

II. Substantial Risk Factors:

RP950170

A. Pattern of defect:

Other: The problem is with the manufacturing process used and flaws in Q/C inspection.

B. Involved Products: 324

Total Manufactured/Imported: 324

Undistributed with mfg:

Total Distributed: 324

Distributor/Retailer: 0

Consumer: 303

Date(s) of production: Jan to May 1993

Date(s) of distribution: Jan 1993 to Feb 1994

Geographic Distribution: Worldwide

C. Severity of the Risk:

1. Seriousness of Injury: If a headlug fractures the rider would loose ability to steer his bicycle and could suffer a fall which could result in broken bones or head injuries.

2. Likelihood of injury: Low, since very few of the frames with the defective weld are in the hands of the consumer [300]. The technical analysis done by ESME has determined that some warning would be given to the rider if the headlug were to crack or even break i.e. vibrations, steering difficulty, and the rider would sstop use of the bicycle.

3. Number of incidents & type: 2 incidents involving cuts and broken bones.

III. Assessment of the Substantiality of the Hazard

Substantial hazard, classification C

Preliminary determination that risk of injury exists, remedial action by firm be acknowledged and file closed.(Classification D).

64

RP950170

IV. Compliance with Reporting Obligation:

Further investigation and review recommended

No further investigation recommended at this time

PD APPROVALS:

Compliance Officer _____
J. DeMarco

Attorney _____
Ron Yelenik

Asst. Director, CCA _____
C. Downs





U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

OFFICE OF COMPLIANCE
DIVISION OF REGULATORY MANAGEMENT

Tel: 301-504-0400

FAX: 301-504-0359

DATE: 12/13/95 PAGES TRANSMITTED 1 (cover)
TO: PAT McVey
TITLE: att'y for Raleigh USA
OFFICE: _____
FAX #: 206-389-1708

FROM: J. Demarco

REMARKS: For your review,
Comment + approval.

NOTE: If all pages are not received, or if you have problems with this transmittal, please contact the person listed above.

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*** ACTIVITY REPORT ***

TRANSMISSION OK

TX/RX NO.	7002
CONNECTION TEL	912063891708
CONNECTION ID	
START TIME	12/13 11:41
USAGE TIME	01'33
PAGES	2
RESULT	OK

67

SUITE 4400 • 1001 FOURTH AVENUE PLAZA • SEATTLE, WASHINGTON 98154

Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

TELECOPY COVER LETTER

DATE: December 11, 1995

TIME: 12:20 pm

PLEASE DELIVER TO:

NAME: James A. DeMarco

FAX NO.: 301/504-0359

OFFICE: CPSC

CITY: Washington, D.C.

PHONE:

THIS TRANSMISSION IS FROM:

Patrick D. McVey, Esq.

RIDDELL, WILLIAMS, BULLITT &
WALKINSHAW

1001 Fourth Avenue Plaza, Suite 4400
Seattle, WA 98154

ADDITIONAL MESSAGE:

ATTACHED IS THE REVISED DRAFT OF THE PRESS RELEASE. PLEASE CONTACT EITHER ME OR DOUG FLEMING AS SOON AS POSSIBLE TO DISCUSS IT.

THIS TRANSMISSION CONSISTS OF 3 PAGE(S) (EXCLUDING THIS COVER LETTER).

TO SEND TO US, CALL 206/389-1708. TO TALK TO US, CALL 206/624-3600.

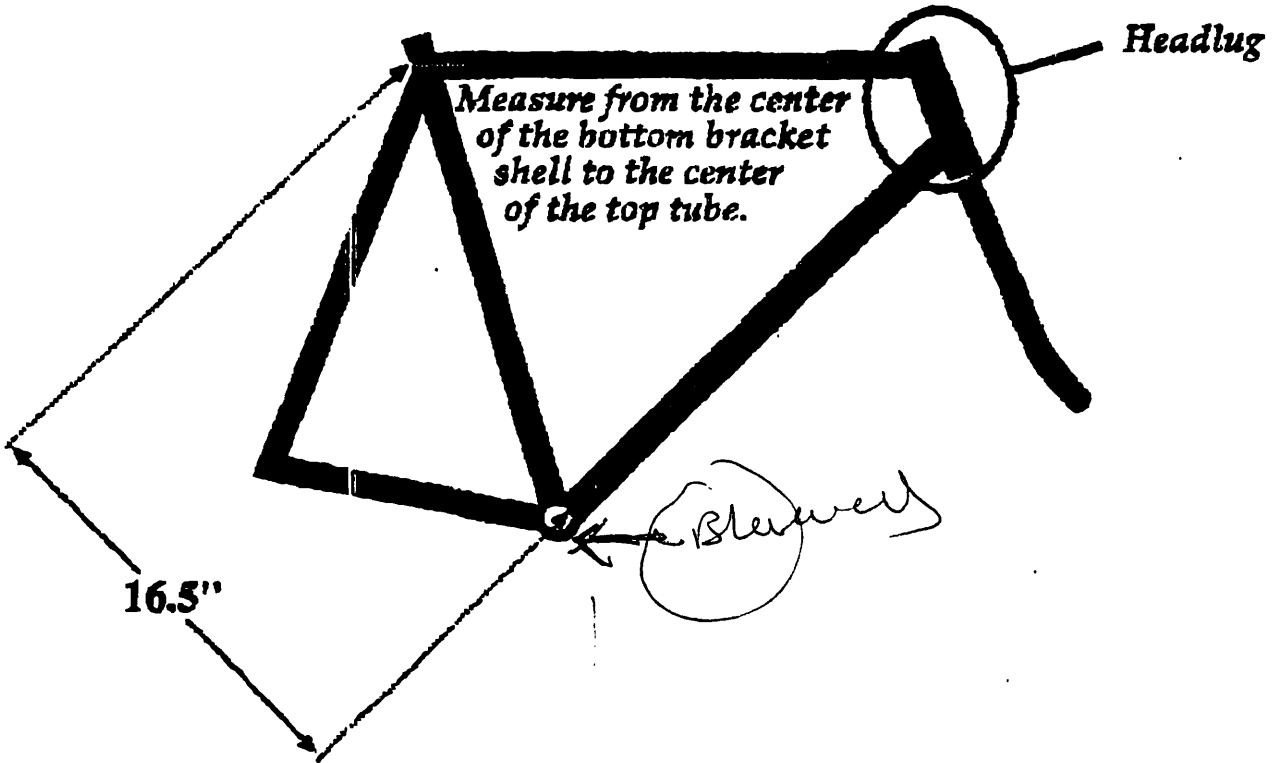
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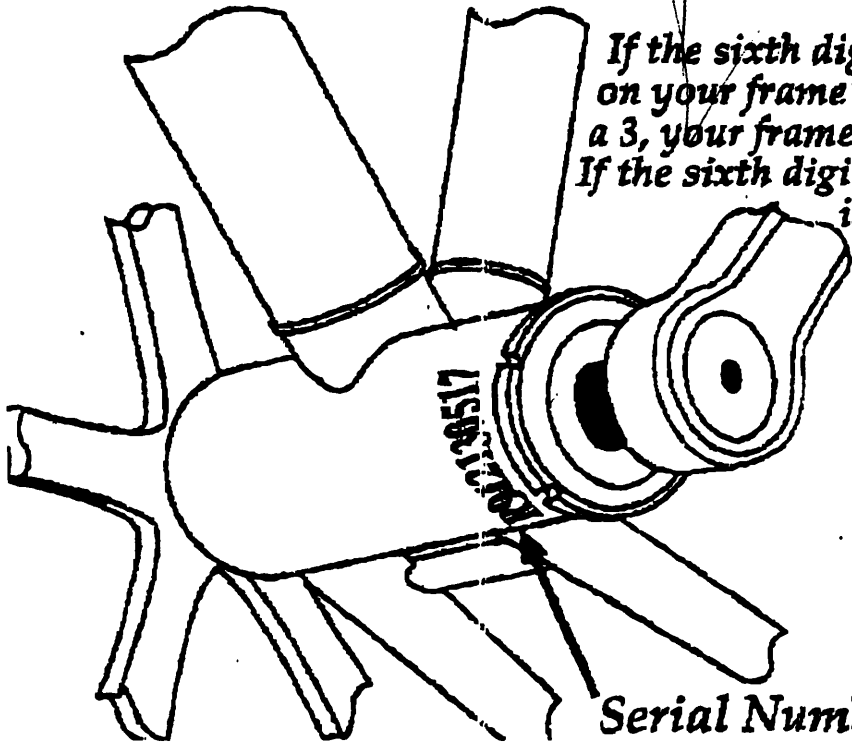
Telecopier Operator: _____

Kathleen St. Marie (x540)
Return to: Doug Fleming

Do You Have a 16.5" Frame?



Is Your Frame on the Recall?



If the sixth digit from the left on your frame's serial number is a 3, your frame must be replaced.
 If the sixth digit from the left is a 2, your frame does not need to be replaced.

underline

R91210517

REPLACE FRAME

R93110522

FRAME O.K.

Serial Number Location

19

Author: Catherine N. Premo at CPSC-HQ1
Date: 12/8/95 3:18 PM
Priority: Urgent
Receipt Requested
TO: James A. DeMarco at CPSC-HQ2
Subject: questions --raleigh

----- Message Contents -----

Could you check on these questions? I need the info down here as I clean up the draft a bit. Thanks!

How many incidents are there in which frames cracked or broken?

How many injuries have there been? What is the least severe to most severe -- ie., ranging from cuts and bruises to brain damage...

Do the bikes have any distinguishing marks or labels or anything?

Can you name some of the stores that sold the bikes?

When you ask for a line drawing, could you try to get drawings of the bike, the frams and where the serial number is?)John Fitch got a great drawing for the radio flyer trikes -- take a look at it and let's see if we can get a similar one from Raleigh.)

MUCHAS GRACIAS!

~~\$500~~ → \$700

rather than
prop. ~~minor~~
injuries. 206
624-3600

Burns
cuts
teeth cut
tongue

70



U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

OFFICE OF COMPLIANCE
DIVISION OF REGULATORY MANAGEMENT

Tel: 301-504-0400

FAX: 301-504-0359

DATE: 12/11/95 PAGES TRANSMITTED 1 + cover

TO:

PAT McVey / Doug Fleming

TITLE:

ATCjs - Raleigh Beke

OFFICE:

Rodell, Wms, Bullitt & Walkerslow

FAX #:

206-389-1708

FROM:

J. DeMarco x1353

REMARKS:

Additional Qus from
OIPA

NOTE: If all pages are not received, or if you have problems with this transmittal, please contact the person listed above.

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7/

Author: Catherine N. Premo at CPSC-HQ1
Date: 12/8/95 3:18 PM
Priority: Urgent
Receipt Requested
TO: James A. DeMarco at CPSC-HQ2
Subject: questions --raleigh

NOTE

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MUCHAS GRACIAS!

PAT / Doug

Additional Questions
from OIPA!

Please Call me!

J.

72



U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

OFFICE OF COMPLIANCE
DIVISION OF REGULATORY MANAGEMENT

Tel: 301-504-0400

FAX: 301-504-0359

DATE: 12/8/85 PAGES TRANSMITTED 2 + cover
TO: PAT McVey
TITLE: ATTY for Raleigh USA
OFFICE: _____
FAX #: 206-389-1208

FROM: J. DeMARCO X1353

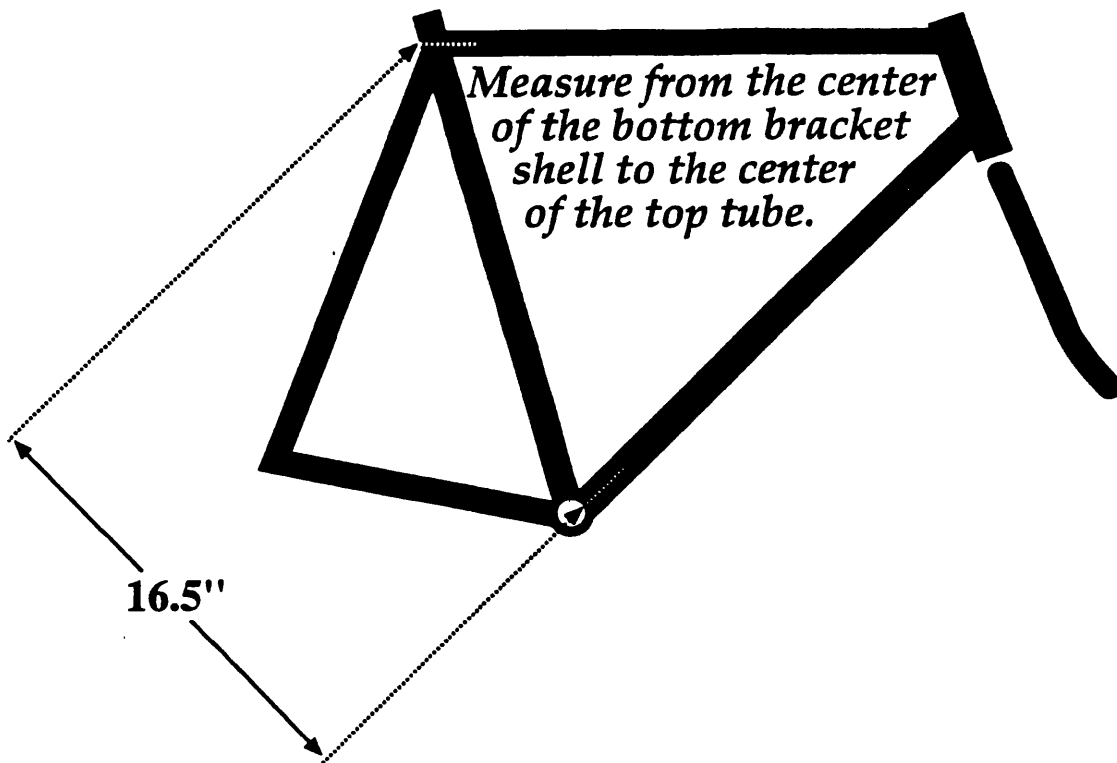
REMARKS: See DRAFT attached
return ASAP

NOTE: If all pages are not received, or if you have problems with this transmittal, please contact the person listed above.

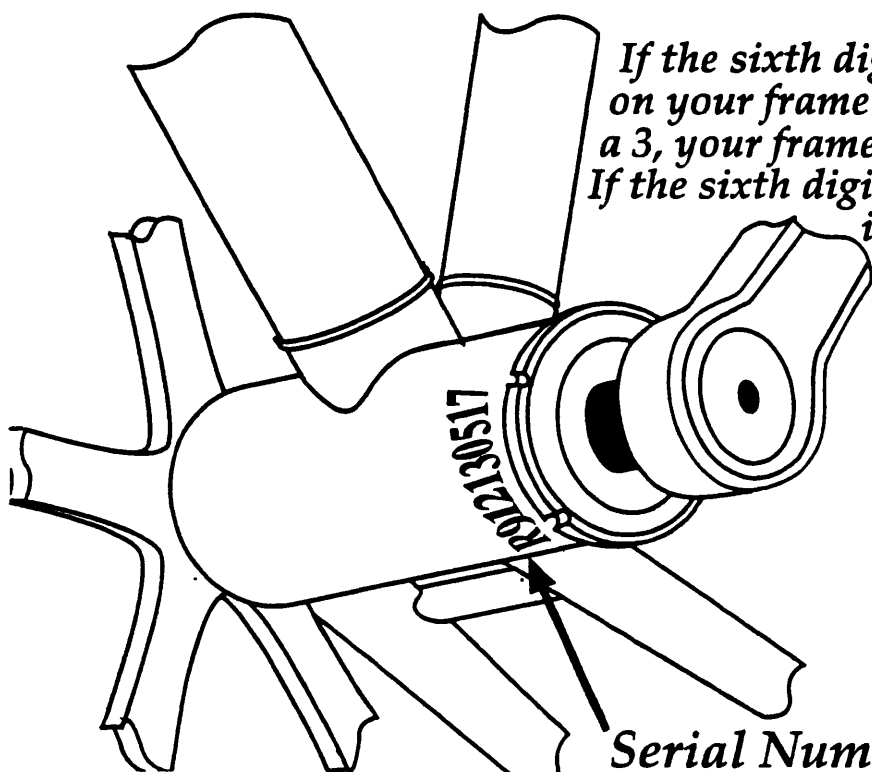
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73

Do You Have a 16.5" Frame?



Is Your Frame on the Recall?



If the sixth digit from the left on your frame's serial number is a 3, your frame must be replaced.
If the sixth digit from the left is a 2, your frame does not need to be replaced.

