HONDA

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NVS-210

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OFFICE OF DEFECTS
INVESTIGATION

February 10, 2003

NVS-214jry
PE02-077

Mr. Richard P. Boyd, Chief
MHTD Division
Office of Defects Investigation
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, DC 20590

Dear Mr. Boyd:

As specified in our December 20, 2002 response to the above-referenced inquiry, we are submitting documents responsive to question 5. English translations are included for all Japanese documents.

5. **Identify and describe all studies, surveys, investigations, and tests that have been, are being, or will be conducted by, or for, Honda and that could, in any way, relate to coolant overheating in the subject vehicles. For each such action, provide copies of all relevant documents, as a separate enclosure, in chronological order. This should include, but not be limited to, methodologies, action plans, final reports and presentations with the original file names and dates, regardless of whether the documents are in interim, draft, or final form. Additionally, provide a table listing each study, survey, etc. identified in your response to this item. Please include the following information in the table for each study, survey, etc.:**

   A. **Study title, identifier or ID number;**
   B. **The actual or planned start date;**
   C. **The actual or planned end date;**
   D. **Brief summary of the subject or objective;**
   E. **Engineering group/supplier responsible; and**
   F. **Findings or conclusions (both preliminary and final).**

   Response:

   The summary table is attachment 5A. The document copies are attachment 5B, and the individual documents are separated by colored paper.

Sincerely,

AMERICAN HONDA MOTOR CO., INC.

William R. Willen
Managing Counsel
Product Regulatory Office

WRW:ke

Attachments

Attachment #5A

Title	Start Date	End Date	Summary of Objective	Responsible Group	Findings/Conclusion
MCAA Overheat Indication Problem HRA Investigation Results	11/7/2000	11/10/2000	Confirmation of symptom on vehicle and investigation of ambient conditions when vehicle is used.	H R A	Please refer to attached file.
Countermeasures against Erroneous Indication by Temperature Gauge of MCAA	11/14/2000	12/11/2000	Validation of placing a resistor. Confirmation of accuracy of indicated coolant temperature on temperature gauge	H G	Please refer to attached file.
GL1800 Temperature Gauge Readings	12/12/2000	5/24/2002	Effectiveness confirmation of placing a resistor.	H G	Please refer to attached file.
GLX1800 (MCA) Remedial Plan to Improve Cooling Performance	5/24/2002	5/27/2002	Proposal of corresponding plan in future	H G	Please refer to attached file.
GLX1800 (MCA) Q1 Report on High Coolant Temperature (91KR)	5/28/2002	6/10/2002	Proposal of countermeasure test plan	H G	Please refer to attached file.
Q2 Report on High Coolant Temperature (91KR)	6/10/2002	6/24/2002	Proposal of countermeasure test plan	H G	Please refer to attached file.
QIS Red Zone MC20020605153920	8/5/2002	8/6/2002	Countermeasure request	M/C AQAO	This QIS was closed and another opened.
QIS Temperature gauge indicates red zone MC20020606184648	8/6/2002		Investigate temperature gauge high reading and evaluate for countermeasure.	M/C AQAO	MY03 gauge red zone changed.
QES Test Report	8/27/2002	8/29/2002	Test for defective coolant conduit	HAM	Please refer to attached file.
GDC-M Coolant Passage Block in Cylinder Head of GLX	8/30/2002	9/27/2002	Confirmation of defective coolant conduit and consideration of countermeasure.	H G	Please refer to attached file.
QIS Overheat due to defect in cylinder head MC20020919110931	9/5/2002		Investigate overheating and evaluate for countermeasure.	M/C AQAO	Casting die modified. Checks added. See attached file.
GLX1800 (MCA) Coolant Temperature Problem	9/11/2002	9/30/2002	Confirmation of safety while overheating	H G	Please refer to attached file.
MCA Trouble with Temperature Gauge	9/26/2002	10/7/2002	Confirmation of investigation on defective coolant conduit	M S S	Please refer to attached file.
GL1800 (MCA) Cooling System Problems (Data for presentation to Market Quality Information Investigation Commission)	10/7/2002	10/28/2002	Proposal of remedy (replace to non-defective unit)	H G	Please refer to attached file.
MCA Trouble due to Broken Water Jacket Core	10/9/2002	10/31/2002	Confirmation of ENG durability while overheating	H G	Please refer to attached file.
GL1800 Cooling System Problems (Matters pointed out at Market Quality Information Investigation Commission held on Oct. 28)	10/21/2002	11/1/2002	Proposal of remedy (replace to non-defective unit)	H G	Please refer to attached file.

Attachment #5B

MCAA Overheat Indication Problem

HRA Investigation Results

2000/11/10

問題事象の確認 Confirmation of Alleged Symptom

AH Quality / Durability Test

- **事象** Symptom

走行中に水温計の指示がオーバーヒート状態を表示。
しかし、実際に機能的なトラブルには至っていない。

While riding, the temperature gauge indicated overheated condition by going into the red zone, but actually it did not result in any functional trouble.

問題事象の確認 Confirmation of Alleged Symptom

AH Quality / Durability Test

- 状況 Situation
  - 激しい渋滞に遭遇 Got caught in a terrible traffic snarl
  - 低速ですり抜け
    Passed through the traffic at low speeds by "lane sharing"
  - 表示で10mph以下の速度 Ran at speeds below 10mph
  - 1速と2速のみを使用 Used only 1st and 2nd gears

- テスト車両 Test vehicles

MCA Bin# 000031 2753 miles
000046 2813 miles

再現確認 Confirmation of Duplicability of Alleged Symptom

- 同様の事象の発生を確認した。

  We confirmed occurrence of the same symptom

水温計表示　Above “Red Zone”
Temperature gauge indication

実水温　117.2 deg C
Actual coolant temperature

実際のOver heatには至らず
Actually the vehicle did not overheat

クーラントの吐出無し
No coolant expulsion

乗り方の評価　Evaluation of Riding Style

結果　Results

- 1速使用での渋滞路すり抜け走行は、車両の安定性、操縦性能から通常の使い勝手とは考えにくい。

  Passing through a stalled traffic in 1st gear by "lane sharing" cannot be considered normal usage in view of the vehicle's stability and maneuverability.

- MCAのコンセプト及び、キャラクターから通常の使い勝手では2速、若しくは3速の使用が殆どと考える。

  Based on the concept and character of MCA, we believe normal usage would mostly be in 2nd or 3rd gear.

道路交通法調査 Research of Road Traffic Laws in US

- “ Lane sharing”即ち、すり抜け走行は全米の中で唯一CAだけに認められている。

  CA is the only state in which “lane sharing” is allowed by the road traffic law.

- 殆どの州のGLカスタマーは、渋滞路をすり抜けで走行する事が無いと考える。

  It is hardly likely that GL customers in most states would dare to pass through a congested traffic by “lane sharing” which is not allowed by the road traffic laws of their states.

➡ 追尾走行型 **Obliged to follow the flow of traffic**

全米の渋滞状況調査
Research of Traffic Congestion in US

- 全米50州の中で、最も渋滞状況の激しい地域はLos Angelesである。

  (TTI Texas Transportation Instituteより)

  The region where traffic is most congested in all the 50 states is Los Angeles (according to TTI).

- 今回発生した事象は、全米の中でも極めて厳しい条件の下で発生したと考える。

  We believe that the alleged symptom had occurred under the severest traffic conditions in the US.

➡

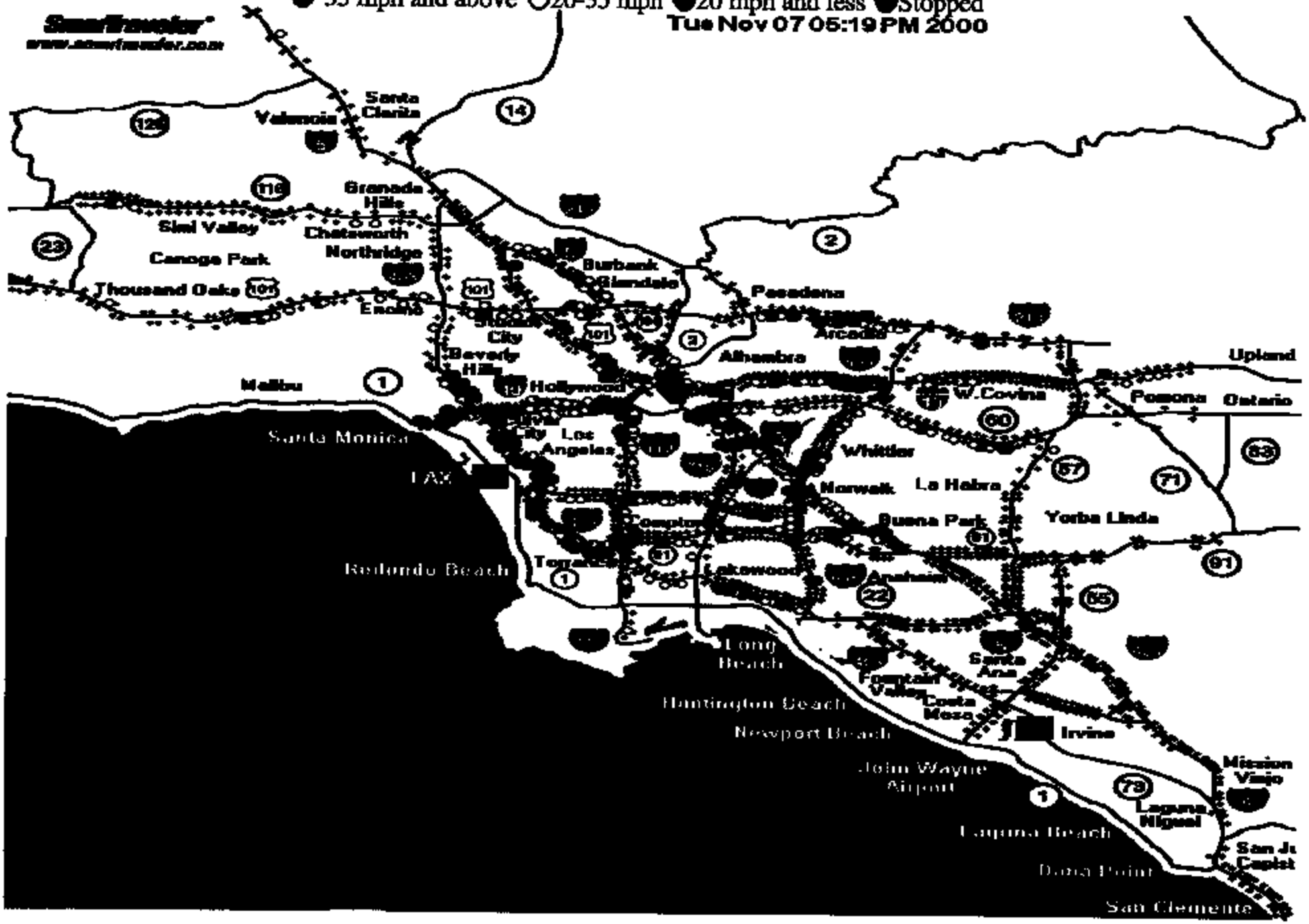
Los Angeles周辺道路での確認作業に妥当性有る。

Confirmation on roads in Los Angeles urban area will prove the validity of our belief.

