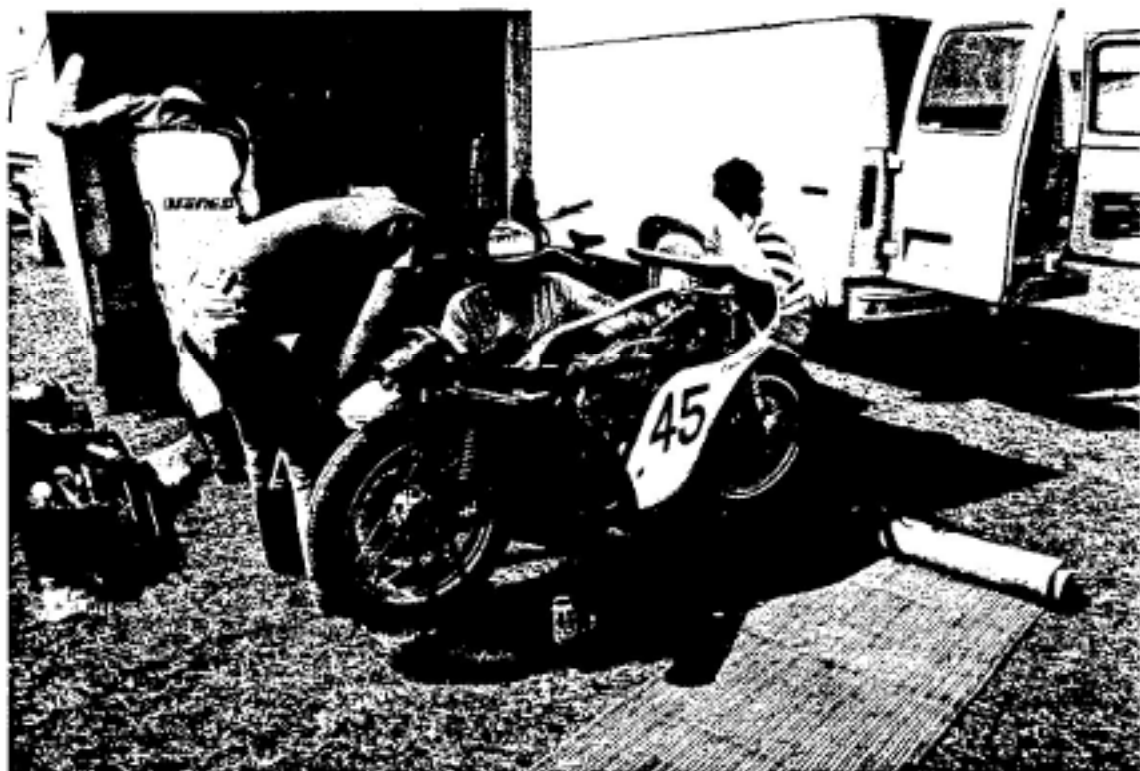


VINTAGE ROAD RACING ASSOCIATION NEWSLETTER



MARCH/APRIL 1988

Vintage Road Racing Association
c/o P.O. Box 165
Ballinafad, ONT. CANADA N0B 1H0

RACE CALENDAR:

WHO'S WHO IN 1988

President: Paul Bowyer
Res: (416) 342-3152

Vice President: Bill Mathison
Res: (416) 877-8289

Recording Secretary: Ruth Hodge
Res: (416) 877-8572

Treasurer: Carol Duff
Res: (416) 877-8289

Membership Secretary: Manzi Warwick
Res: (416) 839-7464
Bus: (416) 291-7794

Competition Chairman: Toivo Madrus
Res: (416) 886-0310
Bus: (416) 630-5220

Technical Committee Chairman: David Hughes
Res: (416) 842-1843
Bus: (416) 238-0000

Editor: Pat Nicholson
Res: (613) 489-3093

Apr30/May1 RACE Castrol Eastern Challenge
Shannonville. (Nelson Circuit)

May 14/15 RACE Castrol Eastern Challenge
Shannonville. (Long Track)

May 14 Vanson Leathers Vintage Series
Bryar Motorsport Park, Loudon NH

May 21/22 AHRMA (TENTATIVE ONLY)
Mosport

May 28/29 RACE Castrol National Championship
Sanair, St. Pie, Quebec

May 30-June 10 Isle of Man TT
for info. on a travel package call
Halmar Enterprises (416)356-6865

June 11 Vanson Leathers Vintage Series
Bryar Motorsport Park, Loudon NH

July 2/3 RACE Castrol Eastern Challenge
Shannonville (Nelson Circuit)