~~R912130517~~

REPLACE FRAME

~~R931120522~~

FRAME O.K.

A



RALEIGH*USA
BICYCLE COMPANY

1993 16.5" MT 400 Mountain Technium Bike Frame Recall

16.5" Raleigh MT 400 frames, (serial numbers R**3****, 300 frames total), are being recalled and will require replacement of the frame. All other sizes of 1993 MT 400's, (15", 18.5", 20.5"), will not require replacement. All 1993 MT 400 frames are measured from the center of the bottom bracket to the center of the seat tube/top tube junction.**

It has been determined that these 16.5" 1993 Raleigh MT 400 bicycle frames (300 total) may be susceptible to cracking at the headlug. This potential headlug cracking, during riding, could possibly lead to serious injury and/or death.

The Consumer Product Safety Commission has been notified of the situation and your cooperation and full participation is crucial in achieving a successful recall of these frames. Please contact Raleigh USA at 1-(800) 222-5527 or your Raleigh bicycle dealer if you believe you have one of these frames.

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"FILE CHRONOLOGY"

11/13 Called + sent FAX
up late - "Progress" ?

11/27 Response Rec'd

"DO Close"

SUITE 4400 · 1001 FOURTH AVENUE PLAZA · SEATTLE, WASHINGTON 98154

Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

TELECOPY COVER LETTER

DATE: November 15, 1995

TIME: 5:18pm

PLEASE DELIVER TO:

NAME: Marc Schoem, Director

FAX NO.: 301/504-0359

OFFICE: CPSC

CITY: Washington, D.C.

PHONE: 301/504-0608

THIS TRANSMISSION IS FROM:

Patrick D. McVey, Esq.

RIDDELL, WILLIAMS, BULLITT &
WALKINSHAW

1001 Fourth Avenue Plaza, Suite 4400
Seattle, WA 98154

ADDITIONAL MESSAGE:

ATTACHED IS MY LETTER TO YOU OF EVEN DATE RE CPSC No. RP950170.

THIS TRANSMISSION CONSISTS OF 1 PAGE(S) (EXCLUDING THIS COVER LETTER).

TO SEND TO US, CALL 206/389-1708. TO TALK TO US, CALL 206/624-3600.

IF THERE IS A PROBLEM WITH TRANSMISSION OR YOU DO NOT RECEIVE ALL OF THE PAGES, PLEASE CALL 206/624-3600 x606 AS SOON AS POSSIBLE.

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Telecopier Operator: _____

Kathleen St. Marie (x540)
Return to: Patrick D. McVey

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Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

PATRICK D. MCVEY

November 15, 1995

VIA FAX NO. 301/504-0359

Mr. Marc J. Schoem
Director
Division of Corrective Actions
U.S. Consumer Product Safety Commission
4330 East West Highway, Room 613
Washington, D.C. 20207-0001

Re: 1992 16.5-Inch Lee Chi Head Lug
Part No.: 001-1483-110
CPSC No. RP950170

Dear Mr. Schoem:

I am writing to confirm our telephone conversation this morning regarding the above referenced matter. As we discussed, Derby Bicycle d/b/a Raleigh U.S.A. Bicycle Company ("Raleigh") will respond to Mr. Demarco's November 13, 1995 facsimile by November 20, 1995. In the interim, if you have any questions, please do not hesitate to contact me.

Thank you for your cooperation.

Very truly yours,

Patrick D. McVey
Patrick D. McVey

PDM:ks

Doc ID: 239780 5852-38
DNF:KSN 11/15/95

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Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

CONFIRMATION COPY

PATRICK D. McVEY

November 15, 1995

VIA FAX NO. 301/504-0359

Mr. Marc J. Schoem
Director
Division of Corrective Actions
U.S. Consumer Product Safety Commission
4330 East West Highway, Room 613
Washington, D.C. 20207-0001

Re: 1993 16.5-Inch Lee Chi Head Lug
Part No.: 001-1403-110
CPSC No. RP950170

Dear Mr. Schoem:

I am writing to confirm our telephone conversation this morning regarding the above referenced matter. As we discussed, Derby Bicycle d/b/a Raleigh U.S.A. Bicycle Company ("Raleigh") will respond to Mr. Demarco's November 13, 1995 facsimile by November 20, 1995. In the interim, if you have any questions, please do not hesitate to contact me.

Thank you for your cooperation.

Very truly yours,


Patrick D. McVey

PDM:ks

Doc ID: 239780 5852-38
DHF:KSM 11/15/95



Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

PATRICK D. McVEY

November 20, 1995

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OF RALEIGH USA BICYCLE COMPANY**

**VIA FAX NO. 301/504-0359 (WITHOUT ENCLOSURES)
ORIGINAL VIA AIRBORNE EXPRESS**

Mr. James A. DeMarco
Compliance Officer
Division of Corrective Actions
U.S. Consumer Product Safety Commission
4330 East West Highway, Room 613
Washington, D.C. 20207-0001

**Re: Lee Chi Head Lug on 16.5 Inch Raleigh MT400 Bicycles,
Case No. RP95-170**

Dear Mr. DeMarco:

I am writing on behalf of Derby Bicycle Company d/b/a Raleigh U.S.A. Bicycle Company ("Raleigh") in response to your November 13, 1995 facsimile and to provide you an update regarding the above referenced case.

The action plan set forth in Raleigh's May 19, 1995 letter has been implemented. As is described in the Dealer Notice provided with the May 19 letter, Raleigh has offered to provide a free new frame for each bicycle, including shipping the frame to the dealer at Raleigh's expense and prepaid postage on the carton for returning the recalled frame. Raleigh has also agreed to pay the dealer for the frame change over labor upon receipt of the recalled frame.

As discussed in the May 19 letter, Raleigh identified a potential universe of 938 MT-400 and 28 FT-500 bicycles which could possibly have a head lug which was not properly heat

Mr. James A. DeMarco
November 20, 1995
Page 2

ts
treated. Raleigh has confirmed that all 24 of the 28 MT-500 bicycles which were distributed, were distributed domestically. As a result of further review of its sales records, Raleigh has determined it is not possible to determine the exact number of the 938 MT-400 bicycles which were shipped domestically because the 938 were commingled with an additional 187 MT-400 bicycles from production runs which occurred prior to the time Raleigh received the improperly heat treated head lugs from Lee Chi. Raleigh records confirm that 412 of the 1125 bicycles (938 subject bicycles plus 187 from prior runs) were shipped to domestic dealers and that the remaining 713 were shipped to foreign dealers. What Raleigh does not know is how many of the 412 bicycles shipped domestically were from the 938 subject bicycles versus from the 187 MT-400 bicycles manufactured prior to the time Raleigh received the improperly heat treated head lugs. In other words, the actual number of domestically distributed subject bicycles ranges from 412 (if all 187 commingled bicycles were distributed to foreign dealers) to 225 (if all 187 commingled bicycles were distributed to domestic dealers). Based upon Raleigh's understanding of how these bicycles were distributed, Raleigh continues to believe that approximately 300 of the subject bicycles ended up being shipped to domestic dealers.

On May 22, 1995 Raleigh called and sent the dealer notice by certified mail to all dealers who received any of the 1993 16.5 inch MT-400 or FT-500 bicycles, including the 187 domestic dealers who received one or more of the subject MT-400 or FT-500 bicycles. Raleigh was able to contact 171 of the 187 domestic dealers. (Raleigh is attempting to contact the remaining dealers and to obtain information sufficient to contact customers.) Thirty-nine (39) of the dealers contacted provided customer lists to Raleigh which identified a total of 46 consumers. Raleigh sent the consumers notice to each of those consumers along with self-addressed cards for the consumer to return to Raleigh. Raleigh received 17 of these customer return cards. To date as a result of the recall efforts Raleigh has replaced 21 bicycle frames of domestic consumers and has received 14 of the subject bicycle frames from the field. Dealer

Raleigh has also followed up on the original recall effort. Raleigh resent dealer notice to the 148 dealers who did not provide the customer list as a requested in the dealer notice and resent the consumer notice to the 29 consumers who did not return

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Mr. James A. DeMarco
November 20, 1995
Page 3

the acknowledgement cards as requested in the consumers notice. Raleigh is using personnel to follow up the second dealer and customer notices with telephone calls to encourage response and insure that recall efforts are reported back to Raleigh and will follow the same procedure with additional customers which are identified as a result of this follow up activity.

As a result of the recall effort, and because of the model year of the subject bicycles, Raleigh does not believe that there are any of the subject bicycles in the possession of dealers, other than those being received as part of the recall effort.

Raleigh continues to believe that the most effective way to identify any additional problem bicycles which may remain in the field is to complete the follow up efforts which are currently underway. Attached as Exhibits A and B are copies of the dealer and customer lists which will allow the CPSC staff to complete effectiveness checks. Although no additional accidents or claims have been reported since our letter to Mr. Marc. J. Schoem dated May 19, 1995, Raleigh also intends to issue a press release to trade publications and requests that the CPSC join with Raleigh to issue a joint press release to the CPSC mailing list to achieve broader coverage and greater effectiveness. A draft press release is attached as Exhibit C for your review and input.

As noted in the heading of this letter, Raleigh considers the vendor, dealer, and other information furnished to the Commission in this report to be trade secret and confidential. The release of this information would harm the competitive position of Raleigh. Accordingly, confidential treatment of this letter is requested under the applicable provisions of the Consumer Products Safety Act, Freedom of Information Act, Trade Secrets Act, and the regulations implementing such laws.

Sincerely,

Patrick D. McVey
Patrick D. McVey.

PDM/lpv:ks
Enclosures
Doc ID: 239-288 5852-38
DHF:KSM 11/20/95

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**U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207**

**OFFICE OF COMPLIANCE
AND ENFORCEMENT**

Division of
Corrective Actions
Tel: 301-504-0608 Ext. 1353
Fax: 301-504-0359

DATE: November 13, 1995 PAGES TRANSMITTED: Cover Only
TO: Patrick McVey
TITLE: Atty for Derby Cycles/dba Raleigh USA
OFFICE: FAX 206-389-1708

FROM: James A. DeMarco, Compliance Officer, CCA, HQ

REMARKS: Please forward an update on Case # RP95-170, re: head lug breakage; numbers remaining with consumers, retailers, numbers corrected or repaired or replaced; types of notice and dates of notice - e.g. Point-of-purchase-posters hung for how long? Also, I need a sampling of customer lists both retailers and consumers so the CPSC Staff can do effectiveness checks on the recall in the filed. Please call me if there is going to be a delay of more than 48 hours.

NOTE: If you have any problems with this transmittal, please contact the person listed above.

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Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

May 19, 1995

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OF RALEIGH USA BICYCLE CORPORATION

95
MAY 22 11:21
1995

Mr. Marc J. Schoem
Director
Division of Corrective Actions
U.S. Consumer Product Safety Commission
4330 East West Highway, Room 613
Washington, D.C. 20207-0001

Re: 1993 16.5-Inch Lee Chi Head Lug
Part No.: 001-1403-110
CPSC No. RP950170

Dear Mr. Schoem:

I am writing on behalf of Derby Bicycle d/b/a Raleigh U.S.A. Bicycle Company ("Raleigh") to provide the information requested in your facsimile dated May 12, 1995.

Raleigh responds to the requests in your facsimile dated May 12, 1995, as follows:

- 1) Patrick D. McVey, Attorney
Riddell, Williams, Bullitt & Walkinshaw
1001 Fourth Avenue Plaza
Seattle, Washington 98154
Phone: (206) 624-3600
Fax: (206) 389-1708
- 2) Manufacturer of Head Lugs:

Lee Chi Enterprises Co., Ltd.
No. 4-5 Shu-Pai Li, Cheng Hwa City
Taiwan, R.O.C.

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Manufacturer of Bicycle Using These Head Lugs:

Derby Cycle Corporation
d/b/a Raleigh U.S.A. Bicycle Company
22710 72nd Avenue South
Kent, Washington 98032

3) Head Lugs:

Lee Chi Alloy Head Lug, Part No. 001-1403-110

Bicycles:

Raleigh 1993 MT-400
General Purposes A.T.B. Style Bicycle
Size/Color: Men's 16.5 inch/two-tone black and red

Raleigh 1993 FT-500
General Purposes A.T.B. Style Bicycle
Size/Color: Men's 16.5 inch/two-tone black and white

- 4) Fracture of head lug on the bicycle as a result of improper heat treatment by the component manufacturer.
- 5) Derby is aware of a 16.5-inch Raleigh MT-400 bicycle with a Lee Chi head lug which was involved in an injury accident in Bozeman, Montana. Although Raleigh has not yet been able to confirm the extent of injuries, the injured party has claimed facial lacerations and related injuries. Raleigh is aware of one other accident involving a Lee Chi head lug on a 1993 16.5-inch Raleigh MT-400 bicycle which occurred in New Jersey and which apparently involves very minor injuries. Raleigh has not yet examined the bicycle involved in the New Jersey accident, but suspects that improper heat treatment of the head lug by the component manufacturer may exist on the bicycle. Although Raleigh is not aware of any other injuries to date, head lug failure could result in serious personal injury or death. See Safety Recall Notice #1 attached as Exhibit A.
- 6) The 1993 Raleigh MT-400 and FT-500 bicycles were built using a manufacturing process known as the Technium process, which entailed press-fitting and bonding of aluminum alloy tubes to an aluminum alloy head lug purchased from and manufactured by Lee Chi Enterprises Co., Ltd. of Taiwan. During the Technium manufacturing process, if the machine was not properly aligned, or if the component head lug was improperly sized or otherwise flawed, the head lug could crack. Cracked or otherwise flawed head lugs which were

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identified during quality control or manufacturing process were either discarded or returned to Lee Chi for refund.

Raleigh manufactured 5,024 1993 MT-400 bicycles of all sizes. Raleigh manufactured 938 Men's 16.5 inch MT-400 bicycles which could potentially have used a head lug manufactured by Lee Chi with improper heat treatment. Of these 938 bicycles, 302 were distributed domestically, 633 were distributed internationally and 3 have been destroyed in testing.

Raleigh manufactured 28 1993 16.5 inch FT-500 bicycles in June 1993. Of these 28 bicycles, 24 were distributed domestically between June 1993 and October 1994. The disposition of the other four (4) bicycles is presently being researched.

In early 1994, Derby received a 1993 MT-400-16.5 inch frame set with a cracked Lee Chi head lug from a dealer in Argentina. A copy of the warranty claim is attached as Exhibit B. The dealer reported that the frame set being returned was identified as cracked when it was taken out of the box. An initial inspection of the Argentina bicycle indicated that the head lug failure appeared to be different than the typical failure resulting from an improper sized head lug or a mistake in the frame assembly procedure. On March 17, 1994, Raleigh retained Northwest Laboratories to test the Argentina bicycle. A copy of that report is attached as Exhibit C. The report suggests that the head lug on the Argentina bicycle had been improperly heat treated.

Because a head lug failure results in the frame needing to be replaced, Raleigh was confident that any domestic failures which occurred would be reported as warranty claims. Since the international distribution chain is longer and typically provides less feedback, on March 2, 1994, Raleigh contacted its international distributors to conduct a product and quality audit of the 1993 Raleigh MT-400 bicycle. None of the responses Raleigh received reported any problems with the head lug.

On April 11, 1994, Raleigh destructively tested thirty (30) randomly selected 1993 MT-400 bicycles still in its possession. That testing revealed zero failures. A copy of the destructive testing which occurred on April 11, 1994 is attached as Exhibit D. On May 19, 1994, Raleigh retained Pacific Testing Laboratories to reexamine the Argentina bicycle to determine whether Northwest Laboratories had accurately identified the problem. A copy of the Pacific



Testing Laboratories report is attached as Exhibit E. Because there had been no new reports of any problems, Raleigh had seen no Lee Chi head lugs on MT-400s or FT-500s sold domestically which had a heat treatment problem, and the condition on the Argentina bicycle's head lug had occurred immediately (out of the box), Raleigh did not believe there were any problem bicycles in the field.

On November 22, 1994, Raleigh received notice of an injury accident involving a 1993 Raleigh MT-400 which occurred in Bozeman, Montana. A copy of the notice is attached as Exhibit F. An inspection of this bicycle was conducted at the University of Montana on April 25, 1995. That examination revealed that the Lee Chi head lug on the Montana bicycle may have fractured as a result of improper heat treatment by Lee Chi.