Los Angeles Nov 7, 2000 5:19PM

● 35 mph and above ○ 20-35 mph ● 20 mph and less ● Stopped

Tue Nov 07 05:19 PM 2000



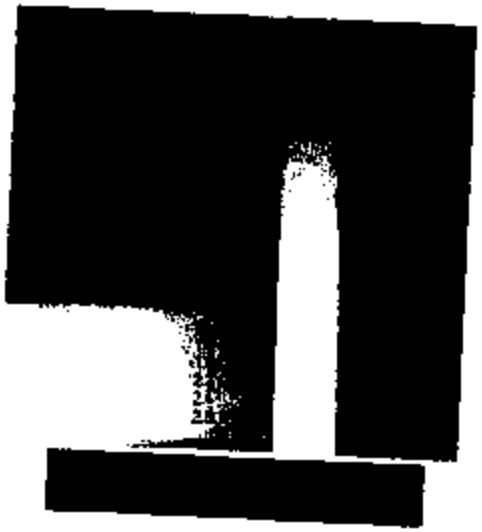
1997 Key Mobility Statistics

Population Group	Urban Area	Travel Rate Index		Annual Delay per Eligible Driver		($) Annual Congestion Cost			
		TRI	Rank	Hours	Rank	Total ($)	Rank	per Eligible Driver	Rank
Vlg	Los Angeles, CA	1.51	1	82	1	12,405	1	1,370	1
Lrg	Seattle-Everett, WA	1.43	2	69	3	1,805	11	1,165	3
Vlg	San Francisco-Oakland, CA	1.42	3	68	7	3,065	5	995	7
Vlg	Washington, DC-MD-VA	1.41	4	76	2	3,580	4	1,260	2
Vlg	Chicago, IL-Northwestern, IN	1.37	5	44	29	4,400	3	720	20
Lrg	Atlanta, GA	1.34	6	68	4	2,270	8	1,125	4
Lrg	Miami-Hialeah, FL	1.34	6	57	18	1,515	13	930	10
Vlg	Boston, MA	1.32	8	66	5	2,635	7	1,085	5
Vlg	Detroit, MI	1.31	9	62	8	3,145	6	1,010	6
Lrg	Las Vegas, NV	1.31	9	34	32	505	28	575	32
Lrg	San Diego, CA	1.31	9	36	29	1,285	16	835	29
Vlg	Houston, TX	1.30	12	58	7	2,210	9	980	9
Vlg	New York NY-Northeastern, NJ	1.30	12	38	26	5,585	2	640	27
Lrg	Portland-Vancouver, OR-WA	1.30	12	52	12	930	21	885	11
Lrg	San Jose, CA	1.29	15	45	18	965	20	755	17
Lrg	Denver, CO	1.28	16	45	18	1,060	17	780	19
Lrg	Phoenix, AZ	1.28	16	35	30	1,050	17	580	30
Lrg	San Bernardino-Riverside, CA	1.28	16	47	16	790	22	815	15
Lrg	Minneapolis-St. Paul, MN	1.28	16	34	32	1,030	19	670	33
Med	Tacoma, WA	1.28	19	29	39	225	50	530	40
Lrg	Dallas, TX	1.24	21	68	7	1,715	12	975	8
Lrg	Ft. Lauderdale-Hollywood-Pompano Bch, FL	1.24	21	31	35	895	25	515	36
Lrg	Sacramento, CA	1.24	21	36	28	895	25	845	28
Lrg	St. Louis, MO-IL	1.24	21	52	12	1,310	15	845	14
Med	Austin, TX	1.23	25	63	11	430	34	890	12
Lrg	Baltimore, MD	1.23	25	47	15	1,330	14	760	16
Med	Charlotte, NC	1.23	25	41	21	300	44	680	21
Lrg	Cincinnati, OH-KY	1.22	28	31	35	515	28	525	35
Med	Honolulu, HI	1.22	28	29	39	280	46	510	38
Lrg	Indianapolis, IN	1.22	28	52	12	695	23	885	13
Vlg	Philadelphia, PA-NJ	1.22	28	27	44	1,825	10	445	44
Med	Salt Lake City, UT	1.22	28	29	46	255	47	400	47
Lrg	Columbus, OH	1.21	33	30	36	495	37	515	38
Lrg	Milwaukee, WI	1.21	33	26	48	410	38	425	46
Lrg	Orlando, FL	1.20	35	41	21	650	27	670	23
Med	Albuquerque, NM	1.19	36	39	25	285	45	660	24
Med	Louisville, KY-IN	1.19	36	40	24	455	32	680	21
Lrg	New Orleans, LA	1.19	36	25	48	300	42	400	47
Med	Tampa, FL	1.19	36	41	21	430	34	660	24
Med	Tucson, AZ	1.19	36	28	42	225	50	450	43
Lrg	Cleveland, OH	1.18	41	20	51	985	29	345	51
Lrg	Norfolk, VA	1.18	41	34	32	450	33	570	33
Med	Memphis, TN-AR-MS	1.17	43	29	39	350	42	480	41
Lrg	Fort Worth, TX	1.16	44	36	26	625	24	640	27
Med	Omaha, NE-IA	1.16	44	31	35	215	52	510	38

水温計精度の確認結果
Confirmation of Accuracy of Temperature Gauge

- 現行のMCAの水温計精度は低い。
  Accuracy of the current MCA temperature gauge is poor

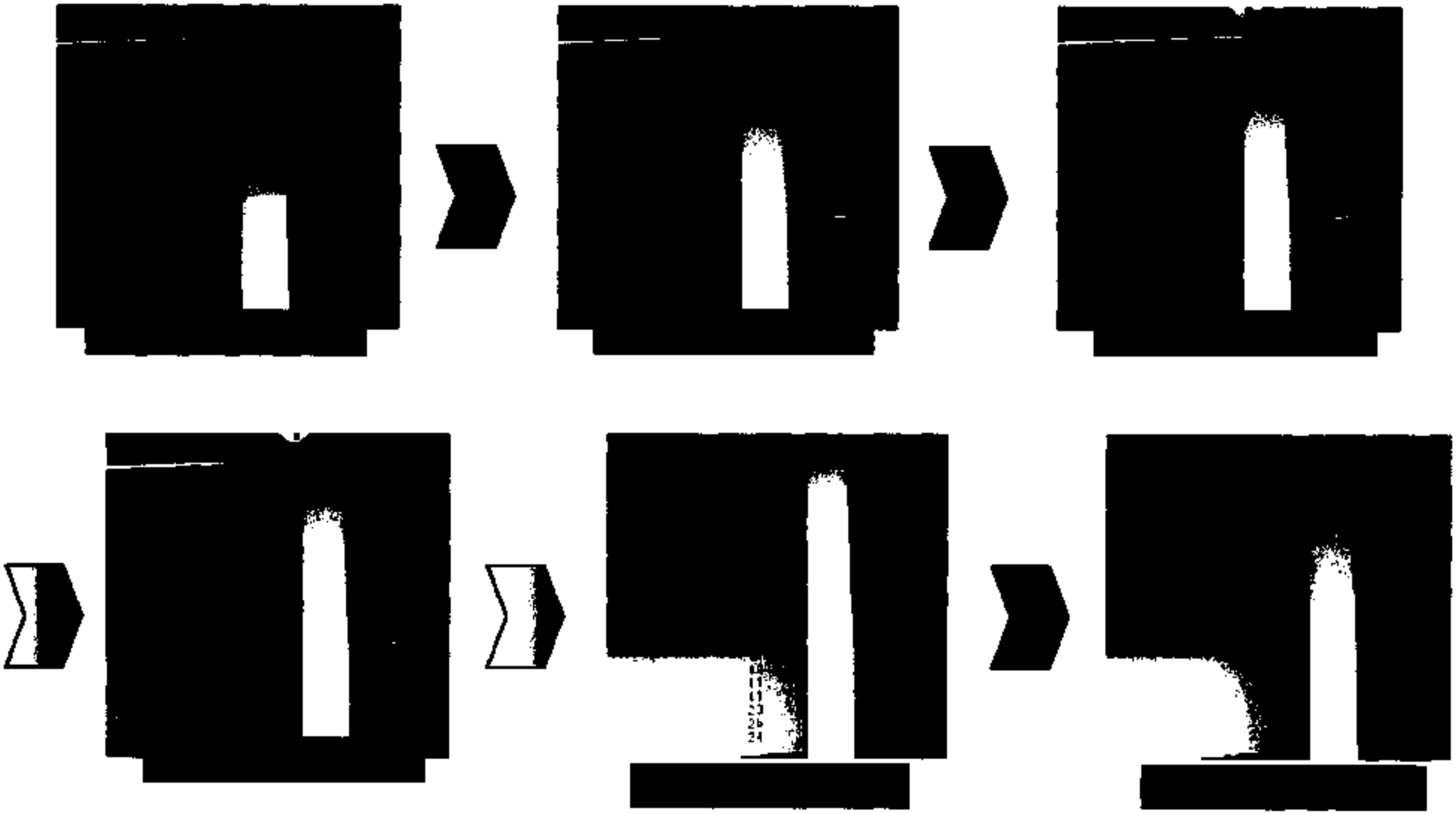
MCA



MAM

"H" Position 122 deg C

水温計精度の確認結果
Confirmation of Accuracy of Temperature Gauge



事象解析 Analysis of Situation

- 実走モード収録 Measurements at actual riding

  5 riders (Includes current GL user)