July 8-10 US CRA Belknap Cup (1st Am/Can)
Bryar Motorsport Park, Loudon NH

July 30/31 VRRR 10th Annual Vintage Festival
Mosport

Aug 6/7 RACE Castrol Eastern Challenge
Shannonville (Nelson Circuit)

Aug 6 Vanson Leathers Vintage Series
Bryar Motorsport Park, Loudon NH

Aug 19-21 Vanson Leathers Vintage Series
Bridgehampton, New York (with VSCC
cars) Muffled event only

Sept 3/4 Vanson Leathers Vintage Series
Bryar Motorsport Park, Loudon NH

Sept 24/25 RACE Castrol Eastern Challenge
Shannonville (Long Track)

SUBMISSIONS:

Submissions for publication are invited. They need not be typed, merely legible. Photos may be black & white or colour. Please provide identifying information with photos. Please send all contributions to:

Pat Nicholson
RR #3 Richmond
Ontario, Canada, K0A 2Z0

Please ensure that you use the correct postal code, we have been confused with both Richmond Hill & Richmond B.C.

EDITORS REPORT

This issue is chock full of useful information and news so I will keep this short. Thanks to all who wrote or commented on the last newsletter and for your submissions, (Happy 11th B'day Mike). Included in this issue will be a pre-entry form for our 10th Annual VRRR Festival at the end of July and another copy of our 1988 membership form (hint, hint). I also hope to include all of Robin Bennett's very informative paper on "Fatigue in Bolts" which should be useful during the refit season. Stan, Paul Heinrichs and I had quite a trip to Daytona and met a number of Canadians down in the sun. I will include a brief report of the races and also look forward to receiving articles about experiences.

COVER PHOTO

Daytona 1988 pits: Tom McMill in the thick of the Team Ecurie Classic Manx Norton.

PRESIDENT'S MESSAGE

OTTAWA: I just want to thank all the Ottawa 'Gang' for their overwhelming hospitality during our w/end stay. Tom Saunders, Dave & Judy Makin, Sandy Cocksedge & Evelyn, Stan & Pat Nicholson & particularly Paul Heinrichs for the use of his home and assorted m/cycles for the Saturday Vintage Ice Follies. (the crateload of replacement parts is in the mail, Paul.) The only unfortunate incident of the w/end occurred when Evelyn slipped on the ice and broke her wrist. (she has since agreed to take up m/cycle ice riding 'cos it's safer) Heal quickly Evelyn.

Motor Cycle '88: Our display at the CNE Show went very well for such short notice and produced several new memberships. Many thanks to those who organised the display; Carol & Chris Duff, Bill Mathison & Andy Beresford and to the others who helped out.

Sponsorship: Bill Mathison & Jim Garrett are still waiting to hear from our prospective sponsors; NGK & Pirelli. Please, if you haven't written to thank these people do so soon, for who knows, one or two extra letters could make all the difference.

VRRR Vintage Festival: Toivo is busy enlisting help for various positions for our '88 race w/end, so if you can help please give him a call. Some positions have already been filled, particularly

timing & scoring tasks which will again be led after by Holly Stephen. (many thanks Holly!) Izi Warwick has also agreed to take on the registration again this year. Included in this newsletter is a pre-entry form for the 10th. Annual Vintage Festival, and as last year your entry will provide you with many happy hours of track time. If you can get your entry in to us before June 15th. we will give you a free gate pass.

Sanair National : For those of who haven't heard, the VRRRA have been invited to race at the Sanair National at the end of May. There will be national T.V. coverage and a large spectator turn-out. I can't stress enough the importance to our club & to vintage racing to have a large competitor turn-out for this event, and it is also a great opportunity to race on another track.

See you at the races, Paul.

COMPETITION CO-ORDINATOR'S REPORT

Attention all ye bold road racers
Last year's experience at the annual race meeting at Mosport provided us with very valuable insights into race event organization & work load and this will pave the way to an even more interesting & successful event in 1988. All this is a subtle way of telling you that to have a successful w/end we need volunteers. The work directly connected to the race w/end can be divided into 2 major categories with sub-groups as needed. We need a leader for each category, someone who will be responsible for organizing sub-groups with volunteers, directing their activities & co-ordinating with me, Toivo Madrus.

Majorwork Categories

Trackside	Hospitality
1) Haybales	1) Catering
2) Registration	marshal's lunch
3) Pit marshalling	B.B.Q.
vehicle recovery	2) Trophy presentation
track clean-up	

The organization of our event was handled in this manner last year, with pleasant results. However we really need a clearer picture of who is going to do what before the race. People wishing to volunteer as group leaders should call me at home (416)886-0310 or at work (416)630-5220 (ask for Mr. Madrus in Engineering Equipment.) Groupies will be welcome for any sub-group. N.B. All volunteers will qualify for the Albert Schwietzer & Clark Kent Awards. See you at the track. Toivo.

