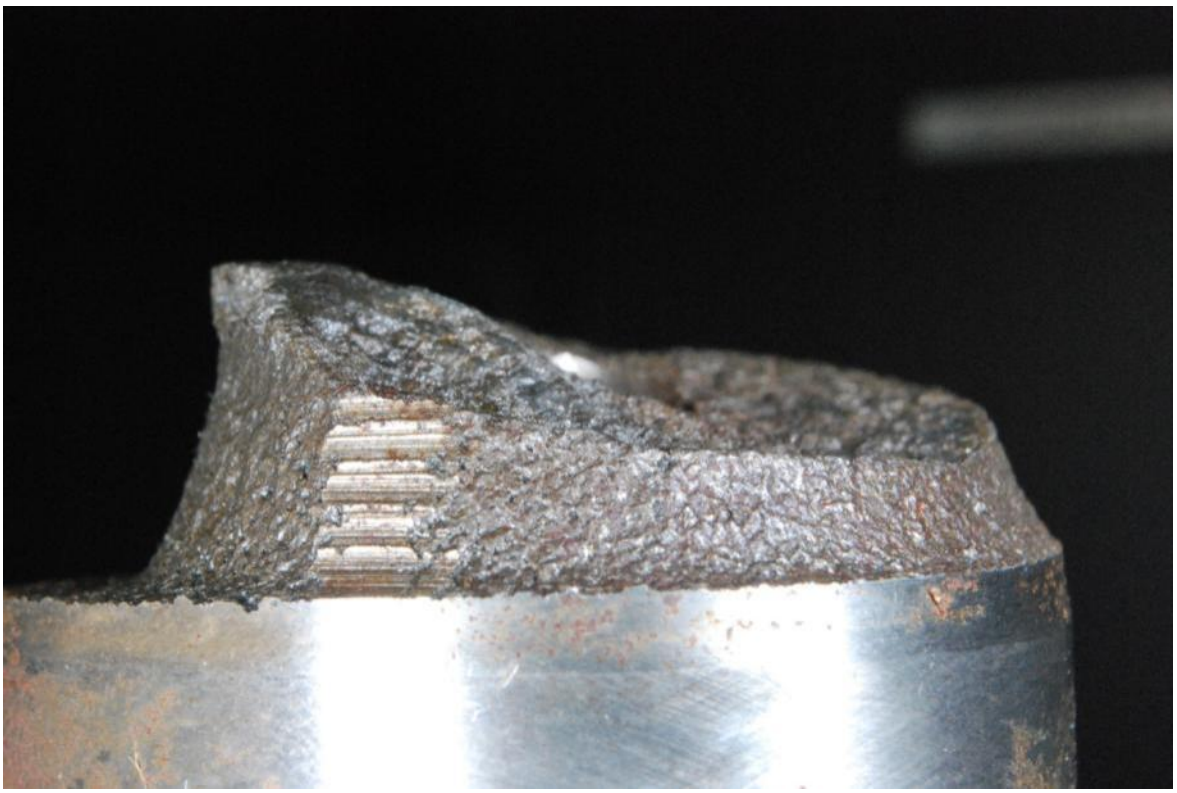

Figure 23: Callagher - Failed camshaft. The angle of fracture shows that the predominant loading was torsional.