- 被測定者のライディングの特徴

  Characteristics of riding

– **Low experience riders**

Most frequently use Low gear

Average speed 10 mph

Riding style Lane sharing & Following

– **GL experienced riders**

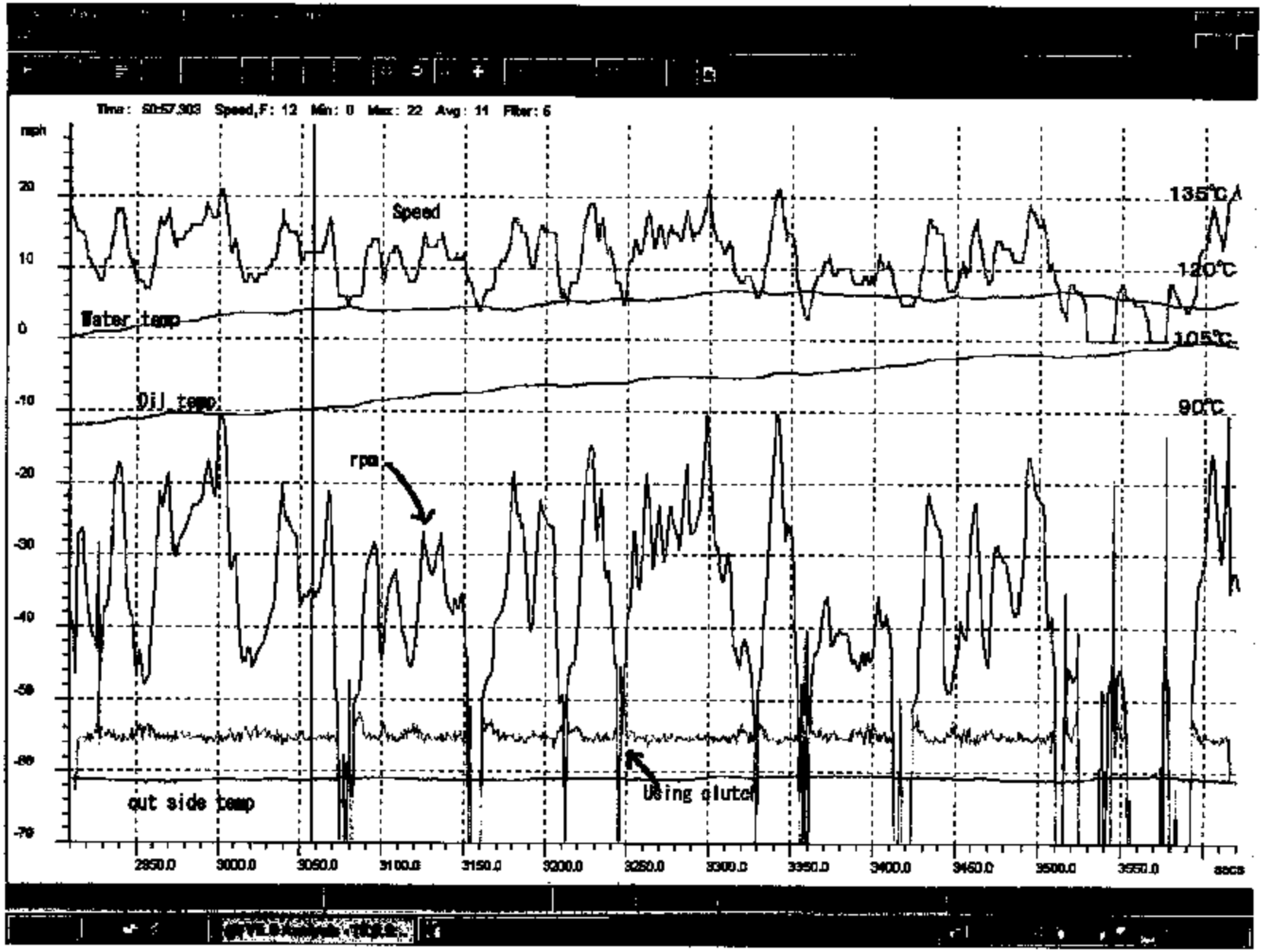
Most frequently use 2nd or 3rd gear

Average speed 15-25 mph

Riding style Lane sharing

波形データ Measured Data

（追尾走行＋1速＋低速走行）(Following + Low gear + Low speed)



総括 Conclusion

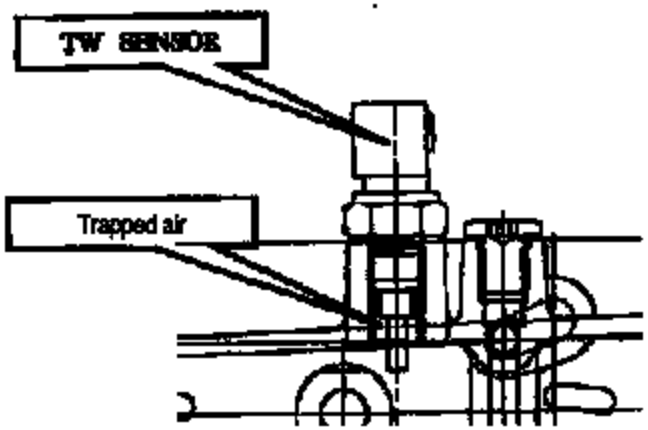
- MCA Overheat 表示問題は、USマーケットでは大きな懸念事項である。
- MCA overheating indication problem is causing a grave concern in the US market.
  - 水温計誤表示はGLカスタマーには許容出来るものではない。
  - Erroneous indication of overheating by temperature gauge is hardly acceptable to GL customers.
  - 実際の overheat が無かったとしても、GL ツーリングの信頼性が著しく失われる。
  - Even if no mechanical overheating occurs, image of GL touring reliability is severely compromised.

- HRA の結論として、現行仕様はUSマーケットでは許容出来ない。HGA で対策を施行する必要有り。
- It is the conclusion of HRA that the current spec is unacceptable to the US market and that HGA must take the necessary countermeasure.

Countermeasures against Erroneous Indication by Temperature Gauge of MCAA

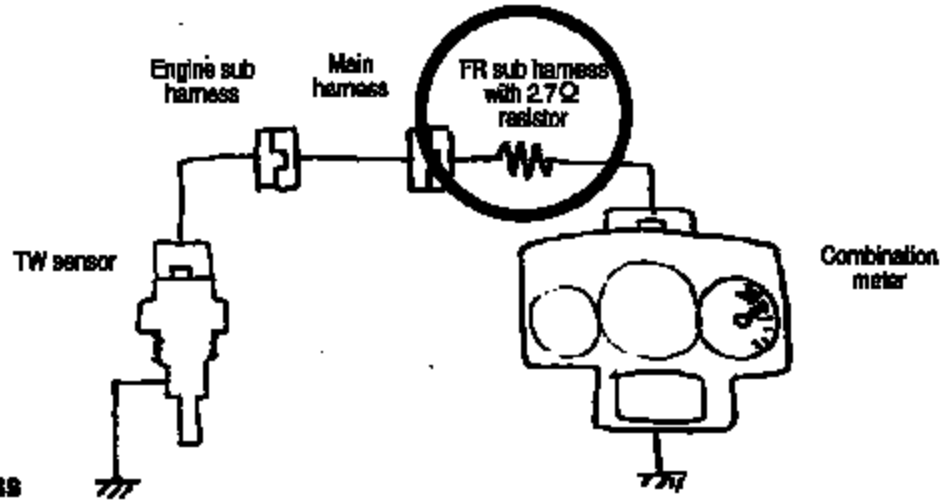
1. Cause of Occurrence

- The TW sensor is installed to the engine cylinder head, but the installation position was inappropriate and air was thereby trapped in the coolant temperature detecting area of the TW sensor. Due to the trapped air, the TW sensor was unable to detect coolant temperature properly, which caused the temperature gauge to indicate higher temperature than actual.
- The temperature gauge goes into the red zone, though the actual coolant temperature is still within the white (normal) range.



2. Countermeasure

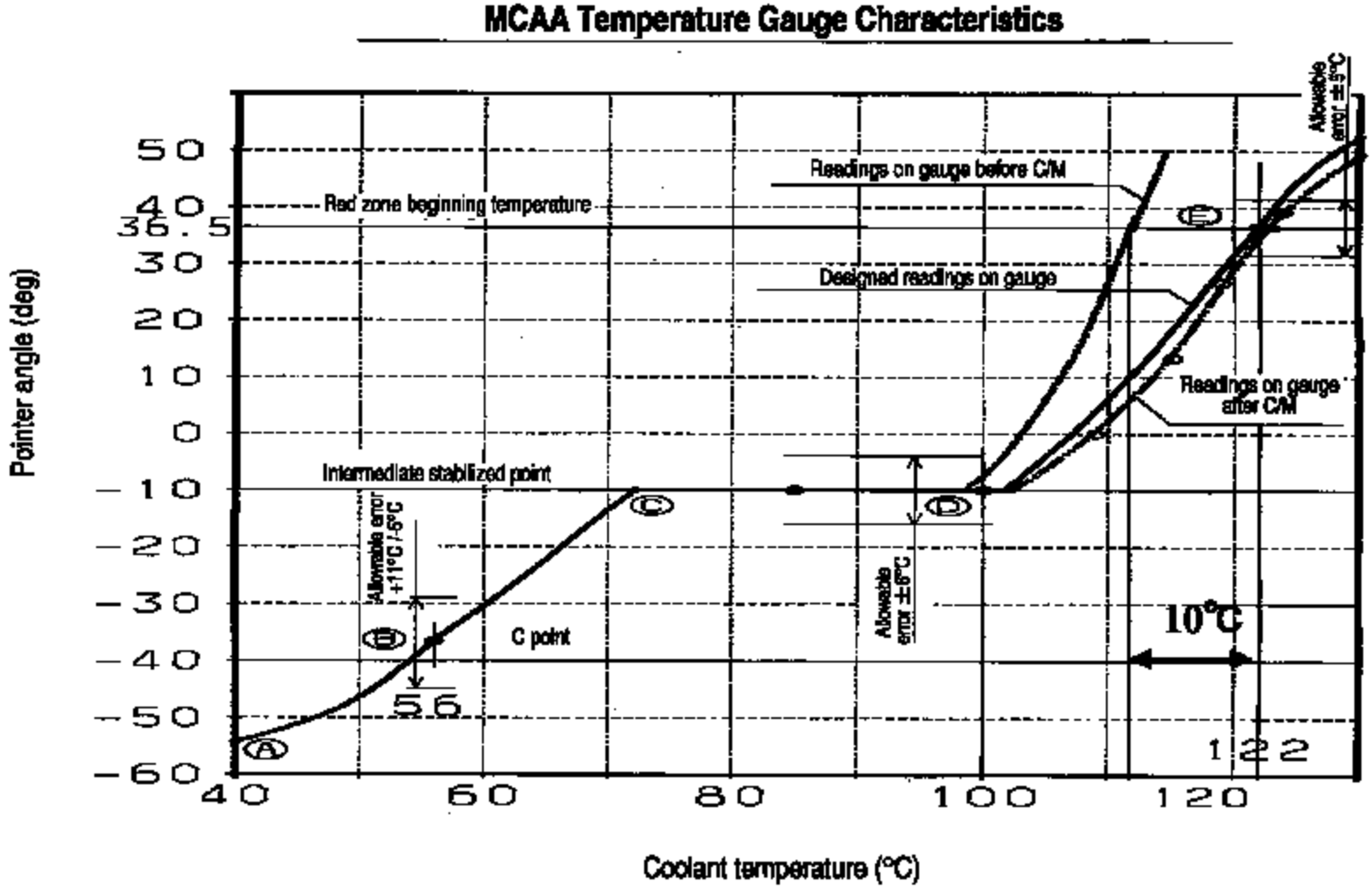
· A 2.7 Ω resistor was added between the temperature gauge and the TW sensor.