Comments from the CNE Bike Show '88
The VRRRA display crew deserves a lot of credit, not only for their hard work, but also for their creative thought, the ramp idea was very effective. During the 4 hours I spent at the display (with Paul Bowyer) there were very few slack times, we had a steady stream of enquiries. The enquiries I handled fell into 3 main groups; Sports touring class, Japanese m/cycles & Norton Commandos.
Toivo Madrus.

DAYTONA RESULTS

250 GP	2 Stroke GP
1 Mike Green Ca Duc	1 Keith Gonyou Mich Yam
2 Jeff Hecox Ca Duc	2 Jim Baker NY Yam
3 M Asakawa Japan Duc	3 M Moscoso Fl Yam
7 S Nicholson Gre	
8 Gord Pulis Duc	

Sp 500	350 GP
1 D Walden Ca Tri	1 M Tunstall Fl Duc
2 K Huber W Germ. Hon	2 C McLean Ca Norton
3 Greg Wills Ohio Tri	3 A Cathcart UK Duc

Class C	750 GP
1 M Nelson Georgia Nor	1 Mike Green Ca Tri
2 P McHenry Ill Indian	2 V Bannister Ala Nor
3 Pat Moroney NY K-D	3 R Tuluie Ca Nor
	4 Frank Mrazek
	8 Pete Kogut
	Larry Strung

Pre 1940	F 750
1 Beno Rodi Ga BSA	1 Paul McMillan Hon
2 L Feece Ind Rudge	2 Dave Roper NY BSA
3 M Batsleer Fl Indian	3 John Long Fl Hon

Sp 750	Prem 500
1 F Shockley SC Tri	1 Pete Johnson Pa Hon
2 Mike Green Ca Tri	2 C McLean Ca Matchless
3 J Morris Pa Tri	3 D Phillips Ca BSA
10 Pete Kogut Nor	12 Paul Heinrichs Tri
16 Paul Heinrichs BSA	13 Tom Faulds Nor
18 Terry Wolfe	7 Frank Mrazek
George Jonas	

SOME SOUTHERN OBSERVATIONS

Approx. 350 entries made 1988 Daytona vintage day the largest to date. The fine weather, large crowds, big fields, great announcing by Pat Gonsalves all combined to create a wonderful day of exciting vintage racing.

A number of Canadians made their mark on the track. Paul McMillan, the "ringer" on the McGill/Faulds Team Ecurie Classic Honda CR750 rode a fantastic race in the F750 to beat Dave Roper on the BSA triple. Frank Mrazek got off on the International Horseshoe in the 500 race and made instant TV fame by leaping again and rejoining the race at the 2nd attempt. Sandy Cocksedge was not so lucky when he came down on corner 1 and as a result has a very nasty pulled muscle in his left foot.

Comment by Paul McMillan after his F750 win "The race was wonderful, great competition, great bike, great handling, I'd ride vintage again any time they ask me."

Other Canadian mark was made by Stan Nicholson on the 250 Yamaha at Savannah when he closed racing for the day by monopolising the only track ambulance for a trip to the hospital. He's fine though the old body still aches a lot. (He still managed to ride the Greeves to a 7th at Daytona).

DAYTONA AMA RESULTS

250 GP	600 SUPERSPORT
1 J.Kocinski Yam.	1 J.Ashmead Hon.
2 A. Carter Yam.	2 D. Polen Suz.
3 D. Coe Rotax	3 D. Bray Hon.
4 K. Ballington Hon.	4 G. Goodfellow Suz.

PRO TWINS GP	750 SUPERSPORT
1 R. Marshall Quant/Cos	1 D. Polen Suz.
2 S. Caracchi Duc.	2 D. Sadowski Suz.
3 D. Brauneck Guzzi	3 S. Dick Suz.
4 C. Oldfield Bimota	4 J. James Suz.

PRO TWINS MOD
1 K. Erion Duc.
2 J. Lamirout Duc.
3 W. Griffiths Guzzi

VRRA MEETING HIGHLIGHTS

TORONTO JAN 15TH :

NGK were praised for their sponsorship & all members were requested to send a note of appreciation to Doug Morrison, NGK Spark Plugs, 31 Melford Dr. Unit 1. Scarborough, Ont. M1B 2G6. Paul Bowyer reported on his meeting with RACE (Colin Fraser):

RACE : VRRA will do all vintage tech. inspection at the Tech building, under RACE supervision to satisfy insurance requirements. Only VRRA members will earn points in the RACE Vintage class, although a 1 race grace will be allowed. Your VRRA membership card will be needed at registration & new memberships will be available there also. We need 35 plus entries to have a 2nd. race. In the event of a class cancellation; before 11a.m. a refund will be given, after 11a.m. a credit will be offered. RACE will include VRRA racing in their promotion through their newsletter and track announcing. All protests and fees will be handled as per RACE rules. Shannonville pit area will be for competitor camping only. Toivo indicated that the approximate budget for the VRRA W/END will be \$10,000 inclusive.