At this time, Raleigh examined its records further to determine whether there was any indication that there was a product problem associated specifically with the Lee Chi head lugs used on the 1993 MT-400 and FT-500 bicycles. Raleigh's records and investigation indicate that there were a number of Lee Chi head lugs to be used on the 16.5-inch Raleigh MT-400 and FT-500 bicycles which were shipped to Raleigh in December of 1992 and which were identified as either cracked upon inspection or as having cracked during the frame assembly process. These head lugs were sorted out and rejected during Raleigh's incoming, and in-process quality control procedure. It was believed at the time that all such head lugs had been identified and sorted out in the production process. There is no record of any similar problem with other size head lugs nor have the other sizes experienced any problem in the field.

On May 5, 1995, Raleigh notified the CPSC of the status of its investigation into this problem. A copy of that letter is attached as Exhibit G.

On May 6, 1995, Raleigh retained X-Ray, Inc. to perform an eddy current inspection of all of the remaining thirty-one (31) 1993 MT-400 bicycles in Raleigh's possession. Following this inspection, all thirty-one (31) 1993 MT-400 bicycles were destructively tested to failure to determine whether there were any problems with the head lugs. A copy of the May 6, 1995 eddy current inspection report and May 8, 1995 destructive testing report are attached as Exhibits H and I, respectively. Thirty (30) of the frames passed the destructive test. The performance of one (1) of the 16.5-inch head lugs during the test raised a question as to whether it met Raleigh's specifications. Subsequent to the

87

destructive testing metallurgical inspection was performed on all of the head lugs about which any questions had been raised either in the eddy current or destructive testing. This inspection revealed no heat treatment problem with any of the head lugs. Unfortunately, only three (3) of the thirty-one (31) bicycles tested (and none of the thirty (30) bicycles tested in April of 1994) were the 16.5-inch frame size, which Raleigh has now isolated as the size with the Lee Chi head lug problem.

Although Raleigh believes that the possibility is remote, in order to insure that there are no additional problem head lugs in the field, Raleigh is undertaking a recall of all 16.5 inch MT-400 and FT-500 bicycles manufactured during 1993, which used the Lee Chi head lug, Part No. 001-1403-110.

- 7) Raleigh's records indicate that 938 16.5-inch Raleigh MT-400 and 28 16.5 inch Raleigh FT-500 bicycles were manufactured using the head lugs in question after the date which Raleigh received the head lugs with this potential problem from Lee Chi in December, 1992.
- 8) The 938 MT-400 and 28 FT-500 bicycles were manufactured between January, 1993 and May 1993. The 302 MT-400 bicycles sold domestically were distributed between January 1993 and February 1994. Most of these were sold domestically at retail between January 1993 and December 1994. It is possible that a very limited number of them remain in dealer inventory. The 28 FT-500 bicycles were manufactured in June 1993 and sold domestically between June 1993 and October 1994.
- 9) Of the 5,024 1993 MT-400s of all sizes built, 61 have been destructively tested by Raleigh. Of the Men's 16.5 inch MT-400s, 302 were distributed domestically, 633 were distributed internationally and 3 were destroyed in testing. Of the 16.5 inch FT-500 bicycles, 24 were distributed domestically. Because of the dates they were distributed, Raleigh assumes that almost all of these bicycles have been sold to consumers.
- 10) The Technium process used on 16.5-inch 1993 MT-400 and FT-500 bicycles is no longer used by Raleigh.
- 11) Recall Plan (the Safety Recall Program documents are attached as Exhibit A).

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- Step 1. Send via certified mail written notice to distributors/dealers (see Safety Recall Notice #1 (MT-400) and #2 (FT-500)).
 - Step 2. Contact distributors/dealers by phone.
 - Step 3. Receive consumer listing from dealers.
 - Step 4. Send notice directly to consumers using consumer listings received from dealers (see Consumer Notice and Ownership Confirmation). Follow up as necessary.
 - Step 5. Once dealers/distributors contact consumers and provide serial numbers and consumer names to Raleigh, Raleigh will ship replacement frames to dealers for replacement at no cost to consumers.
 - Step 6. Dealers/distributors to return recalled frames and are provided a labor credit upon receipt by Raleigh.
 - Step 7. Follow up as necessary.
- 12) See response to No. 11 above.
- 13) Raleigh 1993 16.5-inch MT-400 and FT-500 bicycles were manufactured in Raleigh's Kent, Washington bicycle plant. The head lug which is the subject of this report was manufactured by Lee Chi Enterprises Co., Ltd., in Taiwan. Lee Chi has informed Raleigh that the heat treatment on Lee Chi alloy head lugs is done for Lee Chi by a third party in Taiwan.
- Orders for bicycles are taken by Raleigh field sales representatives and/or in-house customer service representatives from authorized Raleigh bicycle retail dealerships. The boxed partially-assembled bicycles are then shipped to dealers where they are assembled and sold to consumers.
- 14) N/A.
- 15a. The tests, reports, analyses, and evaluations related to the reported problem are attached as Exhibits C, D, E, H and I and are described in the chronology set forth in the response to No. 6 above.

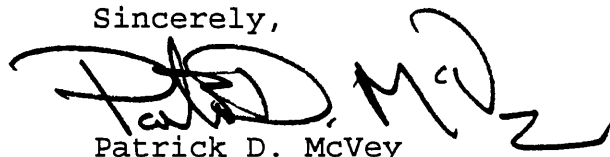
89

Mr. Marc J. Schoem
May 19, 1995
Page 7

- 15b. Lee Chi has provided Raleigh with documents depicting the head lug manufacturing process used by Lee Chi on the subject head lugs. See Exhibit J.
- 15c. See Response to No. 6 above.
- 15d. The warranty claim on the Argentina bicycle and the notice of injury dated November 22, 1994, are attached as Exhibits B and F and are described in the chronology set forth in Response to No. 6 above.
- 15e. As discussed in responses No. 6 through 8 above, Raleigh has no more 1993 16.5-inch MT-400 bicycles in its possession. Raleigh also has no 16.5 inch FT-500 bicycles in its possession. Any remaining bicycles or parts, as well as the metallurgical remains from the Argentina bicycle which were the subject of the Northwest Laboratories and Pacific Testing Laboratories reports attached as Exhibits C and E, respectively, are available on request.
- 15f. See catalog attached as Exhibit K.

As noted in the heading of this letter, Raleigh considers the vendor, dealer, and other information furnished to the Commission in this report to be trade secret and confidential. The release of this information would harm the competitive position of Raleigh. Accordingly, confidential treatment of this letter is requested under the applicable provisions of the Consumer Products Safety Act, Freedom of Information Act, Trade Secrets Act, and the regulations implementing such laws.

Sincerely,



Patrick D. McVey

PDM/wp
Enclosures

90

1993 RALEIGH MT400 16.5" FRAME RECALL

CONSUMER LISTING

Our records indicate that your dealership purchased a maximum possible total of _____ 1993 16.5" MT400 bicycles. Please document, below, each consumer that purchased a 1993 Raleigh MT400 16.5" bicycle and send this information to Raleigh USA within one week of receipt, in the self addressed stamped envelope provided.

1. Consumer Name: _____
Address: _____
Phone: _____
Frame Serial # _____
2. Consumer Name: _____
Address: _____
Phone: _____
Frame Serial # _____
3. Consumer Name: _____
Address: _____
Phone: _____
Frame Serial # _____
4. Consumer Name: _____
Address: _____
Phone: _____
Frame Serial # _____
5. Consumer Name: _____
Address: _____
Phone: _____
Frame Serial # _____

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Consumer Notice #1

1993 Raleigh MT 400 16.5" Frame Recall Notice and Ownership Confirmation

Please complete this form immediately and return to Raleigh USA Bicycle Company. No Postage is required.

1. I have read the recall notice and will/have (circle one) contact(ed) my Raleigh dealership for frame replacement. Yes No
2. If your response to the above question was no, please explain.

3. If you no longer own your 1993 16.5" Raleigh MT 400 bicycle **and** it is owned by another person, please provide the new owner's name and contact information.

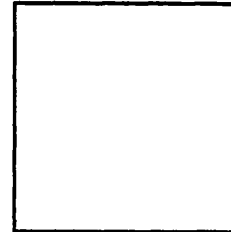
New Owner's Name: _____

Address: _____

Phone Number: _____

Date of Resale: _____

from _____



Raleigh USA Bicycle Company
22710 - 72nd Avenue South,
Kent, WA 98032

Attn. Eric Bailey



RALEIGH·USA
BICYCLE COMPANY

92

SAFETY RECALL NOTICE #1 EXPORT DISTRIBUTOR BULLETIN

Date: May 22, 1995

SUBJECT: 1993 Raleigh MT400 16.5" frames. Bicycle part number 14-23-691

16.5" Raleigh MT400 frames (serial numbers R**3****), are being recalled and will require replacement of the frame.** (see drawing on reverse to determine, by serial number, if your frame is included) All other sizes of 1993 MT400's (15", 18.5", 20.5") will not require frame replacement. All 1993 MT 400 frames are measured from the center of the bottom bracket to the center of the seat tube/top tube junction.

It has been determined that these 1993 16.5" Raleigh MT400 bicycle frames may be susceptible to cracking at the headlug. This potential headlug cracking, during riding, could possibly lead to serious injury and/or death.

The United States Consumer Product Safety Commission has been notified of the situation and your cooperation and full participation is crucial in achieving a successful recall of these frames. Upon receipt of this notice please take the following action:

- 1. Review your sales records and contact (or have your retail dealerships contact) all consumers that purchased the bicycles involved. Notify the consumer of the potential danger and that they must bring their bicycle in for frame replacement. If your records do not include the bicycle serial number, have all purchasers of 16.5" 1993 Raleigh MT400's bring their bicycles into your store for your dealerships so that it can be determined whether or not the bicycle frame is to be replaced (see serial number explanation on reverse)**
- 2. Determine how many replacement frames you require and place an order with Raleigh USA. Please have serial numbers and consumer names ready when placing the replacement frame order.**
- 3. Once you have completed the frame change-over, return (via mail) a bottom bracket cutting of the old frame to Raleigh USA and your account will be reimbursed U.S.\$30.00 for the frame change over labor involved.**

If you have any questions concerning this procedure, please contact your Raleigh USA sales person at 1(800) 222-5527. We are sorry for any inconvenience this may cause you or your customers, but hope for your full support to correct this problem as quickly as possible.

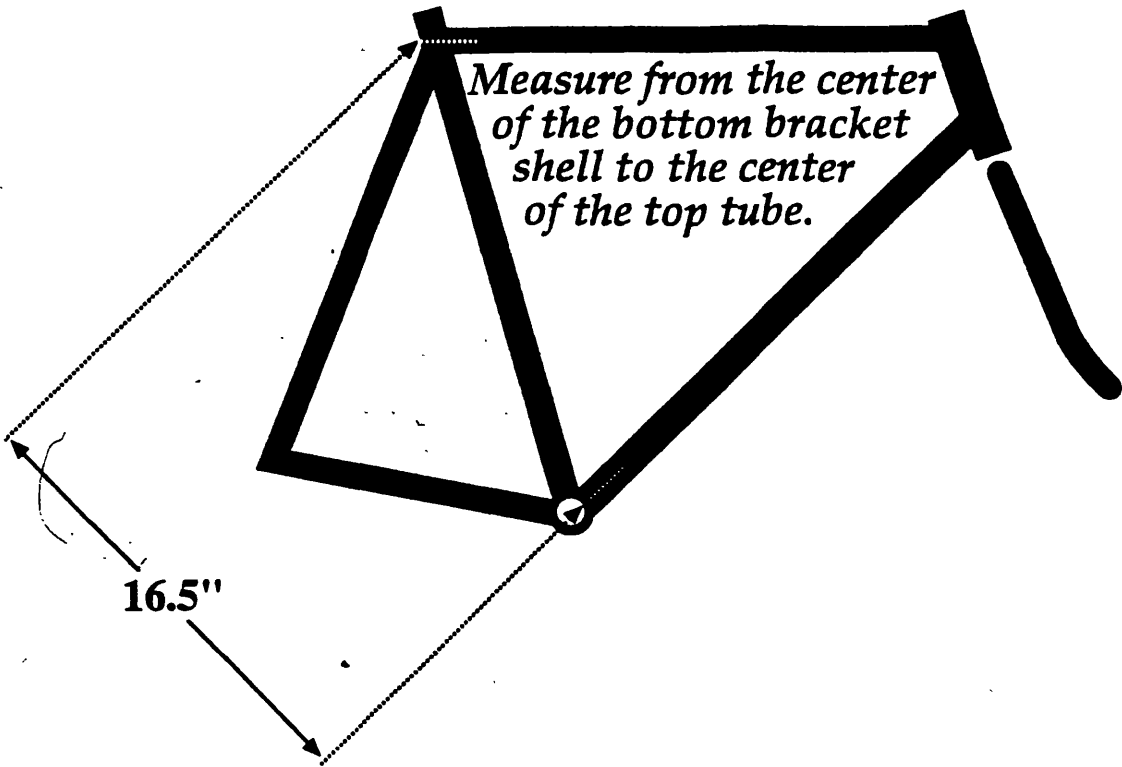
Sincerely,

Raleigh USA Bicycle Company, tradename for Derby Cycle Corporation

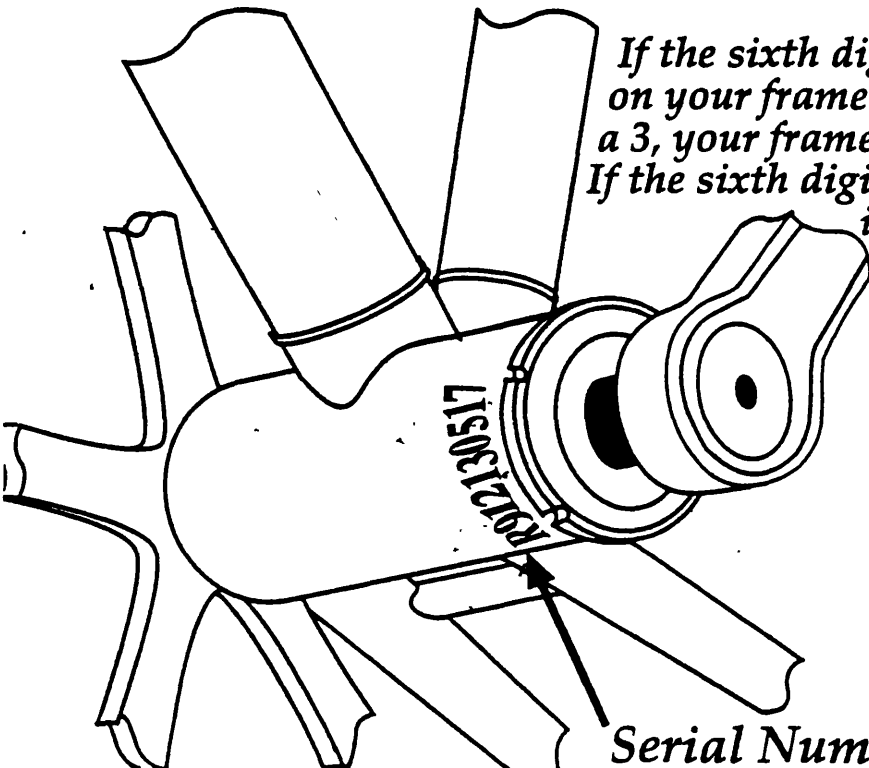
See reverse for Serial Number and Measurement explanation

93

Do You Have a 16.5" Frame?



Is Your Frame on the Recall?



If the sixth digit from the left on your frame's serial number is a 3, your frame must be replaced.
If the sixth digit from the left is a 2, your frame does not need to be replaced.

R9121~~3~~0517

REPLACE FRAME

R9311~~2~~0522

FRAME O.K.

94

SAFETY RECALL NOTICE #2 DEALER BULLETIN

Date: May 22, 1995

SUBJECT: 1993 Raleigh FT500 16.5" frames. Bicycle part number 14-23-707

16.5" 1993 Raleigh FT500 frames (serial numbers R**3****, 24 frames total) are being recalled and will require replacement of the frame (see drawing on reverse to determine, by serial number, if your frame is included). All other sizes of 1993 FT500's (15", 18.5", 20.5") will not require frame replacement. All 1993 FT500 frames are measured from the center of the bottom bracket to the center of the seat tube/top tube junction.**

It has been determined these 16.5" 1993 Raleigh FT500 bicycle frames (24 total) may be susceptible to cracking at the headlug. This potential headlug cracking, during riding, could possibly lead to serious injury and/or death.