- For vehicles off the line : Existing sub harness was replaced with sub harness with a 2.7 Ω resistor
- For vehicles on the line : Application of fairing harness with a built-in 2.7 Ω resistor was started from 11/20

3. Reasonableness of Resistance Value Setting

3-1. Difference between actual coolant temperature and temperature indicated by temperature gauge as measured on actual vehicle

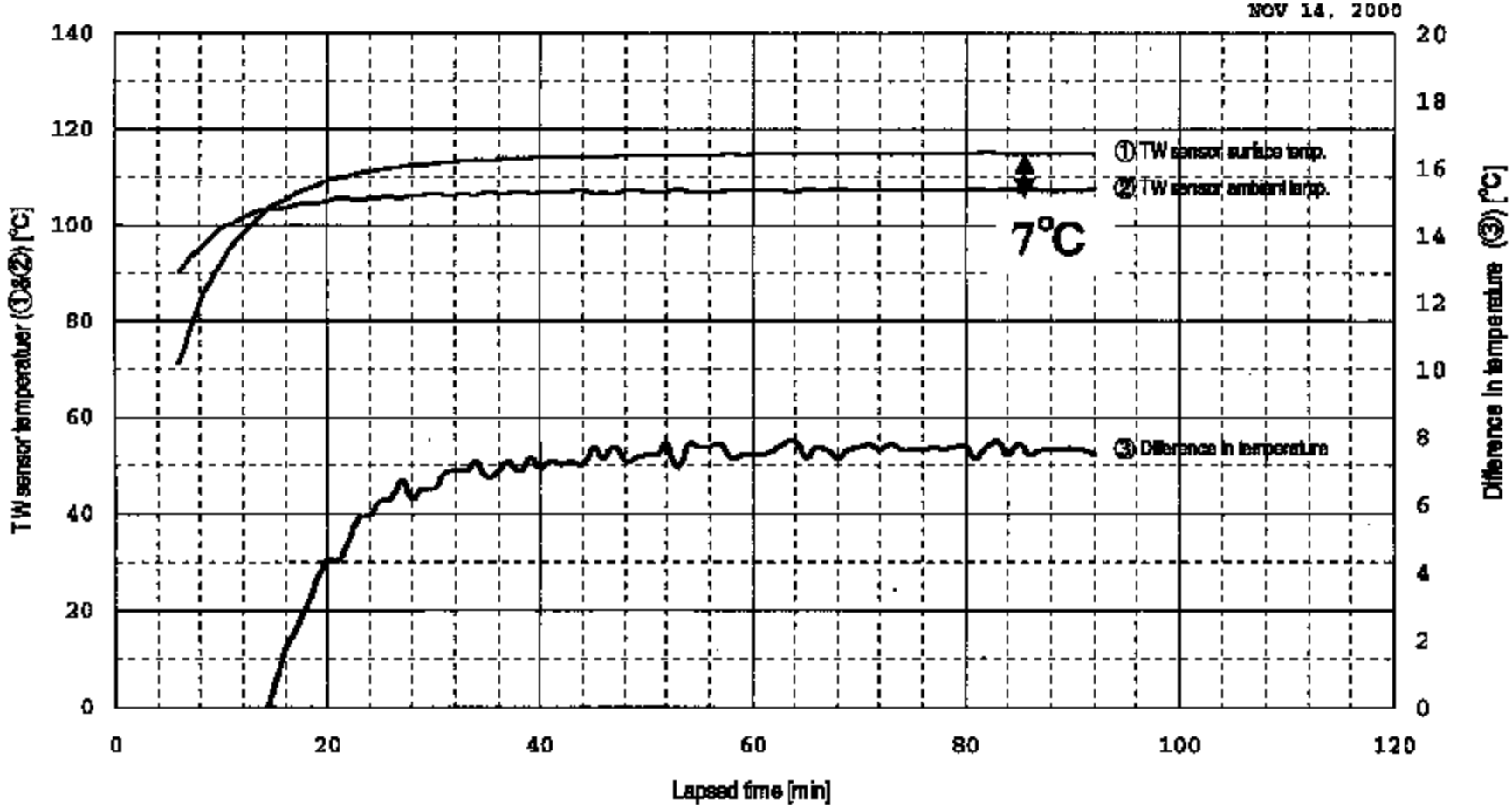


3. Reasonableness of Resistance Value Setting

3-2. Constant temperature exposure test of TW sensor

Because the coolant temperature detecting portion of the TW sensor is not in the coolant but is exposed to the air, the TW sensor is self-heated, and its surface temperature will be 7°C higher than the ambient temperature.

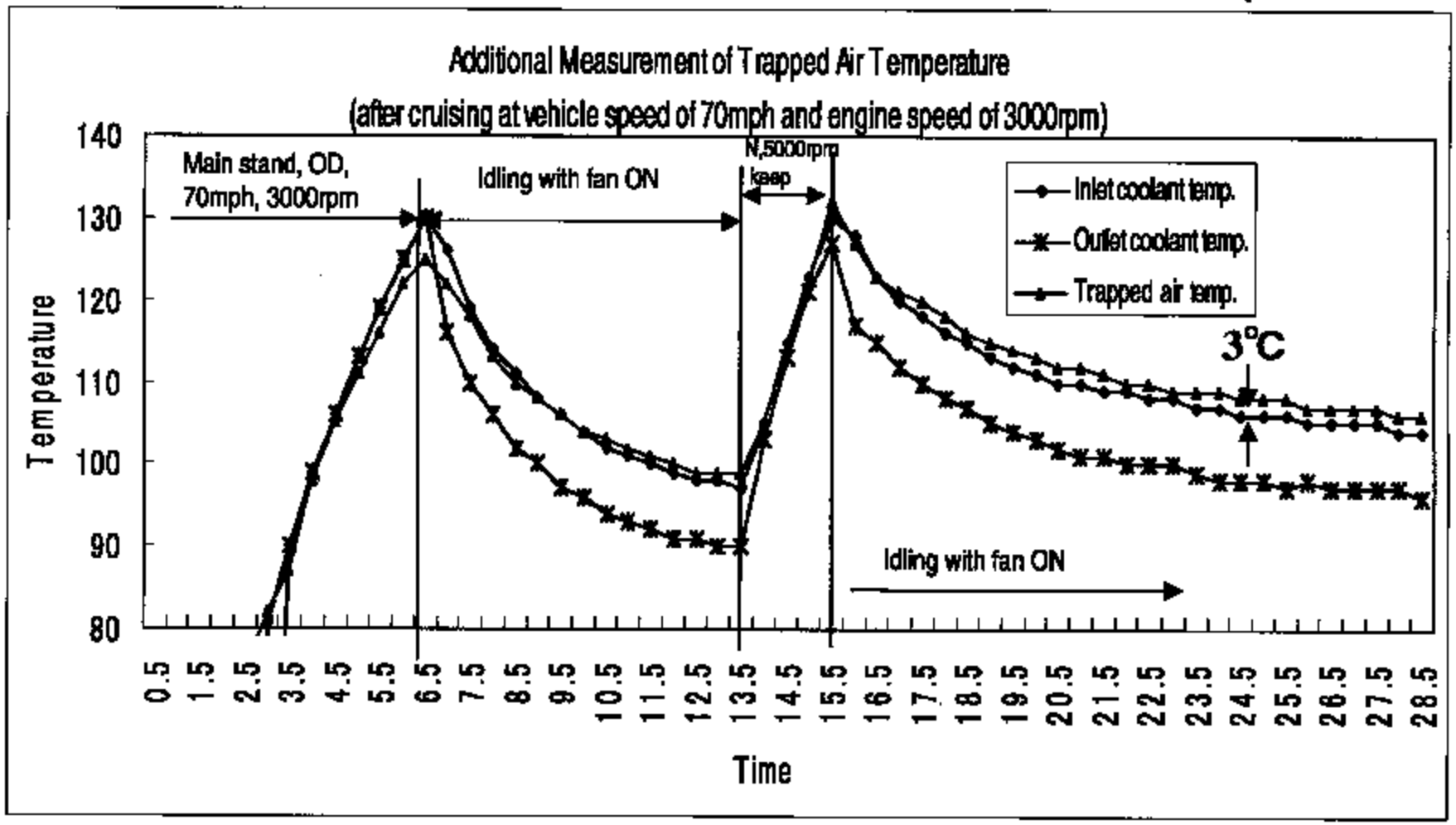
Self-heating Characteristics of MCA[A] TW Sensor
(when left in a thermostatic chamber kept at 110°C)



3. Reasonableness of Resistance Value Setting

3-3. Temperature of trapped air as measured on actual vehicle

Trapped air temperature is 3℃ higher than actual coolant temperature.



3. Reasonableness of Resistance Value Setting

3-4. Decision on resistance value

- There is about 10 ℃ difference, which is equivalent to 2.8 Ω, between the actual coolant temperature and the temperature indicated by the temperature gauge.