OTTAWA FEB. 12TH

Paul reiterated all of the items discussed in Toronto & added a number of items for the benefit of prospective members. ie. A RACE license is needed for all racers: it can be gained through the RACE school w/end fee \$150, using own machine & equipment. The school fee will include first 2 races free for VRRA members & they are sensitive to vintage riders by putting them in the same group.

Re RACE Series: Plan to enter more than one class if your machinery warrants, your 2nd. entry will be refunded or credited if only one race is run. At our Mosport w/end new riders will be asked to provide proof of competency, eg. a reference from a current racer. Paul pointed out that all street bikes must be in good mechanical cond. safety wired & glass taped. Leathers, helmets & boots will be checked for suitability and an 'M' license is mandatory.

New Business: Tech Committee recommendation; Random teardowns at the track based upon the committee's assessment of a bike's performance. Long and detailed discussion ensued halted only by a motion by S. Cockedge, seconded by R. Lobb. Motion: That the VRRA membership accept RACE's protest procedure. Passed unanimously.

N.B. Oversize displacement is limited to 5% over class limit, regardless of the bike capacity. Pirelli tyres will be available at cost from Pat Poisson (you pay shipping costs). Castrol oil can be requested from the Toronto warehouse by giving your RACE membership #.

Arrangements are being made to dedicate this year's AM/CAN Series to John McCaw. Great meeting with over 20 in attendance, we must do it again sometime!

Social Report : After the late Friday night viewing of Kevin Fletcher's excellent video of the 1987 Loudon AM/CAN event at Tom Saunder's the Ottawa meeting was reconvened on Saturday at Heinrich's on a frozen Gatineau lake. The wrecking crew, headed by Sharon Bowyer, tore round the ice, much to the delight of all. David Bowyer had his first ride on an Italian bike & Gary McCaw found that his boots were made for walking as well as riding. Super Dave Makin proved that his truck can pull anything or anyone out of snow banks & Stan was harassed for driving right past Gary at Ton's. (Good thing he's more alert on the track!) As Paul mentioned, Evelyn had a nasty fall. I am pleased to report she is recovering slowly but surely. Pat N.

DAYTONA 200 RESULTS

As posted on Sunday, 6th March

1 Kevin Schwantz Suz	2 Doug Polen Suz
3 Bubba Shobert Hon	4 Scott Gray Suz
5 Rueben McMurter Yam	6 Mike Harth Suz
7 Dale Quarterley Suz	8 Randy Renfrow Suz
9 Scott Russell Suz	10 Jeff Farmer Yam
11 Mark Chin Yam	12 Michel Mercier Suz
13 Tommy Douglas Yam	14 Ricky Orlando Suz
15 Eric Delcamp Kaw	16 Andy McGladdery Suz
17 Ottis Lance Suz	18 Keith Pinkstaff Suz
19 Charles Pittman Suz	20 David Sadowski Suz
21 John Hopperstad Yam	22 Gilles Hussion Hon
23 Paul Schwemmer Yam	24 Steve Dick Suz
25 Tommy Sloan Yam	
41 Norm Murphy Suz	

FOR SALE

1982 Ducati Pantah 5000 Km very good condition, but has fairing & tank damage. New Pirelli's, service & parts manual, spare cam belts, asking \$3500 o.b.o.

1964-65 250 Ducati GT, needs restoration, engine "done", spare crankcase halves & gears plus head asking \$325 the lot.

1966-67 450 Honda frames (2) tanks & seats, side covers, wheels \$75 takes all.

1970 350 Kawasaki Avenger, needs work & parts \$50. Looking for Suzuki T20 bikes/parts.

Will trade on all the above except "Pantah"
Call Joe Rogers (613) 962-3125

1982 Yamaha Vision, black, 6500 Km
10,500 rpm, 550cc water cooled smoothie.
Bergain hunters - \$1800
Purchasers - \$1450
Call Toivo Madrus (416) 630-5220

1967 Bultaco Metralla Mk II - 5 speed with factory sport touring fairing (full).
Full street legal & ready

1967 Bultaco Metralla Mk II - 5 speed with "Isle of Man TT" kit designed for the 1966 Production 250 TT. This includes bikini fairing, 5 gal tank, rear sets, ported cylinder barrel, high compression head & expansion chamber.
This bike is ready to race.