The Consumer Product Safety Commission has been notified of the situation and your cooperation and full participation is crucial in achieving a successful recall of these frames. Upon receipt of this notice please take the following action:

- 1. Review your sales records and contact all consumers that purchased the bicycles involved. Notify the consumer of the potential danger and that they must bring their bicycle in for frame replacement. If your records do not include the bicycle serial number, have all purchasers of 16.5" 1993 Raleigh FT500's bring their bicycles into your store so that you may determine whether or not the bicycle frame is to be replaced (see serial number explanation on reverse)**
- 2. Mail to Raleigh USA a listing of all consumers that purchased the bicycles included in this recall. Use the attached form and the self addressed stamped envelope.**
- 3. Determine how many replacement frames you require and place an order with your Raleigh USA Customer Service Representative (1-800-222-5527). Please have serial numbers and consumer names ready when placing the replacement frame order.**
- 4. Once you have completed the frame change-over, return the old frame (save the box the replacement frame came in because it has automatic N/C shipping return labeling on the inside flap) to Raleigh USA and your account will be reimbursed \$30.00 for the frame change over labor involved.**

If you have any questions concerning this procedure, please contact your Raleigh Customer Service Representative at 1(800) 222-5527. We are sorry for any inconvenience this may cause you or your customers, but hope for your full support to correct this problem as quickly as possible.

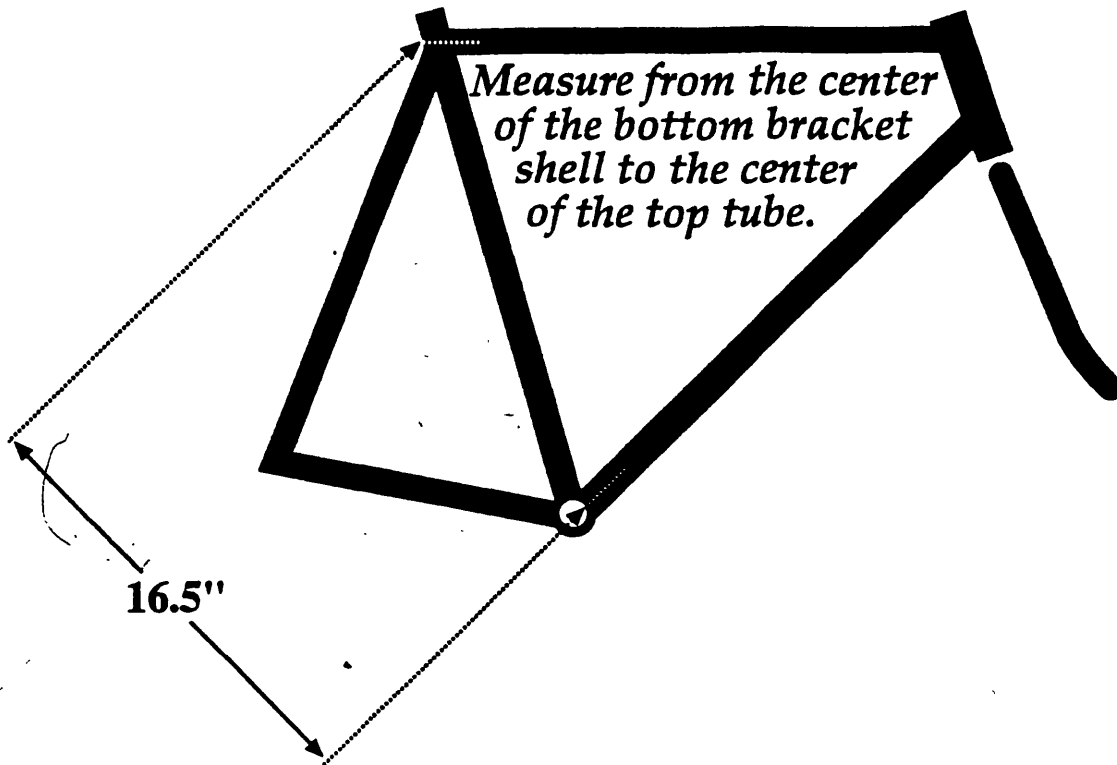
Sincerely,

Raleigh USA Bicycle Company, tradename for Derby Cycle Corporation

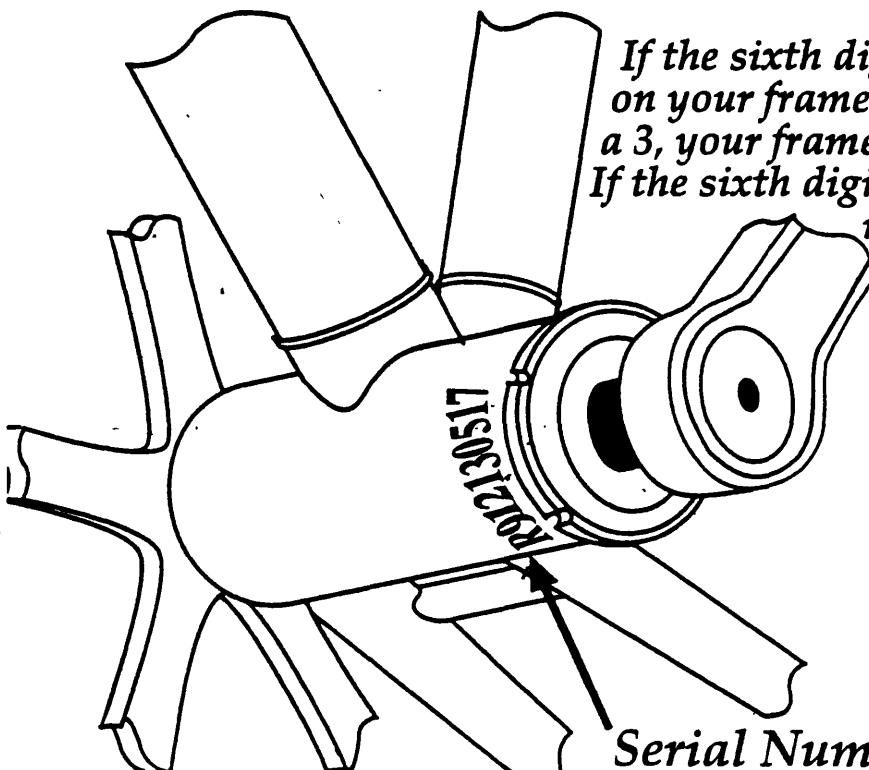
See reverse for Serial Number and Measurement explanation

95

Do You Have a 16.5" Frame?



Is Your Frame on the Recall?



If the sixth digit from the left on your frame's serial number is a 3, your frame must be replaced.
If the sixth digit from the left is a 2, your frame does not need to be replaced.

R9121~~3~~0517

REPLACE FRAME

R9311~~2~~0522

FRAME O.K.

Serial Number Location

9/6

1993 RALEIGH FT500 16.5" FRAME RECALL

CONSUMER LISTING

Our records indicate that your dealership purchased a maximum possible total of _____ 1993 16.5" FT500 bicycles. Please document, below, each consumer that purchased a 1993 Raleigh FT500 16.5" bicycle and send this information to Raleigh USA, within one week of receipt, in the self addressed stamped envelope provided.

1. Consumer Name: _____
Address: _____

Phone: _____
Frame Serial # _____
2. Consumer Name: _____
Address: _____

Phone: _____
Frame Serial # _____
3. Consumer Name: _____
Address: _____

Phone: _____
Frame Serial # _____
4. Consumer Name: _____
Address: _____

Phone: _____
Frame Serial # _____
5. Consumer Name: _____
Address: _____

Phone: _____
Frame Serial # _____

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SAFETY RECALL NOTICE #2
CONSUMER BULLETIN

Date: May 22, 1995
SUBJECT: 1993 16.5" Raleigh FT500 Bicycle frames

1993 16.5" Raleigh FT500 bicycle frames (serial numbers R****3****, 24 frames total) are being recalled. The method of measuring your bicycle for sizing and serial number explanation are shown on the reverse side. If you're not sure if your bicycle is included, contact your Raleigh bicycle dealership for help.

These 24 bicycle frames are being recalled because the frame headlug may have the potential to crack during riding leading to serious injury and/or death.

Your Raleigh bicycle dealership and the United States Consumer Product Safety Commission have been notified of the situation and your full cooperation is crucial in protecting yourself and others from potential harm. Upon receipt of this notice please take the following action:

1. Take your bicycle to your Raleigh bicycle dealer to positively determine if your bicycle frame should be replaced. If your dealer determines your frame needs to be replaced it will be done free of cost unless you would like any optional labor or parts replacement done. Any costs for optional parts/labor would be your responsibility.
2. Please fill out the attached card and return it immediately to Raleigh USA.
3. Please contact your Raleigh bicycle dealer with any questions you may have. We are sorry for any inconvenience this may cause you, but hope for your full cooperation.

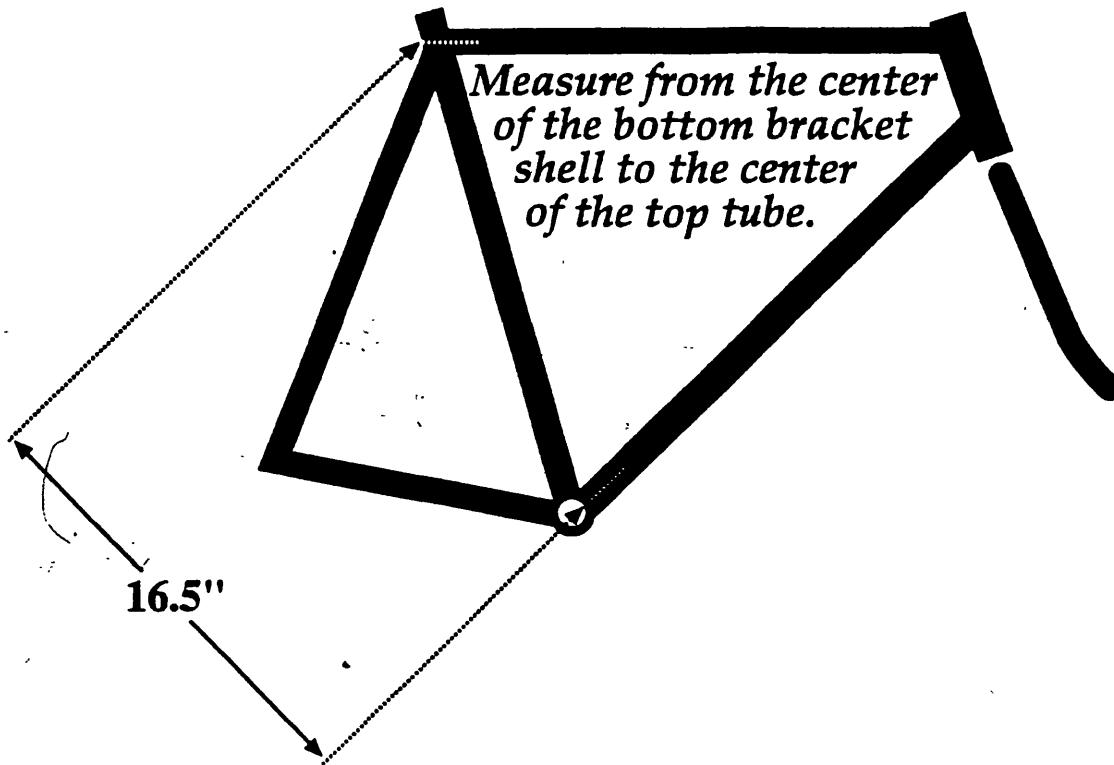
Sincerely,

Raleigh USA Bicycle Company,
tradename for Derby Cycle Corporation

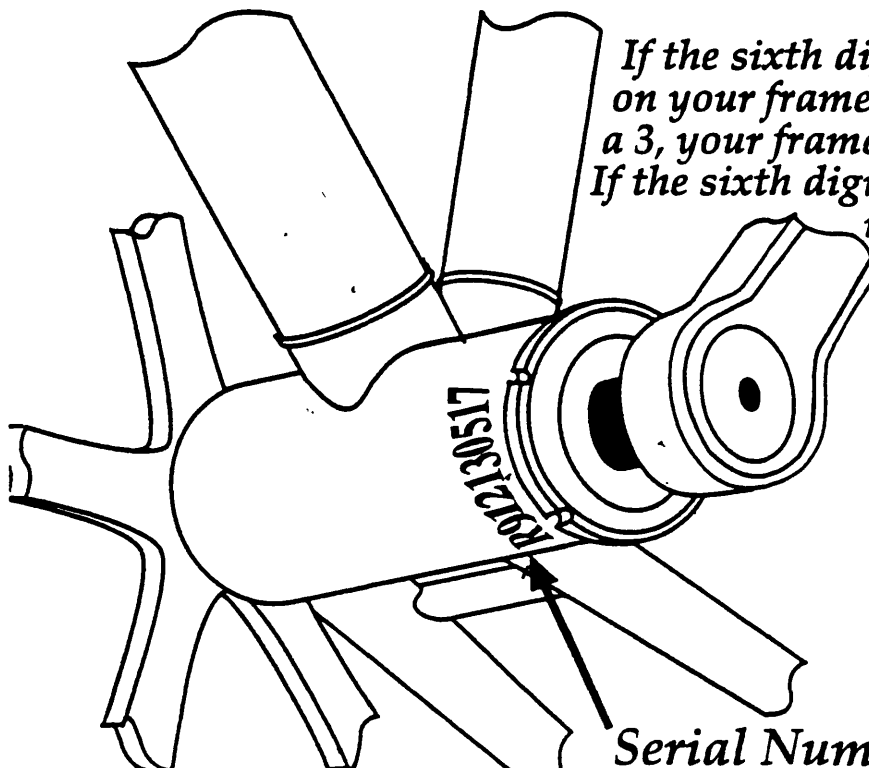
See reverse for serial number and measurement explanation

998

Do You Have a 16.5" Frame?



Is Your Frame on the Recall?



If the sixth digit from the left on your frame's serial number is a 3, your frame must be replaced.
If the sixth digit from the left is a 2, your frame does not need to be replaced.

~~R912130517~~

REPLACE FRAME

R931120522

FRAME O.K.

09

Consumer Notice #2

**1993 Raleigh FT 500 16.5" Frame Recall
Notice and Ownership Confirmation**

Please complete this form immediately and return to Raleigh USA Bicycle Company. No Postage is required.

1. I have read the recall notice and will/have (circle one) contact(ed) my Raleigh dealership for frame replacement. Yes No
2. If your response to the above question was no, please explain.

3. If you no longer own your 1993 16.5" Raleigh FT 500 bicycle and it is owned by another person, please provide the new owner's name and contact information.

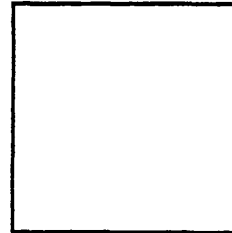
New Owner's Name: _____

Address: _____

Phone Number: _____

Date of Resale: _____

from _____



**Raleigh USA Bicycle Company
22710 - 72nd Avenue South,
Kent, WA 98032**

Attn. Eric Bailey



RALEIGH·USA
BICYCLE COMPANY

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22710 - 72ND AVE. S., KENT, WA 98032
(206) 395-1100 (800) 222-5527

ENTERED 1-31-94

WARRANTY ORDER FORM

IR 15177 Mo/398
CSR Initial/Ext.

- IR (Order No.)
- W (Invoice No.)
- 0 California
- 1 New Jersey
- 3 Washington

SHIP TO

Notes:

CALVAIN S.A
 VICENTE LOPEZ 1724
 (1018) BUENOS AIRES
 ARGENTINA

Oswald M
 011-814-1654

CONTACT PERSON	CUSTOMER NO.	VENDOR NO.	ORDER DATE	SHIP DATE	SHIP TYPE	PICKED BY	SALES CATEGORY	TERMS CODE
	14255	54759	1-31-94				30	83

- BRAND: RALEIGH
 NISHIKI
 HARO

MODEL: ^(R) MT 400
 YEAR: 93
 SIZE: 16.5
 SERIAL NO.: R909330170

Defect Part: _____

Description of Defect: _____

Frame Defect: TOP TUBE & DOWN TUBE CRACKED THROUGH - FORK: FRONT

Part Defect Code: 1 Missing 2 Defect New 3 Defect Used 4 Ship Damage WHEEL UN DAMAGED

Bicycle Purchase Date: _____

Freight Type: Freight Pre-paid Freight Collect

D.P. NUMBER	QTY. ORDER	DESCRIPTION	PRICE
31-93-691	1	MT400 F/F	1
-	-	2	
-	-	3	
-	-	4	
-	-	5	
-	-	6	
-	-	7	
-	-	8	
-	-	9	

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WRITTEN BY M.O 1-31-94

NORTHWEST LABORATORIES

of Seattle, Incorporated

ESTABLISHED 1896

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

FAX: (206) 763-3949

241 SOUTH HOLDEN STREET
SEATTLE, WASHINGTON 98108-4359

Telephone: (206) 763-6252

Report To: Derby Cycle

Date: 3/17/94

Report On: Aluminum Parts

Lab No: E 64960

SUBMITTED:

Two (2) aluminum head lugs, see Fig. 1.