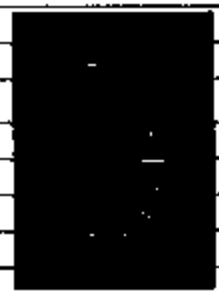
However, in consideration of

1) The contact resistance of harness, and

2) Unavailability of 2.8 Ω resistor on the market,

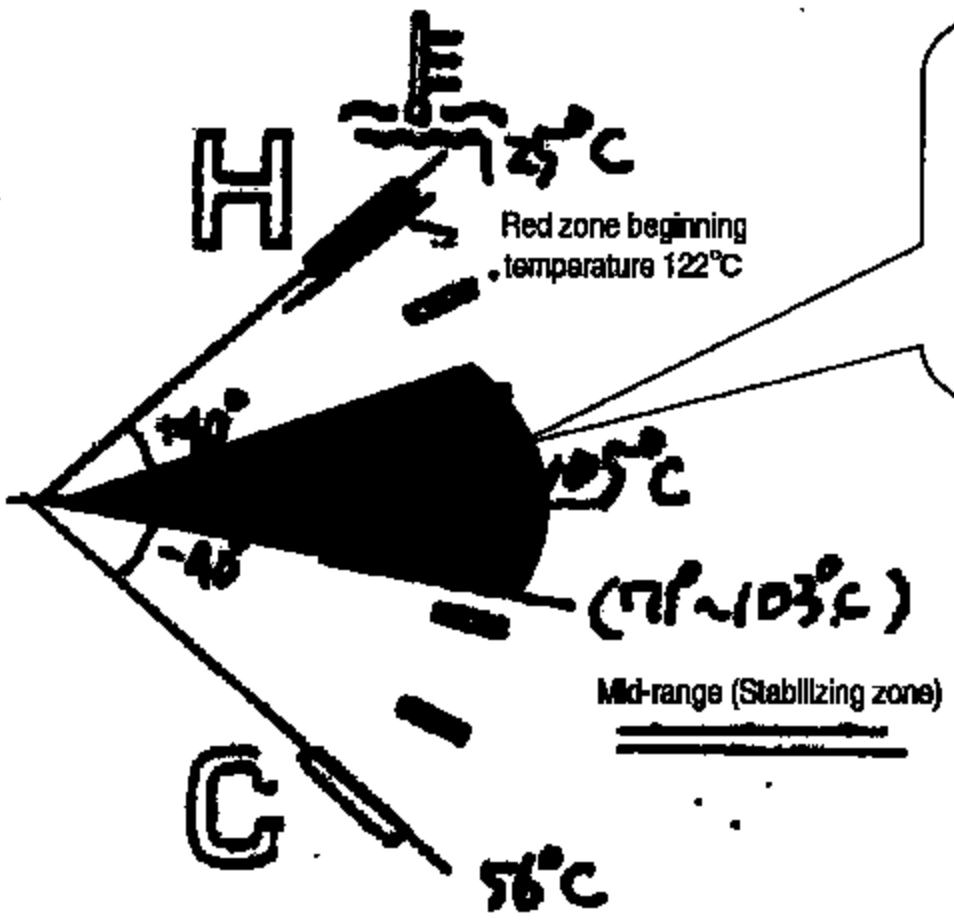
4. Confirmation of Effectiveness of Added Resistor

4-1. Test (conducted by HRA) to establish whether addition of a 2.7Ω resistor is effective

	100℃	105℃	110℃	112℃	115℃	120℃	122℃
Before C/M							
	2m30ss Oil Temp 82.6 C H2O Temp 100.2 C Air Temp 18.9 C	4m20s Oil Temp 83.7 C H2O Temp 105.0 C Air Temp 20.1 C	5m15s Oil Temp 86.4 C H2O Temp 110.0 C Air Temp 21.6 C	7m45s Oil Temp 89.6 C H2O Temp 112.9 C Air Temp 23.0 C	9m20s Oil Temp 92.0 C H2O Temp 114.7 C Air Temp 24.1 C		
After C/M							
SPEC							

4. Confirmation of Effectiveness of Added Resistor

4-2. Confirmation by actual running test in LA 405 mode



Temperature gauge stayed within this range both in stop-and-go mode and lane sharing mode in the simulation of riding along a road congested with traffic.

Mid-range (Stabilizing zone)

5. Conclusion

1. It has been reconfirmed by the analysis and verification conducted by Mss/HGA/HRA that the "addition of a 2.7 Ω resistor" to the temperature gauge circuit enabled the temperature gauge to indicate the actual coolant temperature.
2. Actual riding evaluation from customer viewpoint has confirmed our belief that the pointer of the improved temperature gauge stays within the range that won't cause customer anxiety.

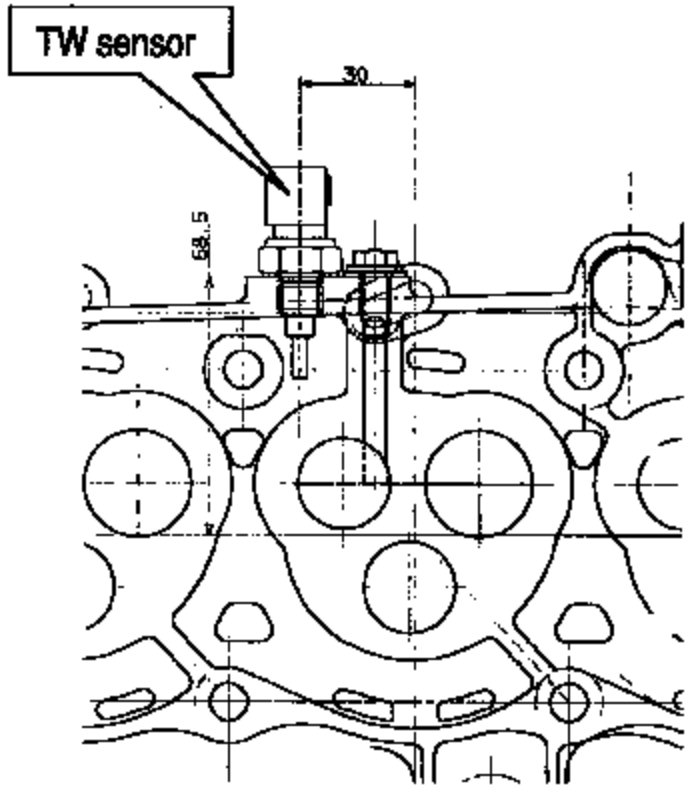
   On these grounds we have adopted the "addition of a 2.7 Ω resistor" as a countermeasure.

6. Further Improvements

1. TW sensor position change

Change the TW sensor installation position so that the coolant temperature detecting portion of the sensor is submerged in coolant

⇒ Application will be from MCAF ('02)



2. Clarification of TW sensor L/O standard

⇒ Technical bulletin is to be issued

Review of existing models revealed that no model was pertinent to the problem

MCAA

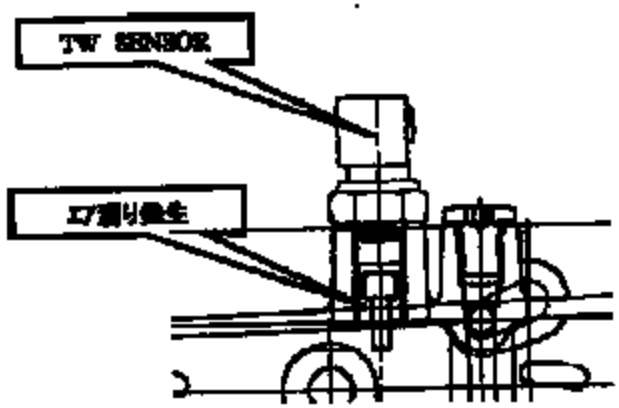
水温計指度異常対策

2000/12/11 AMM完了報告

1.発生原因

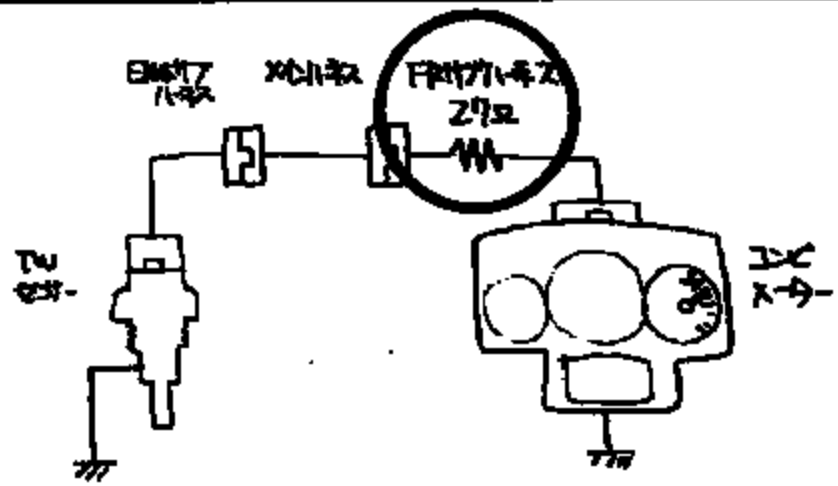
・ENG Cylヘッドに取り付けられている
TWセンサーの位置が悪く、適正な水温が
測定できなかった為、水温計指度が高めに
指示された。