Both machines are in excellent running order and have good restored but not show quality appearance. I also have a multitude of spares accumulated over 20 years of Bultaco ownership.
Price: \$1000 each
Call Ron Grant (514) 636-4015

If the scrutineer turns you back because of dubious lockwiring, you now have the opportunity to smooth ruffled feathers before they start to fly.
I have a quantity of lockwire pliers guaranteed to make any aesthetic scrutineer clap his hands with delight after he has seen the lockwire job on your Norton's sump plug. \$50.00 (less 10% to any VRRA member with his/her membership #) plus \$5.00 postage and handling will buy you peace of mind.

Ralph Ridley, 38 Snider Drive, Markham, Ont.
L3P 6L6

FATIGUE IN BOLTS AND THE RELATIONSHIP TO VINTAGE RACING MOTORCYCLES.

by Robin Bennett #91

What is fatigue, and how does it relate to the performance of your vintage racing machine? This paper will try and answer those questions. Hopefully the answers will encourage the riders of those motorcycles to check the hardware holding their machines together, and if necessary, change to new parts.

Fatigue failure of any given part is a progressive failure over a period of time, which is started by a plastic movement within a localized region. When the load on a part, such as a bolt, is constantly varying in value, or is repeated over a high number of cycles, or exhibits a complete reversal of stresses within each operating cycle then that bolt has a definite fatigue or service life. Or in other words, that bolt is going to break!

Even though the stresses applied to that bolt are well below the yield strength of the bolt, a non-uniform distribution of those stresses may cause a yielding within a small area and thus cause plastic movement in that area. In this way a tiny crack may start from any hole or notch or scratch in a stressed part and will spread across that part until it reaches the critical length required for a common crack. At this point the crack speeds up and runs through the material. A bolt which has failed due to fatigue is easy to recognize due to the characteristic striped or banded appearance at the crack site, followed by the grainy look of a tensile crack, once the crack has reached the point of critical length.

Once a crack has formed, under normal circumstances it may well stop, however, when the fatigue stresses are still applied; it is the beginning of the end for that bolt. The localized plastic movement around the crack area further aggravates the non-uniform stress distribution and causes the crack to propagate.

J.E. Gordon in his book STRUCTURES tells the true story of a cook on a large freighter who was a little startled, when he went into his galley one morning, to find a large crack running down the middle of the floor. He called in his senior officer, only to be told to mind his own business and get to work cooking breakfast. The cook, however, decided to get some paint and mark the end of the crack and paint the date alongside the mark. The next time the crack extended a few inches, usually after some bad weather, he would mark and date the crack again. He did this several times. When this ship finally broke in two pieces and sank to the bottom, the half that was salvaged happened to be the side upon which the conscientious cook had made his marks! It is these marks which provide the best record available of the progress of a crack of sub-critical length. Unfortunately, you can be sure that your vintage bike will accord you no such warning of impending fatigue failure!

It should be stated at this time that it is very difficult to predict when a crack will actually start in a bolt. The nature of the stresses are so complex and changing that even in controlled testing the results show considerable scatter. This results from the wide range of time required before the initial crack develops in the specimen. Once this has occurred, the subsequent time to ultimate failure is fairly well confined and proceeds in a rather uniform manner.¹ This means that although you might not know when the bolt will fail, you can be assured that it eventually will!

How does this information apply to a racing bike? This question is perhaps best addressed by looking at the bolt itself.

Three types of failure normally occur in externally threaded bolts used in tension. This includes almost all loaded bolts on the motorcycle. Fatigue will generally occur in: (a) the threaded area next to the bearing face of the nut, (b) at the thread runout, or (c) in the head to shank fillet area.

In the case of the head to shank area the bolt should be inspected for a smooth radius at the junction of the shank and the head bearing area. The radius should be as large as possible. In typical fatigue tests, the number of cycles to failure increased from 15,000 cycles (for sharp corners) to almost 100,000 cycles (for 0.038" radius).²

There are other factors which can determine the fatigue performance of a bolt, they are, head height and, in the case of socket head bolts, socket depth. A thin bolt head may reduce the life of that bolt by increasing the stress concentration in the fillet. A socket head bolt with a deep socket can reduce the life of the bolt in both fatigue and static tensile strength.

Threads are the most likely place to find bolt failure on a racing motorcycle. The main difficulty with threads is the sharpness of the notches and their depth and number. The crack will start at the root of the notch and progress until there is a catastrophic failure of the part. This can have disastrous consequences if experienced on the racetrack.