IDENTIFICATION:

A - Painted (3 pieces) - fractured
B - Not painted

PURPOSE:

To evaluate the submitted head lugs as per your instructions.

Both macroscopic and microscopic examinations were carried out.

A summary of the findings is offered as follows:

FINDINGS:

1. The upper tubing of the fractured head lug was precracked at the time of final separation, i.e., grey deposits were noticed on the fracture face.
2. The failure of the tubing occurred in a brittle fashion without any plastic deformation. This is unusual since the material will normally exhibit considerable plastic deformation prior to failure.
3. One section was removed from each head lug (A and B) and subsequently prepared for a tensile test. However during the machining of the tensile specimen (lug A) brittle fracture of the material occurred.

The remaining portion of the material was then subjected to a bend test and compared to the material from lug B.

The material from lug B (not painted) could be bent up to 90 degrees without failure. However, lug A cracked after 5 degrees (see Ref. 1).

This indicates that the material of lug B had been embrittled.

4. One section was then removed from an undisturbed section of each head lug, mounted and metallographically prepared.

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NORTHWEST LABORATORIES

of Seattle, Incorporated

E 64960
Page Two

The subsequent inspection revealed that the grain boundaries of the material of lug A (fractured lug) had been embrittled, i.e., grain boundary deposits and cracking of the grain boundaries were observed.

The exact mechanics of grain boundary embrittlement was not determined since Scanning Electron Microscope would be necessary to complete the investigation. Due to budgetary reasons the investigation was stopped at this point.

5. Hardness readings revealed a hardness of 78.5 (15-T Scale) for the new tube, and 79 (15-T Scale) for the fractured tube.

For further details, please check Fig. 1-10 and Ref. 1.

Chemical Analysis:

<u>Element</u>	<u>Test Result</u>		<u>AA 6061</u> <u>Specification</u>
	A	B	
Silicon, Si, %	0.55	0.53	0.40-0.80
Copper, Cu, %	0.19	0.18	0.15-0.40
Manganese, Mn, %	0.021	0.027	0.15 Max.
Chromium, Cr, %	0.92	0.95	0.8-1.2
Zinc, Zn, %	0.002	0.002	0.25 Max.
Iron, Fe, %	0.17	0.20	0.7 Max.
Titanium, Ti, %	0.015	0.008	0.15 Max


Based on chemical analysis, the aluminum alloy samples comply with specifications for Aluminum per AA alloy 6061.

In summary, the head lug material had been embrittled, thus causing the premature failure. The manufacturing steps of the making of the parts should be reviewed and the grain boundaries evaluated (SEM) to determine the mechanism of embrittlement.

NORTHWEST LABORATORIES


RAINER ECKERT, M.S.E.

NORTHWEST LABORATORIES


SAM LEBARRON, Director
Analytical Laboratory

gm

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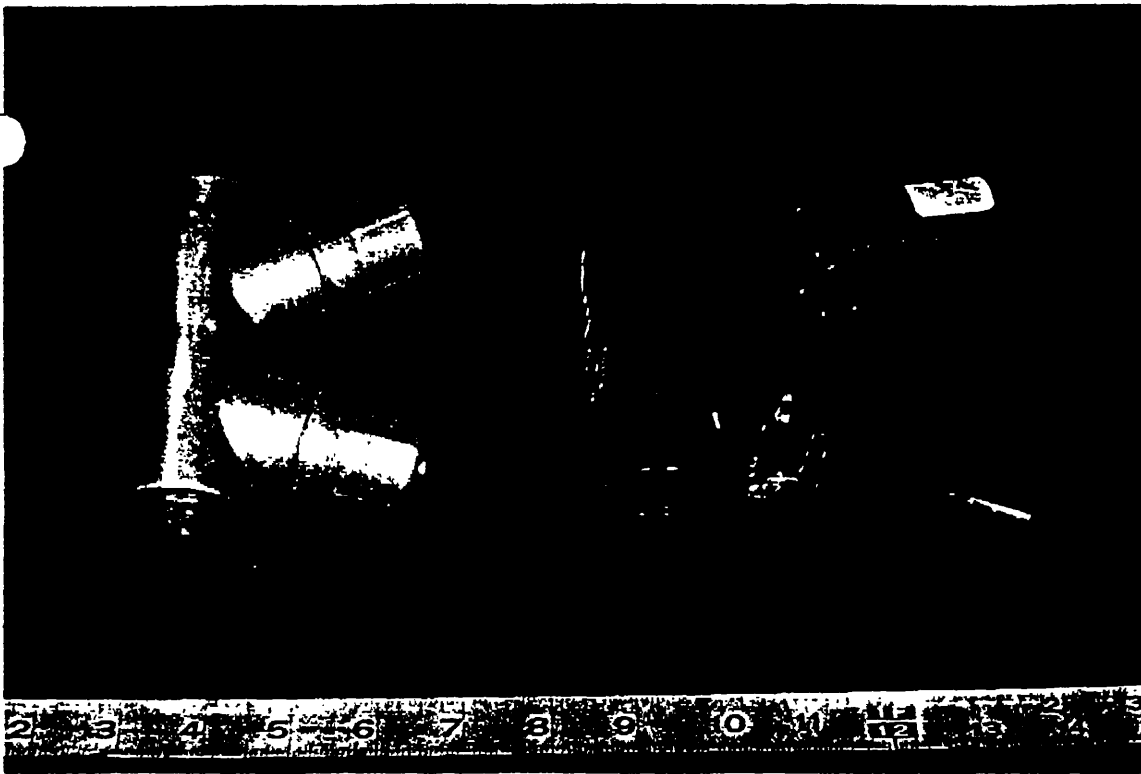


Fig. 1: The two submitted head lugs (A - fractured and B - new) are shown.

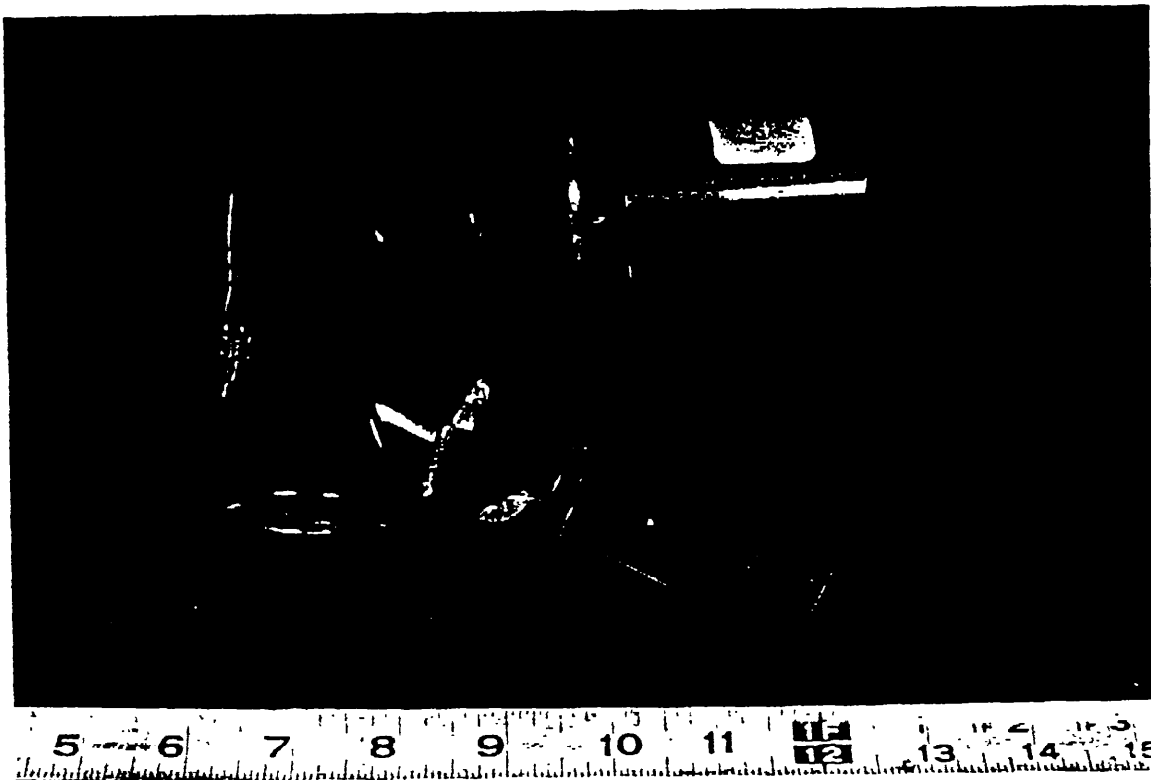


Fig. 2: Close up of the fractured head lug (A).

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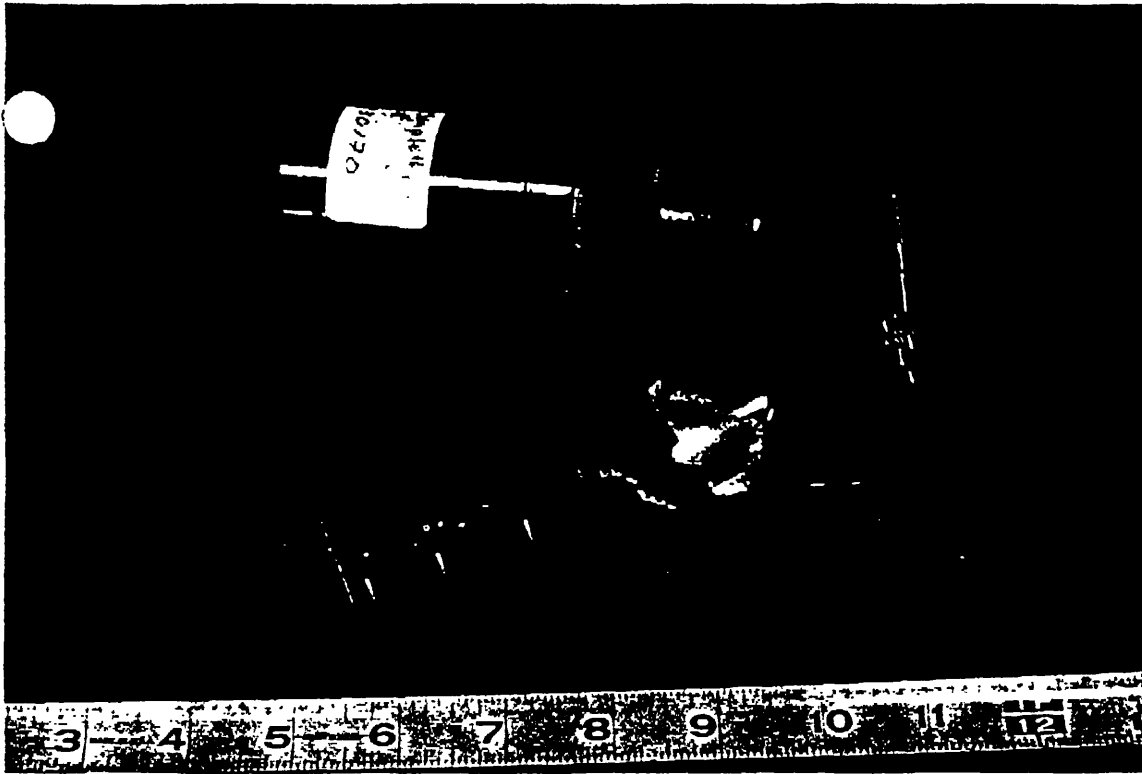


Fig. 3:
Same as Fig. 2, but viewed from the
opposite side. Dotted line represents
the location of sample removal for
tensile testing.

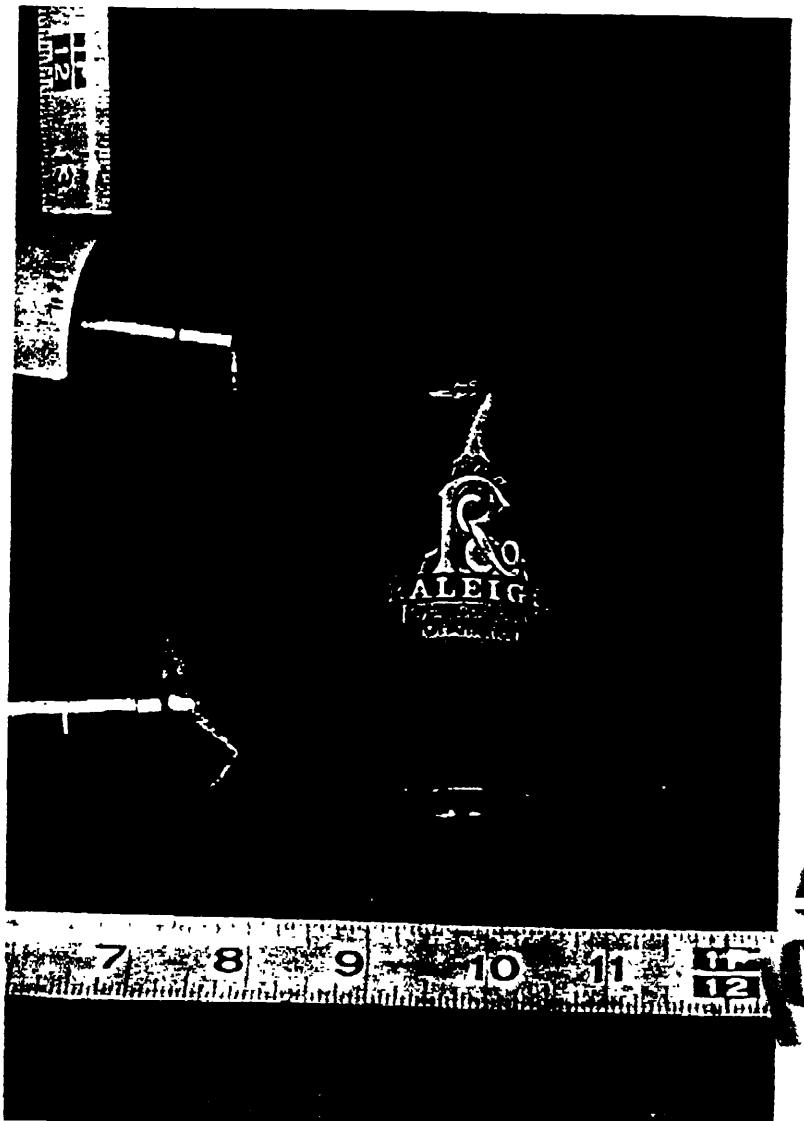


Fig. 4:
Same as Fig. 3, but the tube is
viewed from the front.

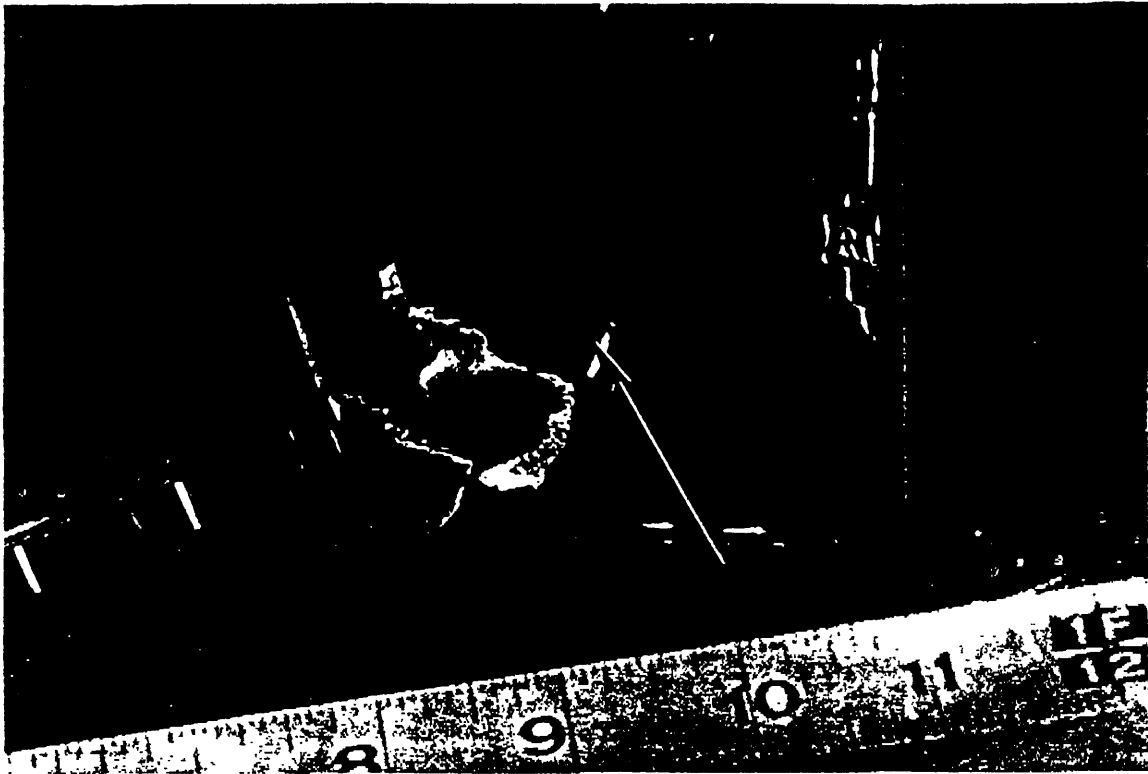


Fig. 5: Close up of Fig. 3 shows some secondary cracks in greater detail. Please note, the fracture occurred in a brittle fashion.