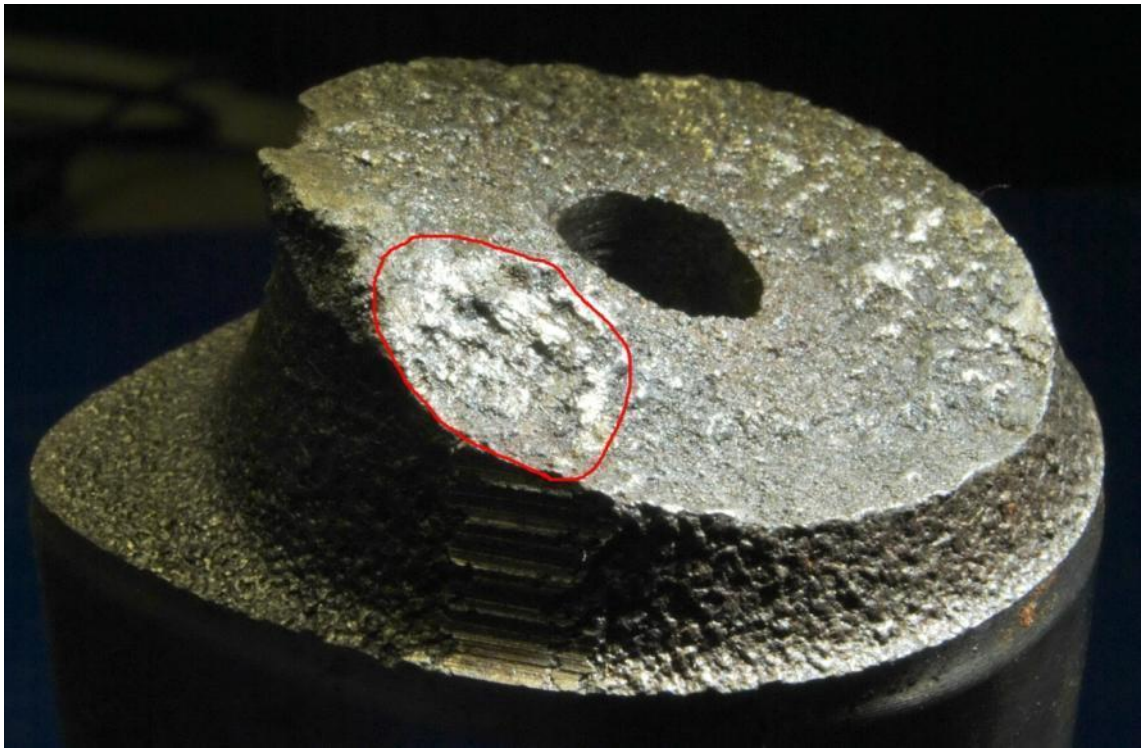

Figure 24: Failed camshaft from the Callagher engine. The crack initiation area is marked.

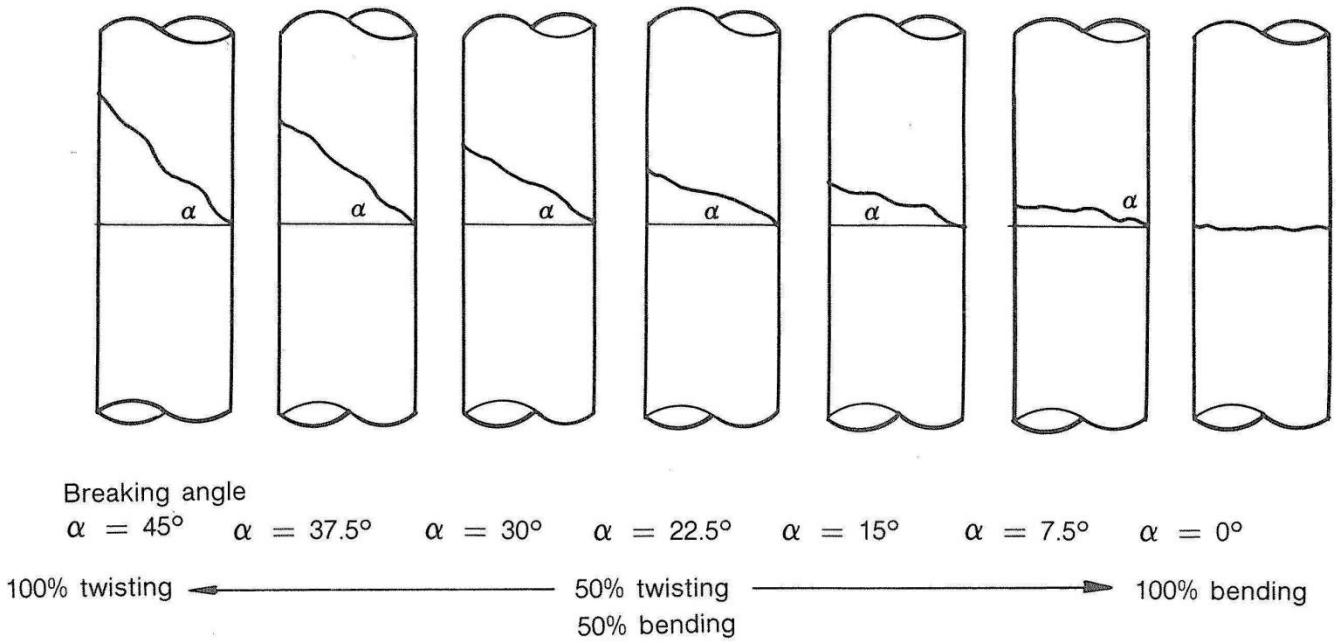

Figure 25: Failure illustration showing breakage angle of metal caused by a variety of bending and twisting loads (From Nissan Diesel Motor Co. Handbook Pub No. AMUDA88E00).