Most bolts are threaded by means of rolling, and this produces a stronger thread. Rolling also leaves residual stresses in the bolt which have a beneficial effect on fatigue life. However it should be noted that the thread runout area of the bolt can be a potential site for fatigue failure due to the difficulty of rolling a good radius from the thread into the shank.

Note that fine pitch threads have a greater fatigue resistance than coarse threaded bolts. In a study of the effect of pitch, 3/4-32 bolts showed an increase in fatigue endurance limit of 28% over comparable 3/4-16 bolts.³

The shank of a bolt is not usually an area of concern in fatigue strength. There can be some problems experienced if certain precautions are not followed. For optimum fatigue performance the nut and bolt in a joint should be of low stiffness while the parts being joined together be of high stiffness. One method of reducing fastener stiffness is threading as much of the shank as possible.

Another is to drill an axial hole through the bolt. These are, however, extreme measures and are not usually required.

For those racers who are using exotic materials such as titanium or beryllium for their fasteners, be warned that any scratches or machining marks on the bolts can produce cracks due to the notch sensitivity of these materials. For fasteners made of steel, a surface finish of 32 μ in. is considered adequate.

Protective plating of bolts can have an effect on the fatigue life of fasteners. Electroplating and galvanizing will reduce bolt fatigue life. Chrome-plating, for example, sets up detrimental residual tensile stresses in the bolt. Some machine oils or molydisulfide coatings, on the other hand, tend to improve fatigue performance.⁴

The above discussion has been concerned exclusively with bolts. What happens when the bolt is used with a nut to make a joint? Unfortunately, things do not improve by the addition of a nut. The fatigue life of a thread is reduced by engagement with a nut or other mating thread. Tests have shown that a thread with a nut on it had an endurance limit less than 60% of the thread without the nut.

When a joint is made with a nut and a bolt the stresses are concentrated over a few threads. The stress area is primarily around the bearing area of the nut, in fact the stress concentration around the bearing area can be four times the concentration at the top of the nut. This problem is not as bad when the bolt is inserted into a tapped hole, as the loads are usually distributed over a larger bearing area.

The subject of nut design and its effect on long bolt life is the subject for another paper, suffice it to say that the nut has a definite role to play when considering the fatigue life of bolts.

There are some useful rules of thumb which may be followed when choosing replacement hardware. Hardware should be of the same grade, or better, when buying new bolts. Check the head of the bolt to see what grade it is rated for. A bolt with three lines on the head, each line being at 120deg., indicates a Grade 5 bolt having a tensile strength of 120,000psi on bolts from 1/4"-1" dia. Note, however that the Fatigue Limit should be rated at about 50,000psi. In fact for all carbon steel hardware the Fatigue Limit should be rated at about 40% of the minimum tensile strength.⁵ A bolt having six lines on the head indicates a Grade 8 bolt, having a tensile strength of 150,000psi., or a Fatigue Limit of about 70,000psi.

Bolts which are subjected to shear loads must not experience shear stress in excess of 15,000psi for A325(High Strength Structural) bolts in friction type connections having the thread included in a shear plane between the connected parts. For A325 bolts in bearing type connections with the thread excluded from shear planes the shear stress cannot exceed 22,000psi.

Bolts which are subject to combined shear and tension, as in a fatigue situation, due to forces

applied to the connected parts must be sized so that:

$$\frac{f_t}{\infty} + \frac{f_v}{\beta} \leq 1.0$$

where: f_t = tensile stress on the nominal area of the bolt (ksi)

f_v = shear stress on the nominal area of the bolt (ksi)

∞ = 60 for A325 bolts in friction type connection, or, 50 for bearing type connection

β = 15 for A325 bolts in friction type connection, or, 30 for bearing type connection

As can be seen from the above formula, when tensile and shear stresses are occurring simultaneously, as in a motorcycle swing-arm for example, the tensile stress must not be over 25ksi, and the shear stress must not be over 15ksi, for a bearing type connection. Or, if one type of stress rises the other must be lower. The stress in a small diameter bolt will, of course, be much larger than in a larger diameter bolt, as the area subjected to that stress is a function of the square of the radius. For example, the area of a 1/4" dia. bolt is 0.196 sq.in., while the area of a 1/2" dia. bolt is 0.785 sq.in.

If a load of 10,000lbs is being hung from a 1/4" dia. bolt then the tensile stress in that bolt would be $10,000\text{lbs} \div 0.196 \text{ in.}^2 = 51,020\text{psi}$ or 51.02ksi, obviously higher than the allowable stress! However, if a load of 10,000lbs is being hung from a 1/2" dia. bolt then the tensile stress in that bolt would be $10,000\text{lbs} \div 0.785 \text{ in.}^2 = 12,739\text{psi}$ or 12.739ksi, this would be within the allowable stress!