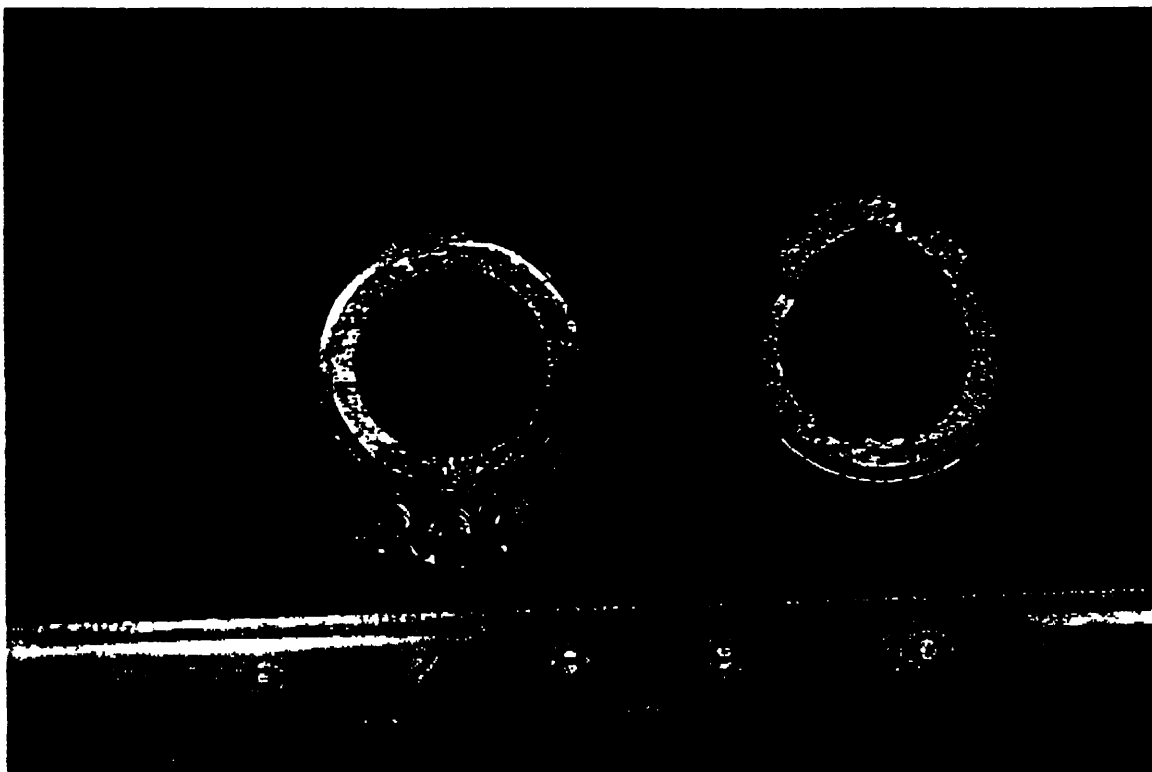


Fig. 6: The two fracture faces (upper and lower tubing) are shown.

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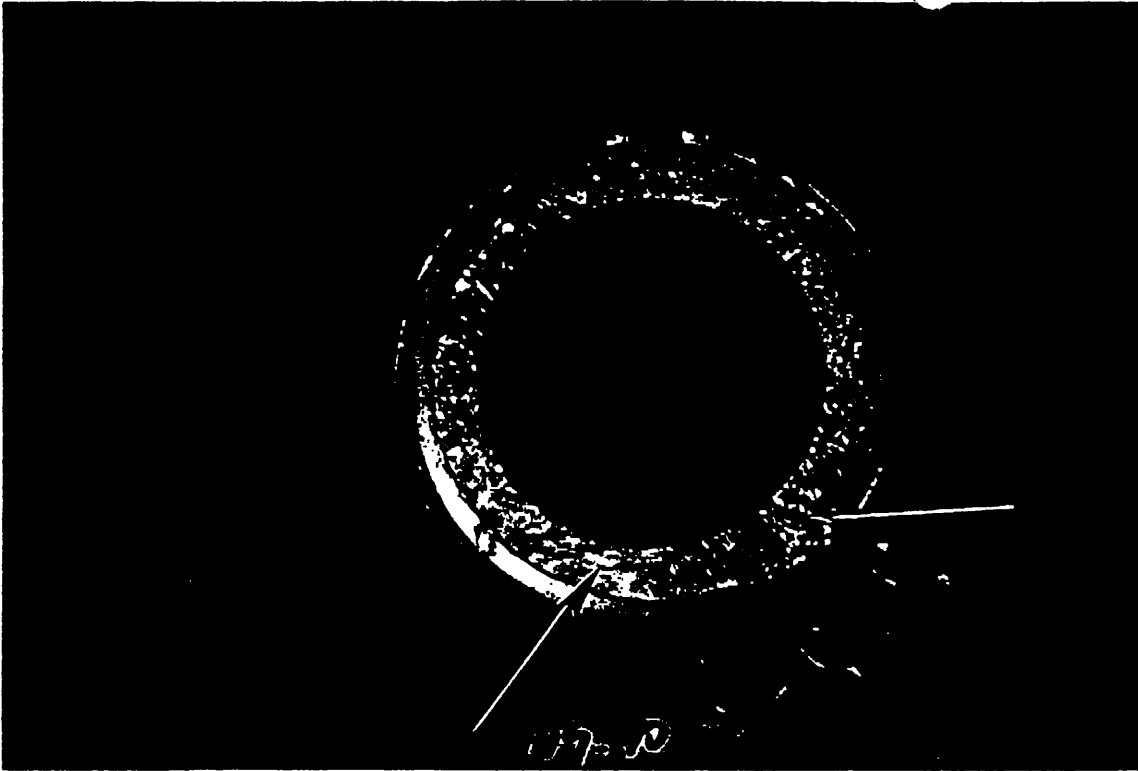


Fig. 7: The fracture face (upper tubing) is shown in greater detail. Please note, the majority of the fracture face was covered with foreign debris (dirt, see thin arrow) indicating the tube was precracked at the time of the accident. Thick arrow points to the area of final break (new, fresh break). Arrows with numbers refer to close up shots.



Fig. 8: Same as Fig. 7, but the lower tubing is shown.

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Fig. 9: Close up of Fig. 7 under the stereo microscope at 7x. Please note, the fracture surface was covered with grey deposits (dirt).

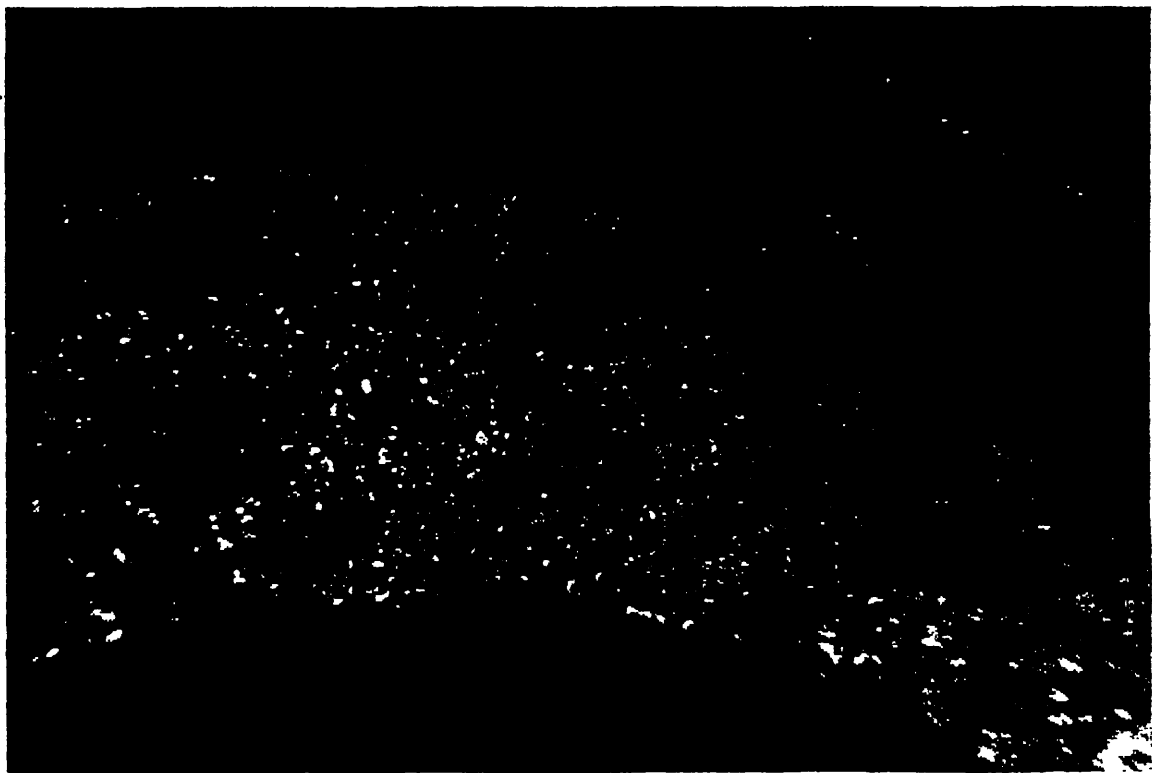


Fig. 10: Same as Fig. 9, but the area of final break (no deposits) is shown, see also Fig. 7.

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Fig. 11:
Cross-sectional view of the tubing
"A" at 50x. Arrow indicates
the embrittlement grain
boundaries. Please note,
this section was removed
from an area that had not
been stressed. As polished.

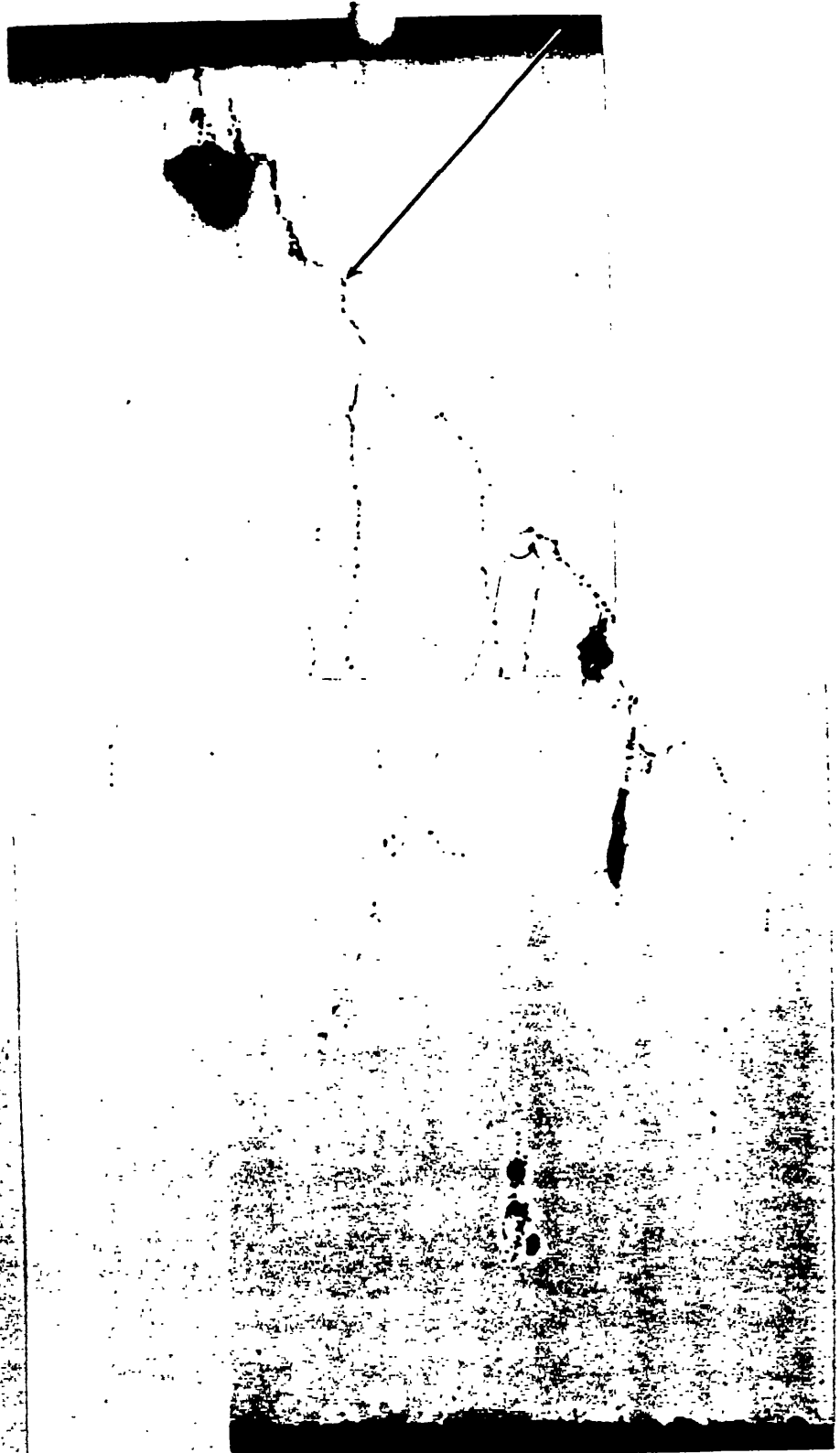


Fig. 12:
Close up of Fig. 11 at 100x.

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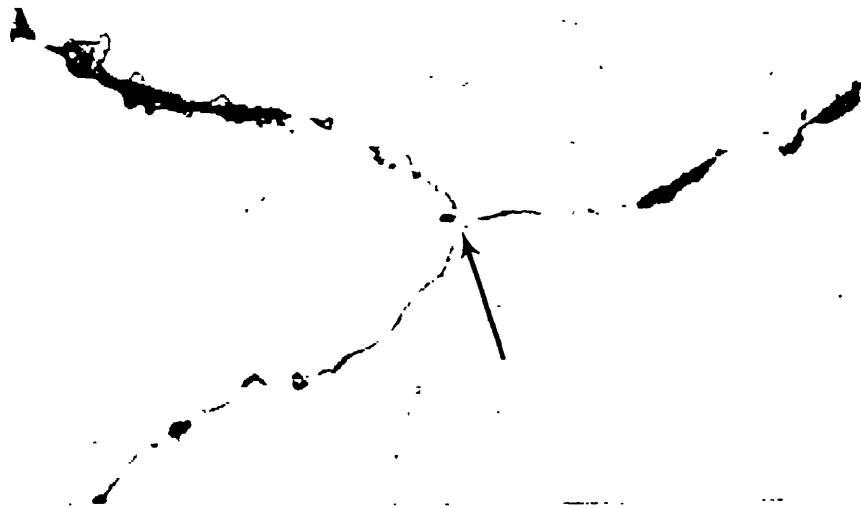


Fig. 13: Close up of Fig. 12 shows a triple grain boundary point. Arrow points to a grey grain boundary deposit. Magnification 400x.



Fig. 14: Close up of Fig 12 at 1000x shows the grain boundary deposit in greater detail. This area should be examined in the SEM and the grain boundary composition determined. Sample was slightly etched.