＊実水温が正常範囲で水温計がR/Zに突入する



2.対策

・水温計 ⟷ TWセンサー 間に、
2.7Ωの抵抗を追加する。

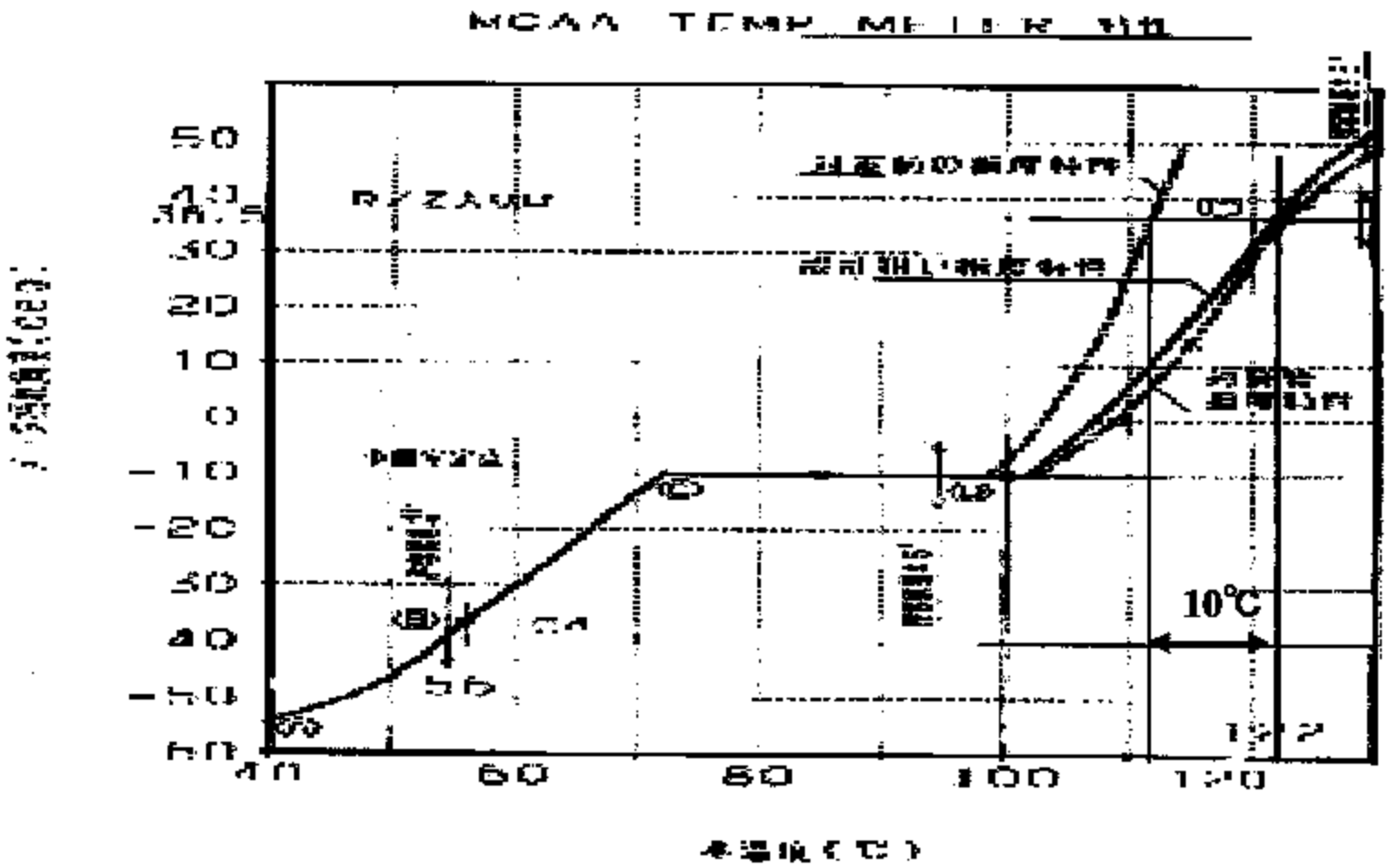


・既生産分；ｻﾌﾞﾊｰﾈｽ追加（組替済）

・ライン対応；11/20生産分より適用済み

3.抵抗値設定の妥当性

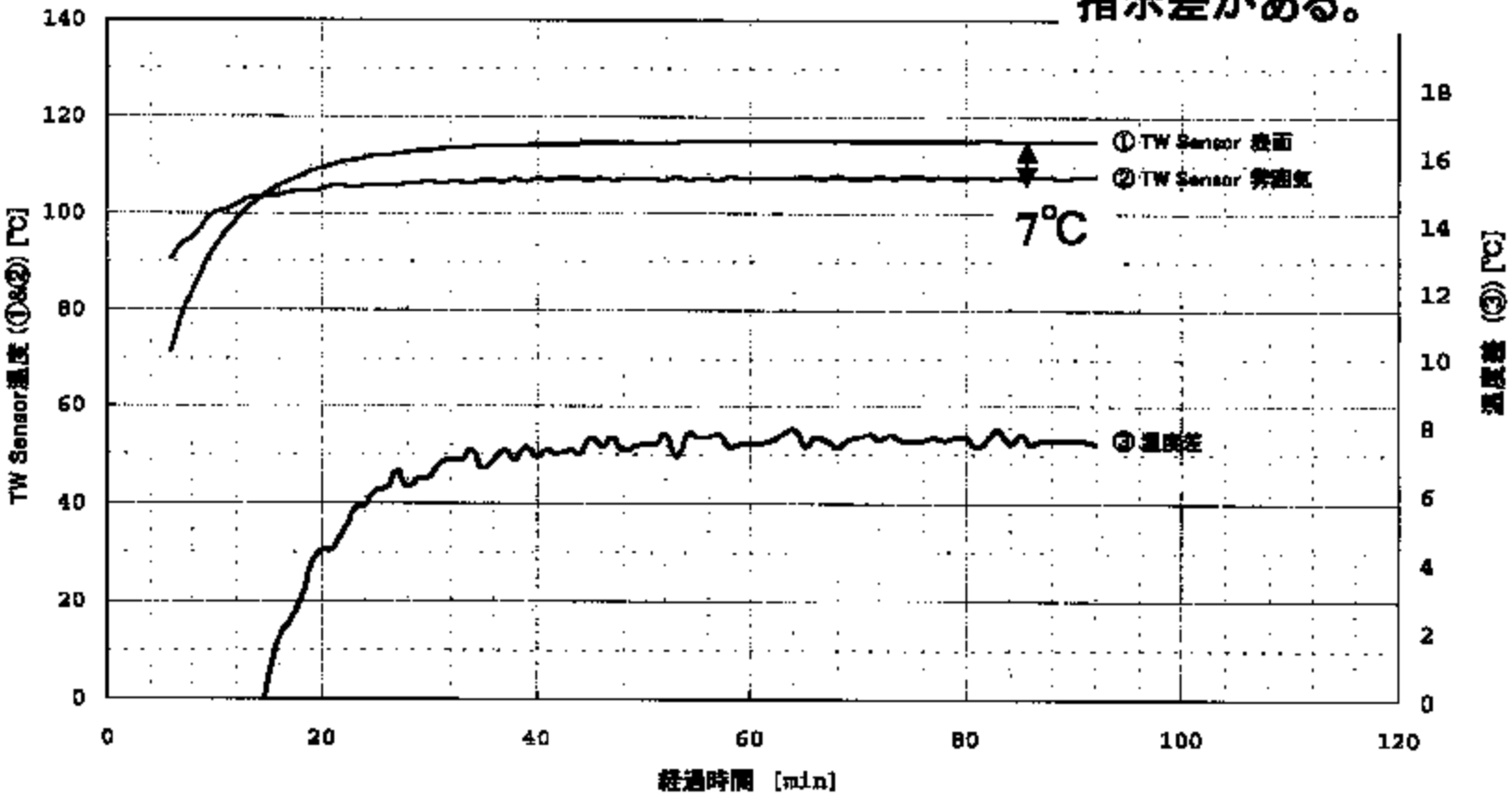
3-①実車における実水温と水温計表示の差



3.抵抗値設定の妥当性

3-② TWセンサー 気中放置テスト

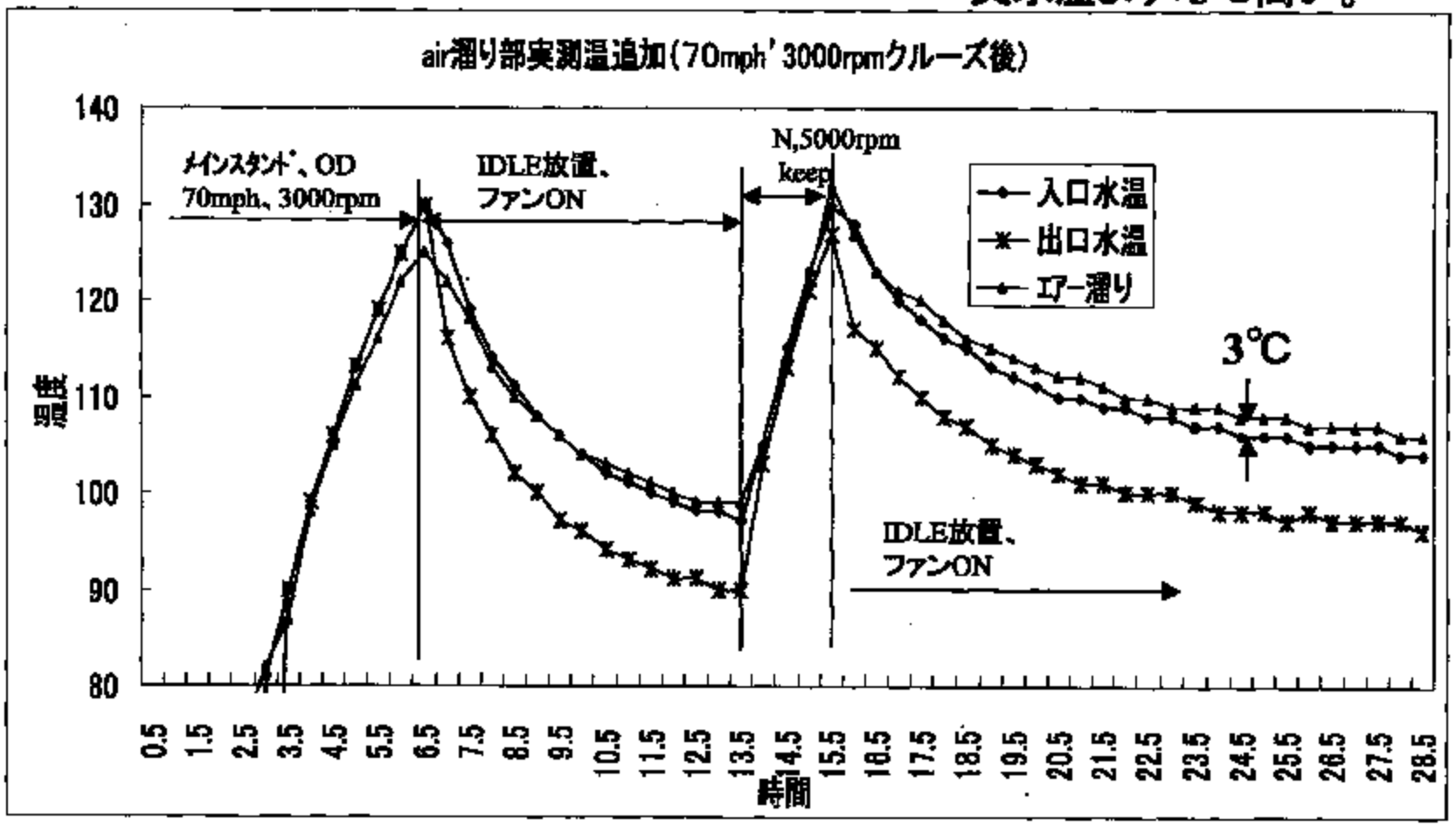
TWセンサー水温感知部が水中に無い場合、自己発熱により+7℃の指示差がある。



3.抵抗値設定の妥当性

3-③ 実機Air溜り部の測温結果

実機Air溜り部の温度は、
実水温より+3℃高い。



3.抵抗値設定の妥当性

3-④ 抵抗値の決定

・実水温と水温計指示差の間には2.8Ω(約10℃)の差が有る。

しかし、

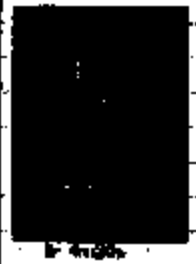
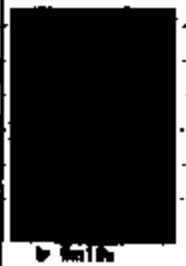
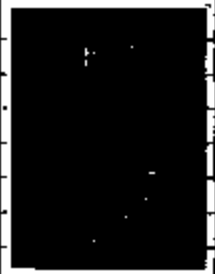
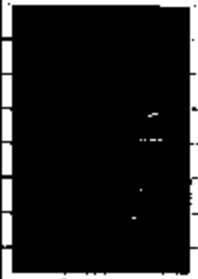
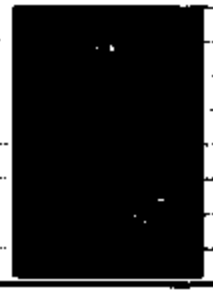
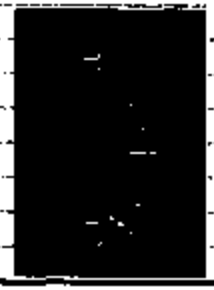
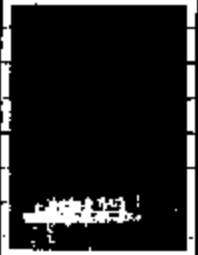
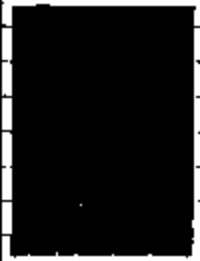
1)ハーネスの接触抵抗