A guide for allowable stress (ksi) under cyclic loads shows the following:

Item	Type of stress	100,000cycles	600,000cycles	2,000,000cycles
A325 Bolts	Shear, friction type	15	$\frac{15}{1-1/2R}$	$\frac{15}{1-1/2R}$
	Tension	40	40	40
A490 Bolts	Shear, friction type	20	$\frac{20}{1-1/2R}$	$\frac{20}{1-1/2R}$
	Tension	54	45	40

where: R = the algebraic ratio of the minimum stress to the maximum stress.

Fortunately, steel bolts conform to the "s-n" curve for fatigue. The typical "s-n diagram" for steel would look like Figure 1. This curve shows a leveling off of fatigue stress over about 10^6 cycles. This means that if the bolt does not break within about one million cycles then there is some hope that it will continue to be safe; assuming that the stress reversals remain of the same magnitude. If you think that 10^6 cycles is a lot, consider that a racing engine running at a steady 6000rpm reaches 10^6 cycles in less than three hours!

All hardware on a racing motorcycle must be protected from the effects of vibration. Vibration is

ever present on any vintage bike, and can cause loosening of hardware very quickly. Correct types of lockwashers and lockwire are necessary to prevent the bolted joint from becoming loose and thus imposing additional fatigue stresses on the bolt. If a bolt starts to experience the full effects of fatigue stresses due to vibration then the fatigue life can be reduced considerably.

As racers who are responsible for the care and feeding of our own motorcycles, it behooves us to pay close attention to the parts which hold the machine together. It is difficult to say just which bolts on a motorcycle are going to experience the greatest stress and strain. Some of the more obvious are swing-arm bolts, front wheel and fork hardware, motor mounts, oil tank hardware, and any other part which experiences vibration. In other words just about every bolt on a racing bike!

I would be very interested in hearing about any bolt failures which riders may have experienced. A compendium of such information would be useful in preventing similar failures in the future.

FOOTNOTES

1. The James F. Lincoln Arc Welding Foundation, DESIGN OF WELDMENTS, (The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, 1963)p.3.2
2. Machine Design, FATIGUE IN BOLTS, (The Penton Publishing Co., Cleveland, Ohio, Sept. 15, 1966)p.182.
3. Machine Design, FATIGUE IN BOLTS, (The Penton Publishing Co., Cleveland, Ohio, Sept. 15, 1966)p.185.
4. Machine Design, FATIGUE IN BOLTS, (The Penton Publishing Co., Cleveland, Ohio, Sept. 15, 1966)p.186.
5. Theo. Baumeister, Ed., STANDARD HANDBOOK FOR MECHANICAL ENGINEERS, Eighth Ed., (McGraw-Hill Book Co. New York, 1978)p.5-10

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1. The James F. Lincoln Arc Welding Foundation, DESIGN OF WELDMENTS, (The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, 1963)
2. Machine Design, FATIGUE IN BOLTS, (The Penton Publishing Co., Cleveland, Ohio, Sept. 15, 1966)
3. Theo. Baumeister, Ed., STANDARD HANDBOOK FOR MECHANICAL ENGINEERS, Eighth Ed., (McGraw-Hill Book Co. New York, 1978)
4. Viglione, Joseph, in Machine Design, NUT DESIGN FACTORS, (The Penton Publishing Co., Cleveland, Ohio, Aug. 5, 1965)
5. Gordon, J.E., THE NEW SCIENCE OF STRONG MATERIALS, (Penguin Books Ltd., Harmondsworth, Middlesex, 1976)
6. National Research Council of Canada, CANADIAN STRUCTURAL DESIGN MANUAL, (Canadian Standards Assoc. Rexdale, Ontario. 1970)
7. Gordon, J.E., STRUCTURES or Why things don't fall down, (Plenum Press, New York, London, 1978)