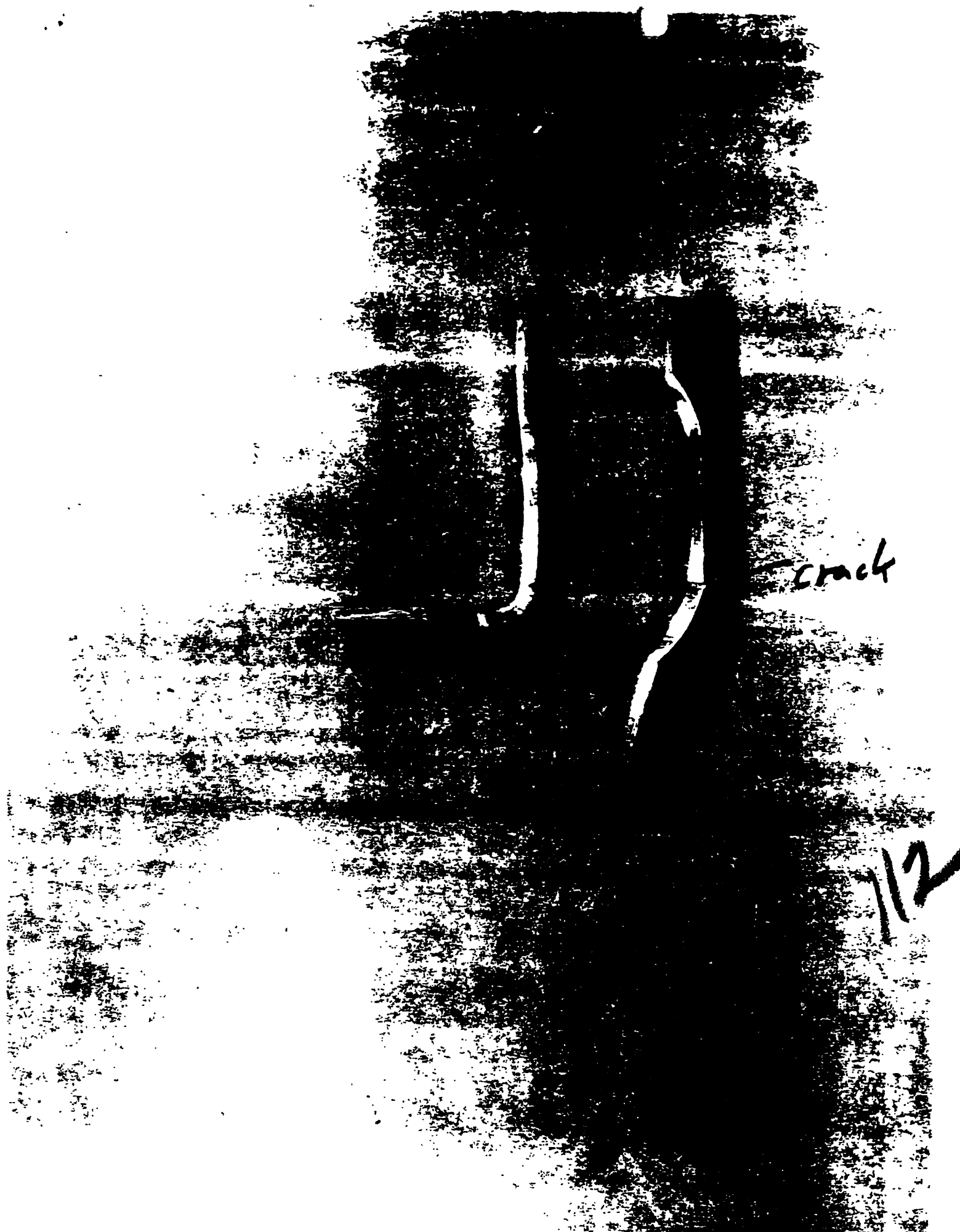
110

NORTHWEST LABORATORIES

of Seattle, Incorporated

REFERENCE 1

The two sections subjected
to a bend test are shown



crack

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COMPANY CONFIDENTIAL

RALEIGH

**TEST REPORT
PRODUCT ENGINEERING**

PAGE NUMBER

1 OF 2

REPORT NUMBER

R94-14

LITERATURE CHANGE
REQUIRED

PRIOR TEST REPORT

DISTRIBUTION: TOM MORAN, ERIC BAILEY

**ENGINEERING PROJECT
NUMBER**

BACKGROUND:

**PRODUCT DESCRIPTION: 14-23-690,692,693
1993 MT-400**

PURPOSE OF TEST: HEAD LUG INTEGRITY

OBJECTIVE:

GOALS OF TEST: USING AIR RAM LOADER HEAD LUGS WERE DESTROYED

**ACCEPTANCE/FAILURE OF CRITERIA: ACCEPTANCE: BENDING OF HEAD LUG
FAILURE: CRACKING OF HEAD LUG**

**CONCLUSIONS: SEE ATTACHED
WITH SAMPLE LOT OF 30 PCS. 0 FAILURES WERE RECORDED**

DISPOSITION:

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TRIAL RUN APPROVAL		REQUESTED BY	TEST TECHNICIAN DAVE KATO	PROD. ENGINEER TOM MORAN
A	REVISION	DATE ISSUED 11-Apr-94	ORIGINATOR/DATE	MGR. PROD. SUP.
ISSUE				MGR. PROD. ENG.

DP#	MFG DAT	P/F
14-23-690	12/3/92	P
14-23-690	1/7/93	P
14-23-690	12/3/92	P
14-23-690	3/9/93	P
14-23-690	4/19/93	P
14-23-690	4/19/93	P
14-23-690	3/10/93	P
14-23-690	3/10/93	P
14-23-690	12/3/92	P
14-23-690	12/3/92	P
14-23-692	4/20/93	P
14-23-692	5/13/93	P
14-23-692	4/20/93	P
14-23-692	5/13/93	P
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14-23-692	5/13/93	P
14-23-692	5/13/93	P
14-23-692	5/13/93	P
14-23-692	4/20/93	P
14-23-693	11/18/92	P
14-23-693	11/18/92	P
14-23-693	3/10/93	P
14-23-693	11/18/92	P
14-23-693	12/10/92	P

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Pacific Testing Laboratories

*Mailed
5-24-94*

COPY

Seattle
Bothell
Tacoma
Sumner
Peninsula
Portland

May 19, 1994
Certificate No. 9405-5005

Mr. Tom Moran
DERBY CYCLE CORPORATION
22710-72nd Avenue South
Kent, Wa 98032

Subject: Failure Analysis of a Forged Aluminum Bicycle Head Lug

Dear Mr. Moran:

Pacific Testing Laboratories was retained by your company to reexamine and evaluate the cause of failure of the subject bicycle head lugs. The lugs were originally examined and tested by Northwest Laboratories after which time a report was submitted on 3-17-94 to you with their findings and conclusions. It is our understanding that you requested us to review the findings and conclusions of Northwest Laboratories and to further evaluate the cause of failure in more specific terms so as to assess the extent of the problem and to determine a means of eliminating its existence in the future.

One Lab.

INTRODUCTION

The material submitted for analysis consisted of a head lug which fractured during normal usage (Figure 1), one unused non-fractured head lug (Figure 2), a fractured tensile specimen removed from the fractured head lug, a bent tensile specimen removed from the unused head lug and two metallurgical mounts of samples removed each lug. In addition, the report from Northwest Laboratories dated 3-17-94 consisting of their findings and conclusions. The tensile specimen and metallurgical mounts were prepared by Northwest Laboratories. A flow chart of the manufacturing process and a spectrochemical analysis report of the head lug material were also submitted to assist in our evaluation.

One Consultant.

SCOPE OF WORK

The fractured head lug was examined under low powered optics (to 70X) to determine the fracture mode. Hardness testing and chemical analysis was performed on the fractured and unused lugs respectively for comparison and to verify their alloys. The metallurgical mounts were repolished, etched with 0.5% hydrofluoric acid, and examined at high magnification (to 900X). Photodocumentation of all pertinent aspects of the analysis was carried out.

One Solution.

VISUAL EXAMINATION

The fracture surface showed both light and dark areas which represent old and new fractures. The light areas corresponds to new fracture which has not extensively oxidized. The darker areas corresponds to old fractures which have undergone oxidation and fretting. This was

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DERBY CYCLE CORPORATION

Certificate No. 9405-5005

Page 2

VISUAL EXAMINATION, CONTINUED

apparent when examined at higher magnification. The fracture topography of the dark areas had a more rounded appearance than the light areas resulting from cyclical contact of the opposing surfaces during usage. Also visible in the dark areas were triple points and large facets. This type of topography is indicative of an intergranular fracture mode. The bright regions showed a much finer topography with no visible triple points suggesting a transgranular mode.

Secondary cracking was also visible on the lug in the vicinity of the fracture. A portion of the cracks were still covered with paint indicating their existence at the time of bike assembly.

CHEMICAL ANALYSIS

A section was removed from the fractured and unused lugs respectively for chemical analysis. The results which are tabulated in Table 1, indicate that both lugs were made of 6061 aluminum per the Aluminum Association Aluminum Standards and Data 1984 publication. These values were similar to the test results submitted by the aluminum supplier Wei Shin Aluminum Co., Ltd. for the extruded product form. Extrusions are typically starting stock for aluminum die forged parts which is what the manufacturer claims is the forming process of the head lug.

METALLURGICAL ANALYSIS

The microstructure of the fractured lug showed very large recrystallized grains of aluminum solid solution containing particles of Mg_2Si (Figure 4). Precipitates were also visible in the grain boundaries along with fusion voids which had coalesced. The grain boundary precipitates and voids suggest eutectic melting and possibly high temperature oxidation (HTO) occurred. This differed from the microstructure of the non-fractured lug (Figure 5) which shows much smaller grains with evenly distributed particles of Mg_2Si throughout the aluminum matrix and no evidence of voids or precipitates in the grain boundaries.

The hardness values of the two head lugs differed considerably as can be seen in Table 2. The unused lug had a hardness value of HRB 57 which is in the range for AA 6061-T6 aluminum die forging. In comparison, the fractured lug had a hardness value of HRB 43, well below the acceptable limits. This supports the theory of eutectic melting since a reduction in strength accompanies this condition. This does not rule out HTO since both conditions can occur simultaneously.

DISCUSSION

Our findings, as described above, supports the findings of Northwest Laboratories. In both analysis the main issue is what caused the embrittlement. Our analysis determined the cracking occurred prior to the bicycle being used. In a telephone conversation, you indicated cracks were found in lugs upon arrival to Derby Cycle Co. This indicates the problem is occurring during manufacturing and the most likely process which would cause this would be the solution heat treatment. The aluminum lug material (AA 6061) utilizes magnesium and silicon, in the form of the intermetallic compound Mg_2Si for strengthening. This is done through diffusion during the solution heat treatment and aging processes. The solution heat treatment puts the constituent alloying elements into a homogeneous solution after which time the aging cycle

DISCUSSION, CONTINUED

diffuses the elements together forming particles of compounds within the matrix. The suggested solution heat treatment temperature by The Aluminum Association is 990 degrees Fahrenheit (plus or minus 10 degrees) which is held for a period of time dependent on the size and amount of cold work in the material. This process is followed by a rapid quench in water or glycol. This temperature is very close to the eutectic melting temperature of AA 6061 aluminum (Eutectic Temp.: 1038 degrees Fahrenheit) hence, very accurate control is needed to assure melting does not occur.

HTO is caused from an improper solution heat treatment atmosphere with high humidity being the most common problem. When this occurs, the water disassociates into hydrogen and oxygen allowing the monatomic hydrogen to diffuse into the lattice structure of the aluminum and reside in the grain boundaries. The hydrogens combine forming diatomic molecules creating voids at the grain boundaries similar to what we see in the fractured lugs. The combined affect of eutectic melting and HTO at the time of room temperature quenching after solution treatment could cause additional cracking in the lugs.

It should be noted that cracking in the lugs probably occurred only in the worst case situations. It is more probable to have eutectic melting and not see any macroscopic differences in the material. This condition is best detected by hardness and conductivity testing and microstructural analysis. This size of part is typically heat treated in lots which are sized depending on the oven capacity. A common method for testing a lot is by sampling based on the lot size. Statistical analysis can then be used to verify the heat treatment of the parts.

CONCLUSIONS

1. The subject aluminum head lug fractured due to preexisting intergranular cracks which existed prior to assembly of the bicycle.
2. The cracks were most likely caused from eutectic melting possibly combined with high temperature oxidation (HTO) of the aluminum material resulting from improper solution heat treatment conditions.
3. The likely hood of improperly heat treated head lugs which were not detected by Derby Cycle Co. are very probable.

RECOMMENDATIONS

1. A review of the suppliers heat treatment procedures is needed to assure the proper solution heat treatment temperatures are being used.
2. Proper temperature and environmental controls for the solution heat treatment process are needed to ensure proper heat treatment.
3. A quality control procedure including hardness and conductivity testing should be performed after heat treatment to verify specified mechanical properties have been obtained. Dye penetrant inspection should also be carried out to check for preexisting defects.

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05/24/94

11:22

P. T. L. PORTLAND DIV.

P. 05

This report is provided for the information of the client only. Reproduction and transmittal of this report by any method and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories is prohibited.

Thank you for using Pacific Testing Laboratories. If you have any questions, or if we can be of further assistance to you, please contact us at (503) 224-2248.

Reviewed by: Kevin H. Lewis, P.E., Forensic Engineering Department

KHL

Sincerely,



Gregory A. Marbett, Manager
Forensic Engineering
Portland Division

GAM/hlw

Enclosure

118

DERBY CYCLE CORPORATION
Certificate No. 9405-5005

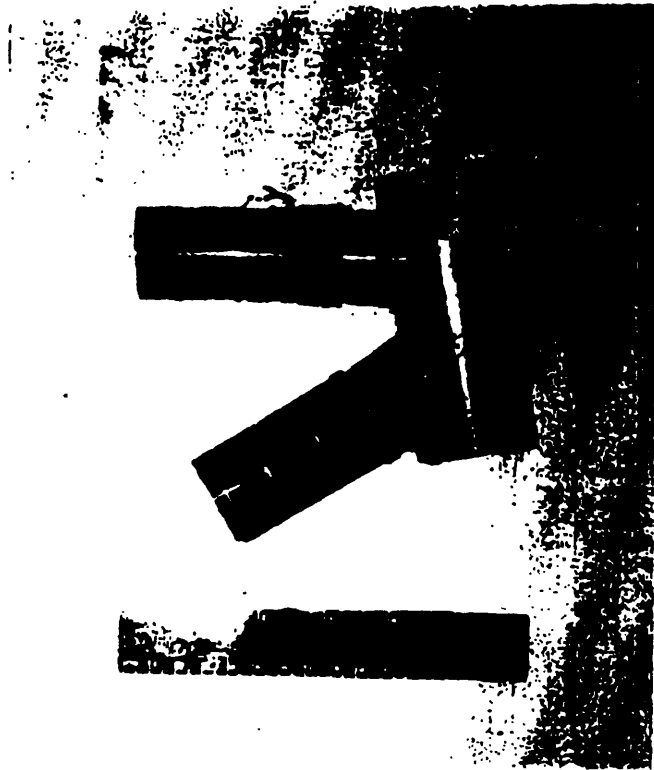


Figure 1. Fractured head lug.



Figure 2. The unused head lug.

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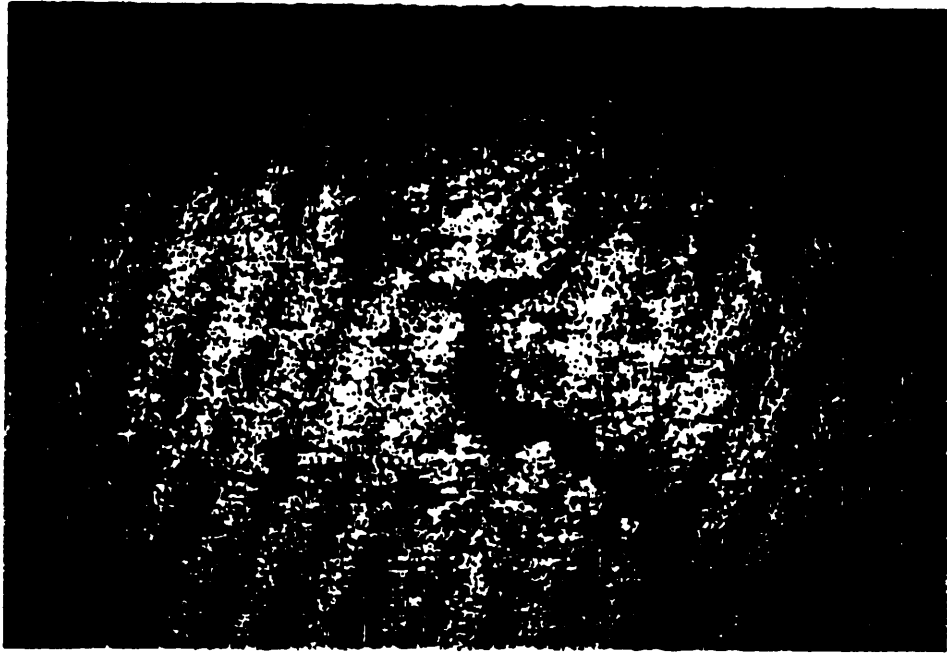


Figure 3. Micrograph of the fractured lug showing an aluminum solid solution of recrystallized grains containing Mg₂Si particles, grain boundary voids and precipitates. Mag. 100X, 0.5% hydrofluoric acid.