2)市場の入手性･･･2.8Ωの抵抗は市販されていない。

[redacted]

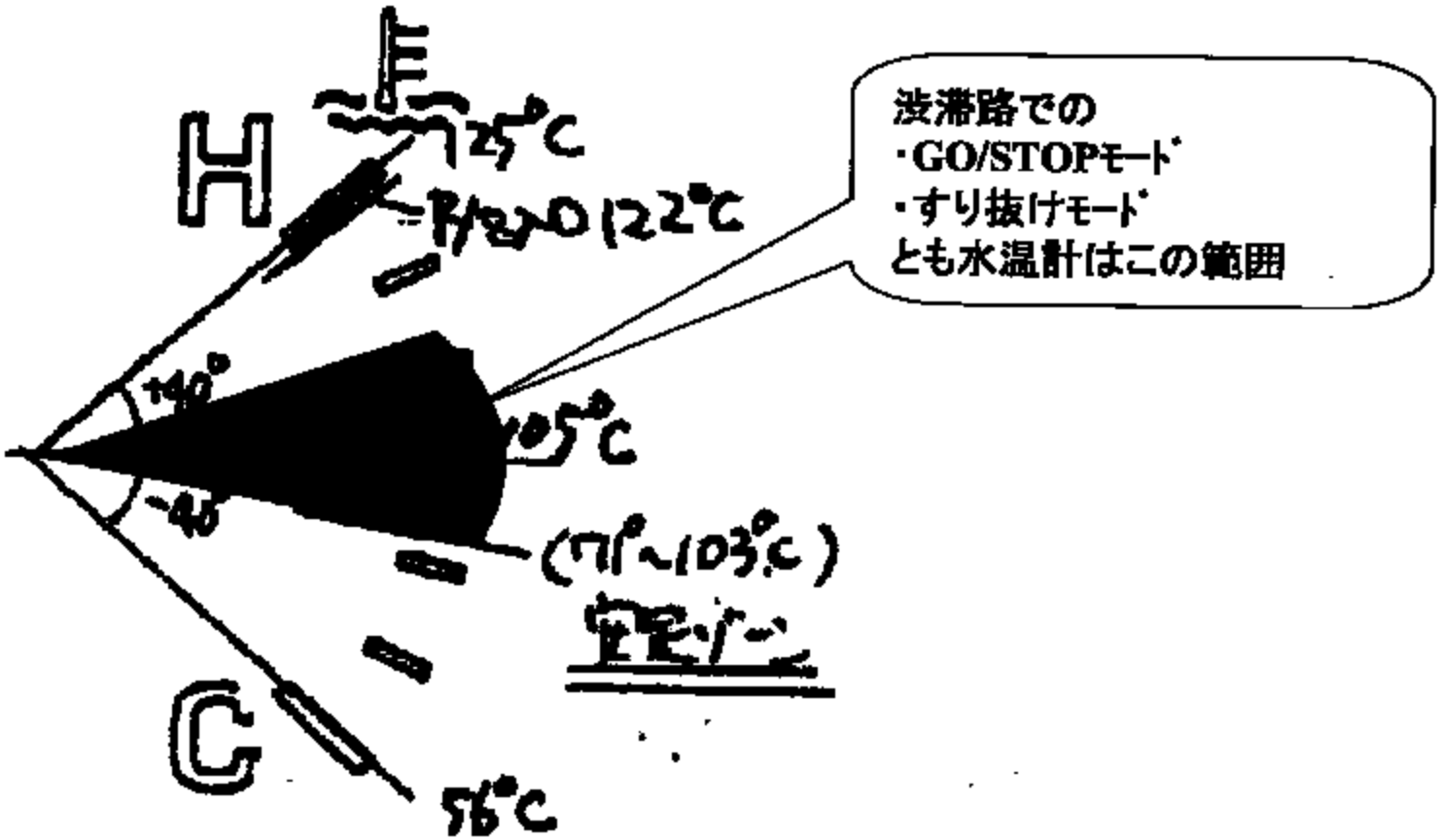
4.抵抗追加効果確認

4-① 2.7Ω追加サンプルでの効果確認 （HRA）

	100℃	105℃	110℃	112℃	115℃	120℃	122℃
対策前							
対策後							
SPEC							

4.抵抗追加効果確認

4-② LA 405モードでの実走効果確認



5.結論

1.水温計回路への「2.7Ω 抵抗追加」は、実水温値を
表示している事がMss/HGA/HRAでの解析及び確認
結果より再確認された。

2.ユーザー視点からの実走評価より、対策後の水温計の
指針は不安をいだかない範囲にある。

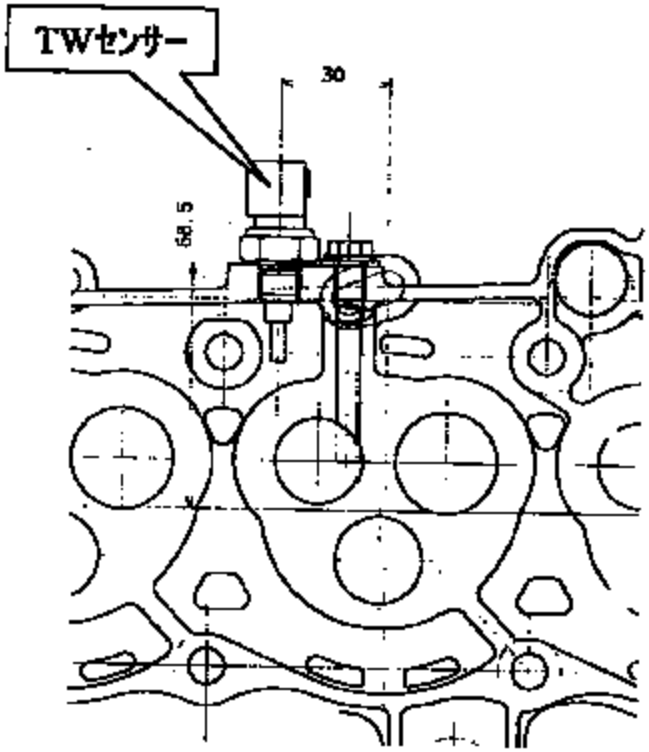
従って「2.7Ω抵抗追加」を対策仕様とする。

6.今後の展開

1；Twセンサー位置変更

センサー部が水中にあるように取り付け変更

⇒MCAFより適用



2；TwセンサーL/O基準の明確化

⇒技連発行予定

既存機種の見直し結果は問題該当機種なし

GL1800 Temperature Gauge Readings

1. Alleged Symptoms
2. Results of Duplication Tests
3. Results of Analysis
4. Remedial Action to Use on Future Models

2002/2/12

Customer Complaints

QIC No.	Title	Vin# 1HFSC47	Eng	Deliver	Occurrence	DLR	Millage	Complaint			Coolant Loss	Temp Gauge
2H-2001-041	Engine overheating	A61A000169	2006805	04-19-01	04-20-01	Italy	1000km	While riding at very low speed about 25~30km/h on mountain road, suddenly customer noticed coolant temp gauge needle on the highest zone and coolant flowing out from the coolant reserve tank.	NG setting of cooling fan operating system. Proceeding at low speed with low gear on climbing roads or during procession of M/C in occasion of M/C rally.	Glodwing Members use to make trip together, so this problem in the same time has been noticed by several people.		Red Zone
2H-2001-041	Engine overheating	A01A001141	2011449	06-30-01	06-07-01	Italy	200					
2SH-2001-005	Overheating of engine	A31A000033	2005815	03-28-01	07-29-01	Switzerl	1200	To stop the bike to avoid the water boil and flow outwards by reserve tank.	In extreme hot condition, high air temp. slow hill up drive, traffic jam in city areas.			
		A61A002276	2013274	03-28-01	08-05-01		1500					
		A61A001192	2011535	05-01-01	08-02-01		1700					
		A11A002122	2013170	05-01-01	08-11-01		1300					
M1M057	Temp Gauge Reads High, After C/M	061A000048	2000199		08-27-01	AH	12000		Complaints from Dealers and Customers. Temp Gauge Indicates the vehicle is overheating on units.	No actual colant loss. Normal street riding. Coolant level had risen slightly, but there was no evidence of boil over.	Coolant level is normal	Red Zone
M2OH028	Runs High on Temp Gauge	037A102192	2102592	08-10-01	08-21-01	104151	1081	The bike was overheating.	After 15min of running at any speed, the temp gauge would go into the red zone.	No actual coolant loss.	Coolant in the reserve tank and radiator was full.	Red Zone

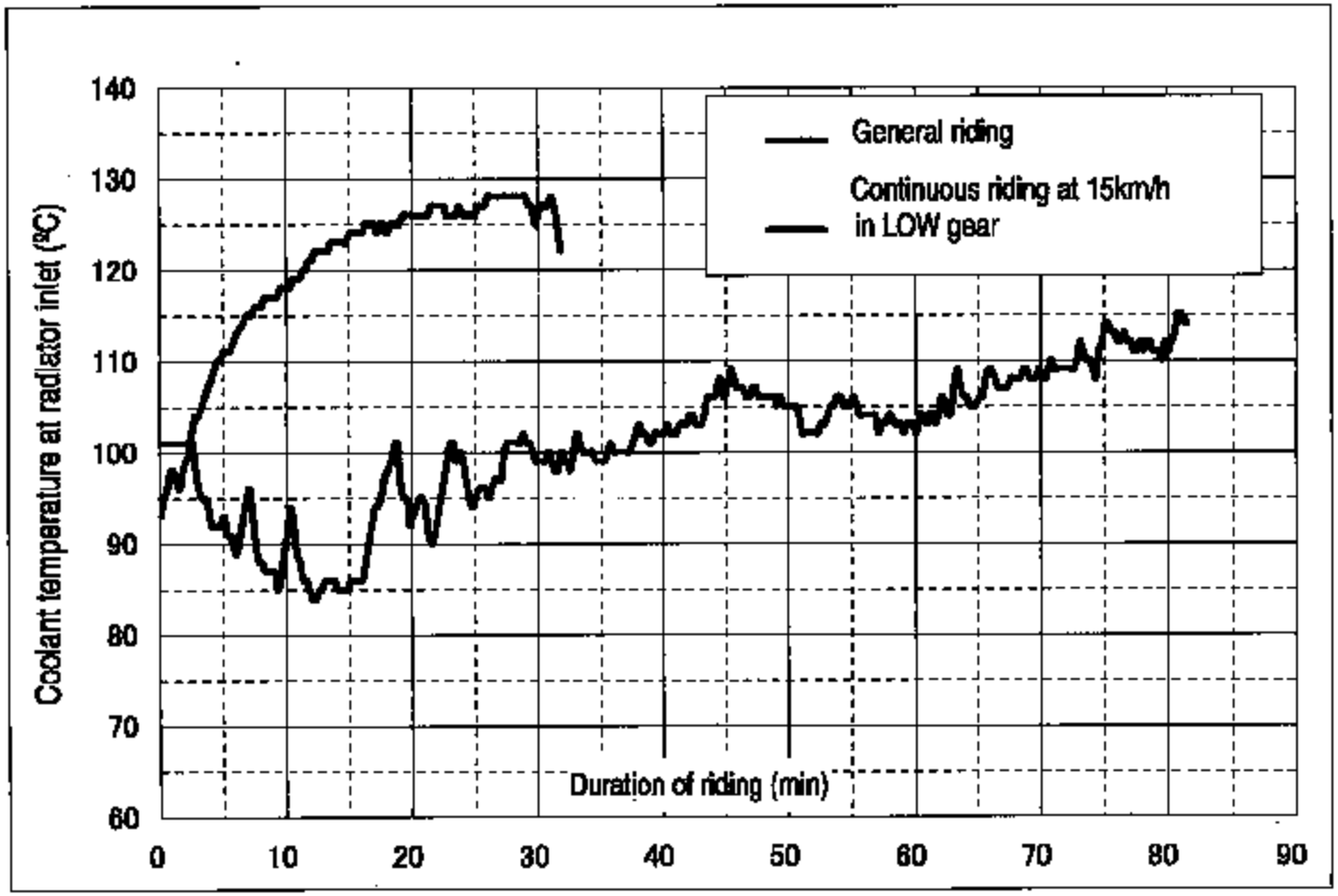
According to the information from QIC reports, there have been one complaint that the coolant expulsion had occurred and seven complaints that the reading on the temperature gauge was so high that the customer felt anxiety that his/her vehicle might overheat.