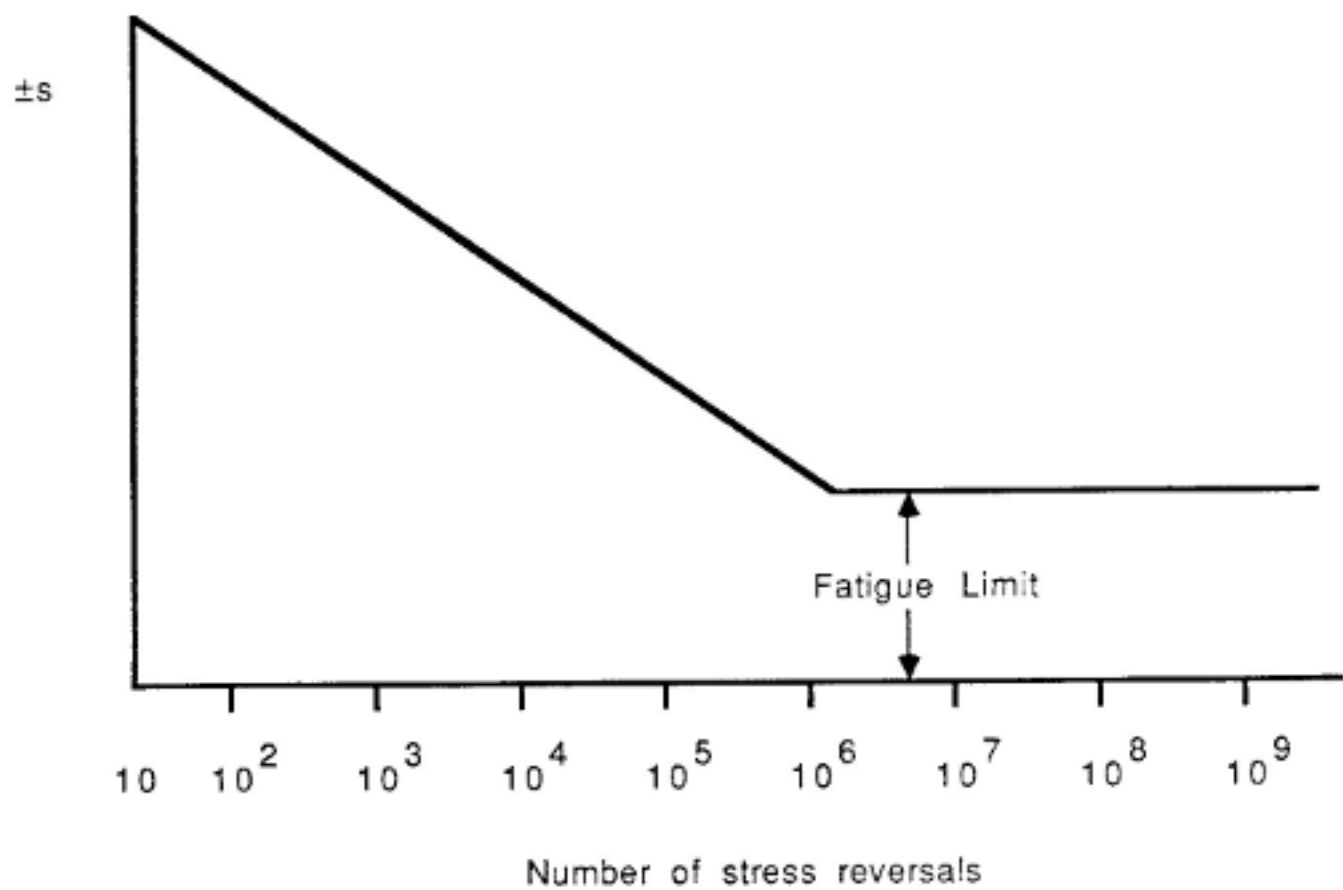


FIGURE 1

OFFICE USE ONLY	
MEMBERSHIP #	
RACING #	

VINTAGE ROAD RACING ASSOCIATION

The Vintage Road Racing Association was founded in 1980 to bring together those motorcycling enthusiasts whose main interest is the collection and preservation of vintage racing motorcycles. To further this aim, the V.R.R.A. will encourage active participation in vintage road racing by organizing one major vintage road race annually and by supporting other race meetings by invitation. The V.R.R.A. is affiliated with the C.M.A. (Canadian Motorcycle Association)

APPLICATION FOR MEMBERSHIP

NAME _____

ADDRESS _____

CITY _____ PROV/STATE _____ CODE _____

TELEPHONE (home) _____ (business) _____

CLUB AFFILIATIONS _____

C.M.A.# _____ A.M.A.# _____ R.A.C.E.# _____

Road Racing Experience (continue on back of form if necessary):

Membership Fees: \$25.00 per year from Jan. to Dec. renewable each January. \$10.00 for second and subsequent members in the same household. After Sept. \$1.50 per month in addition to the following year's full fees. (New Members).

I hereby apply for membership in the Vintage Road Racing Association (VRRR) and agree to abide by its rules and regulations.

Date _____ Signed _____

SEND APPLICATION TO;
 MRS. MANZI WARWICK
 VRRR MEMBERSHIP SECRETARY
 1870 SPRUCE HILL ROAD
 PICKERING, ONTARIO
 CANADA L1V1S7.
 416-839-7464

GENERAL CORRESPONDENCE AND ENQUIRES;
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