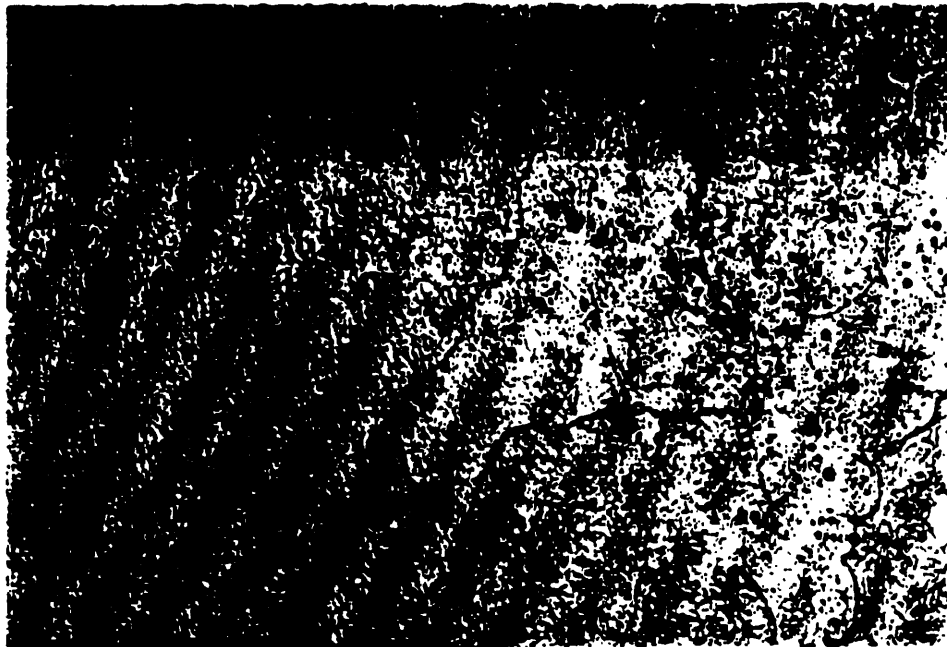


Figure 4. Micrograph of the unused lug showing a much smaller grain size and no voids or precipitates in the grain boundaries. Mag. 250X, 0.5% hydrofluoric acid.

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DERBY CYCLE CORPORATION
 Certificate No. 9405-5005

Table 1.
Chemical Analysis of Aluminum Head Lugs

SAMPLE NO.	FRACTURED LUG	UNUSED LUG	AA 6061
Cu	0.23	0.25	0.15-0.4
Fe	0.20	0.20	0.7
Mg	0.88	0.87	0.8-1.2
Mn	0.03	0.03	0.15 max
Si	0.55	0.59	0.40-0.8
Zn	0	0	0.25 max
Cr	0.07	0.07	0.04-0.35
Ni	0.01	0.01	0.05 max
Ti	0.01	0.02	0.15 max
Va	0.01	0.01	0.05 max
Al	98.0	98.0	rem

Note: Unless noted, other elements less than 0.01%.

Table 2.
Aluminum Head Lugs
Rockwell Hardness Test Results, HRB Scale

Fractured Lug	Unused Lug	Aluminum Standards & Data 1984, 6061-T6
45	57	---
44	58	---
40	57	---
41	55	---
Average 43	Average 57	Average 55

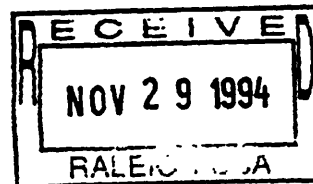
PH

STEPHEN D. ROBERT
ATTORNEY AT LAW

ASPEN PROFESSIONAL CENTER
1700 WEST KOCH STREET, SUITE 5
BOZEMAN, MONTANA 59715
TELEPHONE (406) 586-3100
FAX (406) 585-0087

November 22, 1994

Mr. Eric Bailey
Product Service Manager
Raleigh USA Bicycle Company
22710 72nd Avenue South
Kent, WA 98032



RE: Our Client: Ian Schnee
Date of Accident: 7/26/94

Dear Mr. Bailey:

This letter is to inform you of a serious injury which occurred to our client, Ian Schnee, on July 26, 1994, when his newly purchased Raleigh MT 400 suffered a catastrophic failure while he was riding it down a National Forest Service trail near Bozeman, Montana.

Ian Schnee's parents, Steve and Jean Schnee, had purchased Ian the Raleigh MT 400 from Hi Line Sports in Plentywood, Montana. Before the day of the accident, the bicycle was still virtually new, since Ian had ridden his Raleigh MT 400 in the mountains only six or seven previous times.

On the day of the accident, July 26, 1994, at about 10 a.m., Ian and two friends started up a popular and well maintained National Forest Service trail called the Bozeman Creek Trail, just south of Bozeman.

After riding for several miles, Ian and his friends turned around and headed back toward the trailhead. The return trip was downhill, and Ian was riding his bicycle in control, using his brakes. About two miles before reaching the trailhead, Ian's bicycle travelled over a stone in the trail, and the front end of his Raleigh MT 400 broke and collapsed away from him. Ian went down instantaneously, and recollects that his handlebars felt like they sank away from him as he went down.

Ian's head hit the ground extremely hard, and he recalls doing a half roll and landing on his side.

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Raleigh Bicycle
Page 2
November 22, 1994

One of Ian's friends proceeded down to the trailhead, where he located a Bozeman city employee. Together, Ian's friend and the city employee got to a phone and called an ambulance. A search and rescue squad assisted Ian, and he was transported by ambulance to the Bozeman Deaconess Hospital.

Ian suffered extensive facial injuries to his tongue, chin, upper lip, and teeth.

Ian's mouth injuries alone required 200 stitches, with extensive lacerations and injuries to Ian's tongue.

It is now more than three months after Ian's accident, and he continues to have pain and numbness in his chin, limited motion in his tongue, sensitivity and limited feeling in his upper lip, pain in his front teeth when he bites, and impaired speech. I have enclosed photos showing the scarring on Ian's face, some of the damage to his teeth, and the deformity of his tongue caused by the severe lacerations he suffered. Ian on occasion bites the lump on his tongue, and it is extremely painful when he does so. In addition, parts of the back part of his tongue feel numb.

Ian's upper lip was severed in the accident, and it is still painful.

Ian's two upper front teeth, and three lower front teeth were damaged in the accident. The upper right front tooth has been temporarily crowned and needs to be permanently crowned. The top left front tooth had a root canal, and the upper right front tooth will need a root canal. Three lower front teeth were damaged, two of which need root canals and crowns.

Ian continues to receive treatment from Bozeman Ear, Nose, and Throat specialist, Dr. Fred Bahnson for his tongue and facial injuries. Bozeman dentist, Dr. Patrick Hays, is performing the dental treatment.

Because Ian is continuing to receive treatment for his injuries, any discussion of settlement of Ian's claims at this point is premature. By this letter, however, we wish to inform you of Ian's claim, and alert you of the catastrophic failure which occurred in his Raleigh MT 400. In the event other similar bicycles manufactured by Raleigh are also affected by this defect, you can take appropriate measures to attempt to avoid similar accidents. The number on the frame of Ian's Raleigh MT 400 is P908330318.

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Raleigh Bicycle
Page 3
November 22, 1994

Enclosed for your review are photographs of Ian's Raleigh MT 400, showing where the metal failed, and where the break occurred on Ian's bicycle.

I will inform you when Ian has reached maximum healing from his injuries, and at that time will present you with a proposal for settlement of Ian's claims. Please feel free to contact me if you require additional information.

Very truly yours,

Stephen Roberts
Stephen D. Roberts

SDR:rag
Enclosures

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SUITE 4400 · 1001 FOURTH AVENUE PLAZA · SEATTLE, WASHINGTON 981

Riddell, Williams, Bullitt & Walkinshaw

LAW OFFICES

PATRICK D. McVEY

May 5, 1995

**CONFIDENTIAL
CONTAINS PROPRIETARY
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ATTORNEY WORK PRODUCT
DO NOT RELEASE WITHOUT PERMISSION
OF RALEIGH USA BICYCLE COMPANY**

**VIA FACSIMILE
ORIGINAL TO FOLLOW BY MAIL**

Mr. Albert F. Limberg
Consumer Product Safety Commission
Western Regional Center
600 Harrison Street, Room 245
San Francisco, CA 94107-1370

Re: 16.5 Inch Raleigh MT-400 Bicycles

Dear Mr. Limberg:

I am writing on behalf of Derby Bicycle Company d/b/a Raleigh USA Bicycle Company ("Raleigh"), to advise the CPSC of an investigation which is being undertaken by Raleigh regarding the performance of its 16.5 inch Raleigh MT-400 bicycles. I have enclosed a delegation of authority executed by the President of Raleigh delegating to me the authority to send this letter on its behalf.

On April 25, 1995, consulting experts retained by Raleigh examined a 16.5 inch Raleigh MT-400 bicycle which was involved in an accident in Bozeman, Montana. The examination revealed that the head lug on the bicycle may have fractured as a result of improper heat treatment by the component manufacturer. The head lug in question was manufactured by Lee Chi Enterprises Company, Ltd., No. 4-5 Shu-Pai Li, Cheng Hwa City, Taiwan, R.O.C.

Doc ID: S-205840 Ver: 1 5852-40
5/5/95 LPV

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BELLEVUE OFFICE

2100 SECURITY PACIFIC PLAZA · 777 108TH AVENUE N.E. · BELLEVUE, WASHINGTON 98004

125

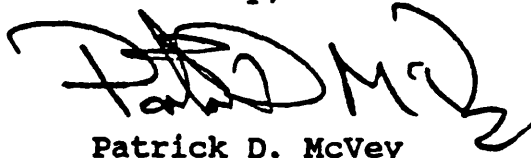
Mr. Albert F. Limbco
May 5, 1995
Page 2

Raleigh has initiated a comprehensive review of its production records and claims history and has undertaken a testing program to evaluate the problem. Raleigh expects to complete this review and analysis early next week.

Preliminarily, it appears that Raleigh's quality control procedures may not have detected a very limited number of head lugs with improper heat treatment which may have been shipped to Raleigh by Lee Chi. The preliminary investigation indicates that the head lugs with this potential problem were shipped to Raleigh in December, 1992 and potentially could have been used in bicycles produced after that date. Again, preliminary investigation of Raleigh's records indicate that 938 16.5 inch Raleigh MT-400 bicycles were manufactured using the head lug in question after that date. Raleigh expects to be able to complete its testing program and develop a comprehensive analysis of this problem by early next week. We will supplement this report at that time. Although Raleigh does not believe that this condition creates a substantial product hazard at this time, it wanted to advise the CPSC of the condition and the steps which it is committed to undertaking to investigate this condition so that the CPSC will be fully advised of the situation.

As noted in the heading of this letter, Raleigh considers the vendor, dealer, customer and other information furnished to the Commission in this report and any subsequent reports to be trade secret and confidential. The release of this information would harm the competitive position of Raleigh. Accordingly, confidential treatment of this letter is requested under the applicable provisions of the Consumer Product Safety Act, the Freedom of Information Act, the Trade Secrets Act, and other regulations implementing such laws.

Sincerely,



Patrick D. McVey

PDM/lpv
cc: Mr. Eric Bailey



DELEGATION OF AUTHORITY

I, William W. Austin Jr., certify that I am the President of the above named company and that as such I am authorized to sign documents and to certify on behalf of said company the accuracy and completeness of information in such documents under Section 15 (b) of the CPSA.

Pursuant to the power vested in me, I hereby delegate that authority to the person listed below.

This delegation is effective until revoked in writing.

Authority is delegated to:

Patrick D. McVey
Riddell, Williams, Bullitt & Walkinshaw
1001 Fourth Avenue, Suite 4400
Seattle, WA 98154
Attorney

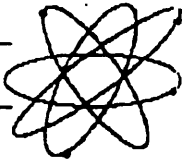
Date: 10-3-94

Signed: William W. Austin Jr.

William W. Austin, Jr.
Raleigh U.S.A. Bicycle Company
22710 - 72nd Avenue South
Kent, WA 98032

127

X - RAY INC.



LEADERS IN NDT SERVICES

7500 PERIMETER RD SOUTH
SEATTLE, WA 98108

TEL: (206) 763-1919
FAX: (206) 767-5994

REPORT NUMBER 35532 - 1

DATE ISSUED 5/ 6/95

CUSTOMER P.O. PAT MCVEY

INSPECTION REPORT

CUSTOMER

WORK SITE LOCATION

Riddell, Williams, Bullitt
Patrick McVey
Seattle, WA 98154

X-Ray, Inc.
Seattle, WA

ATTENTION:

SPECIFICATION: Customer Information

CLASS:

PART NO: Mountain Bike Frames

QUANTITY: 31

MAT'L: Al

DESCRIPTION OF TEST:

High Frequency Eddy Current Inspection of:

"K" Fittings on: 23 ea. 15" bike frames
3 ea. 16.5" bike frames
2 ea. 18.5" bike frames
3 ea. 20.5" bike frames

INSPECTION RESULTS:

23 ea. 15" frames No crack indications noted
3 ea. 16.5" frames Shrinkage and crack indication noted
1 ea. 18.5" frame No crack indications noted
1 ea. 18.5" frame Possible shrinkage or large grain size noted
3 ea. 20.5" frames No crack indications noted

Total Frames Inspected: 31

CUSTOMER APPROVAL

Bret Kaiser

II

DATE

PREPARED BY

Bret Kaiser

ASNT LEVEL

II

DATE

APPROVED BY

ASNT LEVEL

DATE

MAY 8 1995

NOTE: This report is unbiased. We assume no responsibility for losses of any kind due to our interpretation of the quality of the material submitted. All data and information will be held strictly confidential.

May 8, 1995
MT400 Headlug Test

Unit #	P/N	Serial #	Size	Result
1	14-23-690	R911230659	15	P
2	14-23-690	R911030621	15	P
3	14-23-690	R911230665	15	P
4	14-23-690	R911030520	15	P
5	14-23-690	R903330033	15	P
6	14-23-690	R911230658	15	P
7	14-23-690	R911230663	15	P
8	14-23-690	R911230662	15	P
9	14-23-690	R911030624	15	P
10	14-23-690	R911030628	15	P
11	14-23-690	R911230661	15	P
12	14-23-690	R911030626	15	P
13	14-23-690	R911030623	15	P
14	14-23-690	R903330061	15	P
15	14-23-690	R911030618	15	P
16	14-23-690	R911230665	15	P
17	14-23-690	R911230664	15	P
18	14-23-690	R911030632	15	P
19	14-23-690	R911230660	15	P
20	14-23-690	R911030631	15	P
21	14-23-690	R903330055	15	P
22	14-23-690	R911030625	15	P
23	14-23-690	R903330064	15	P
24	14-23-690	R903330271	16.5	P
25	14-23-691	R911230358	16.5	P
26	14-23-691	R903330261	16.5	?
27	14-23-692	R908330591	18.5	P
30	14-23-692	R933720596	18.5	P
28	14-23-693	R933320180	20.5	P
29	14-23-693	R933320132	20.5	P
31	14-23-693	R931520148	20.5	P

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MT400

There's nothing like blasting down the trail confident that your bike will respond with precision wherever you point it. That's exactly the responsiveness the MT400 provides. And, best of all, the MT400 combines high performance and affordability.

- **Technium™** frame with two **Easton E-9 aluminum** tubes thermally bonded to a lightweight aluminum head lug and a chrome-moly rear triangle with a **Monostay Wishbone**
- **Rigid Point Design (RPD)**
- **High String™** triple **top tube cable routing**
- **Shimano** Exage FS 11 21-speed derailleur SRS Rapid Fire Plus shifting system
- **Chrome-moly** dual elastomer suspension fork
- **Top-pull** front derailleur
- **Made in the USA**