Data-1. Duplication Test – 1 (Test on General Public Road)

The duplication test has shown that the coolant temperature can rise as high as to the coolant's boiling point when the vehicle is ridden continuously in LOW gear.

Test conditions
Riding on a general public road (in an ambient temperature of 30ºC), including stop-and-go riding

General riding : Frequently shifted up and down between LOW gear and 4TH gear in stop-and-go riding.
Continuous riding at 15km/h in LOW gear : Conducted on a suburban road where there was no traffic light to prevent continuous riding.



Data-2. Duplication Test – 2 (HGP Test)

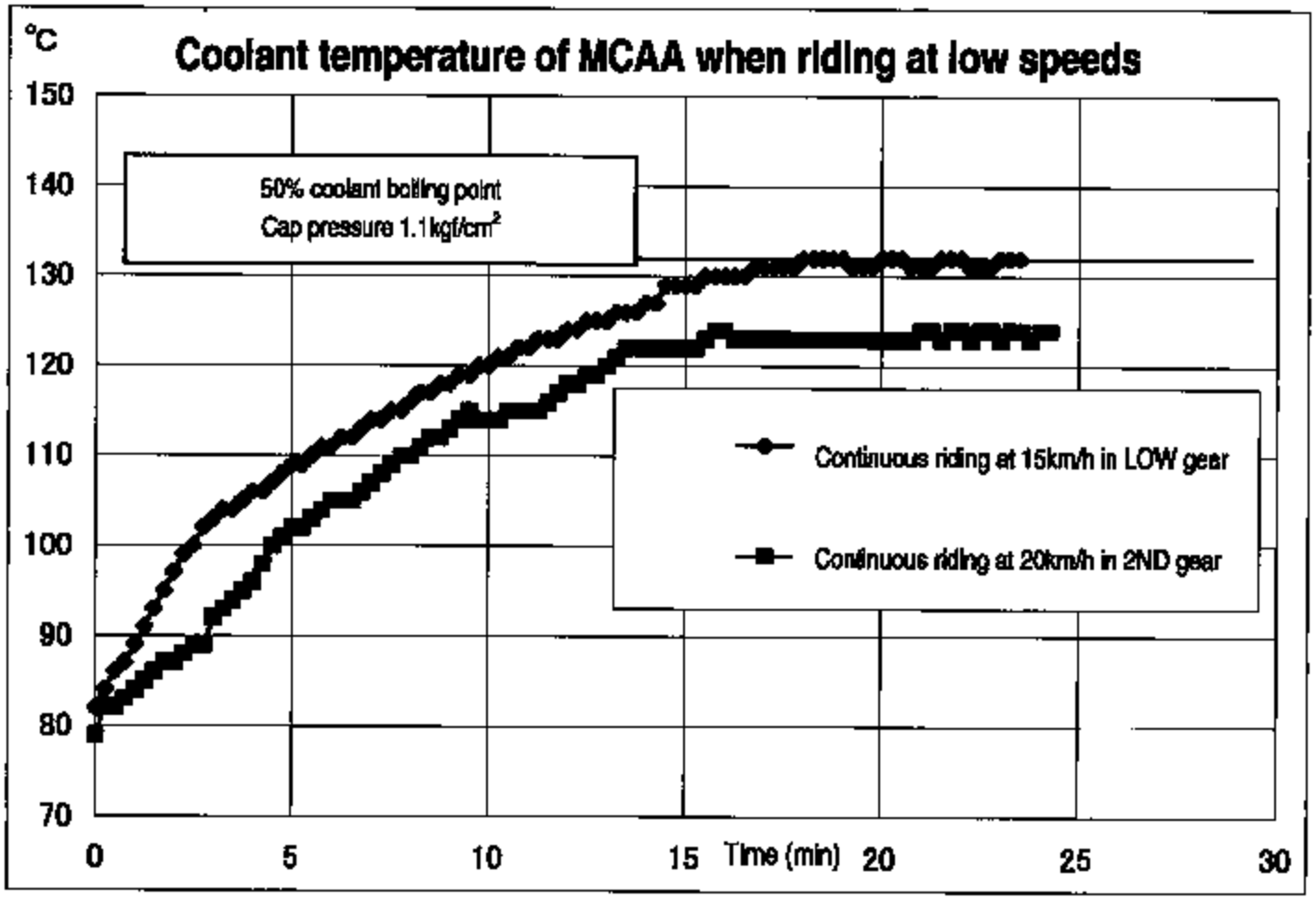
The HGP test conducted as duplication test-2 for the purpose of gaining stability in data revealed that

● The coolant temperature climbed as high as to the coolant's boiling point when the vehicle was ridden continuously in LOW gear, and

○ The coolant did not reach its boiling point when the vehicle was ridden continuously in 2ND gear.

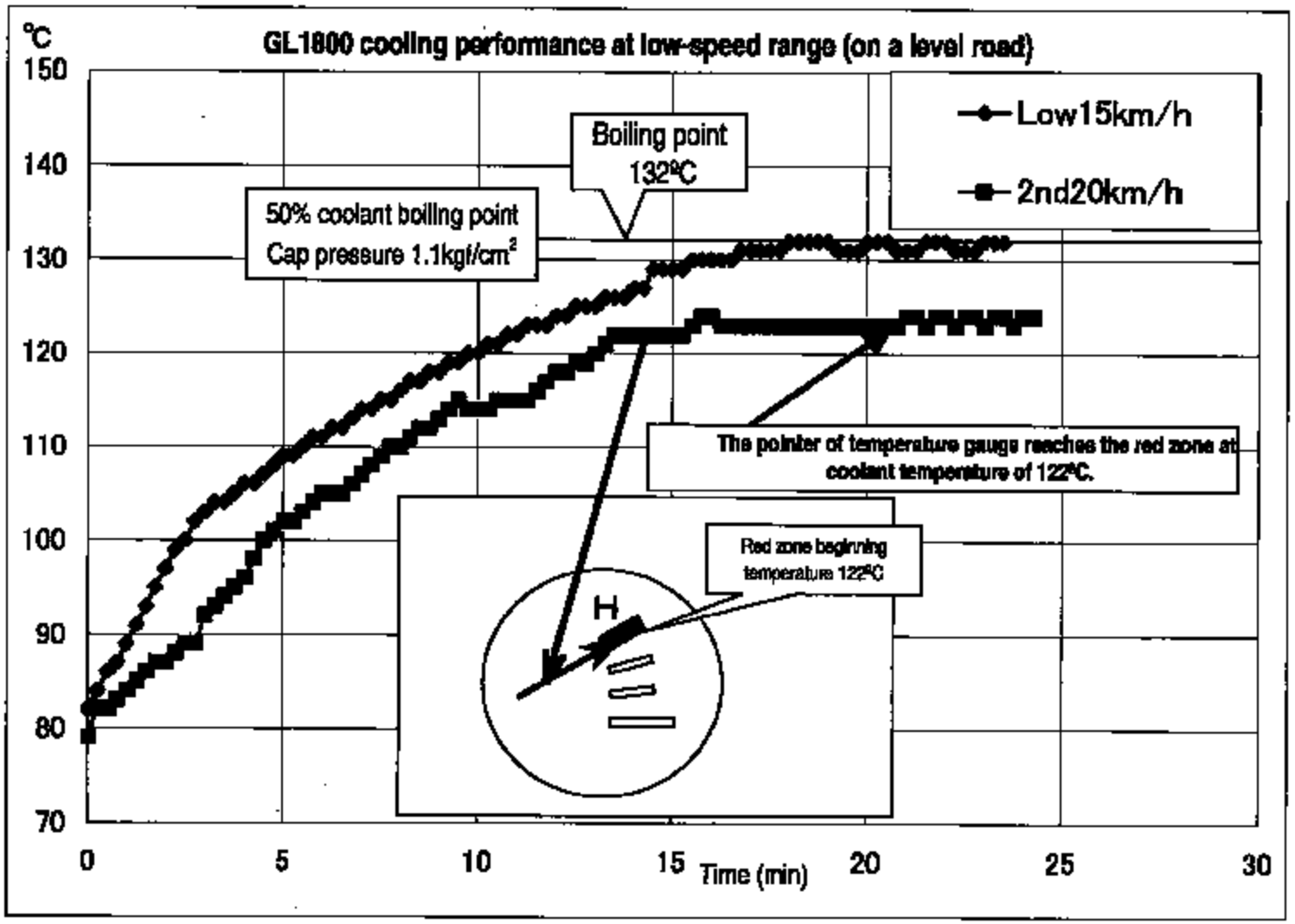
Test conditions

HGP (in an ambient temperature corrected to 35°C)



Data-3. Duplication Test – 2 (HGP Test)

Temperature gauge indication during continuous riding ... The pointer climbs to the red zone before coolant expulsion occurs.



Data-4. Temperature Gauge Indication Characteristics – 1

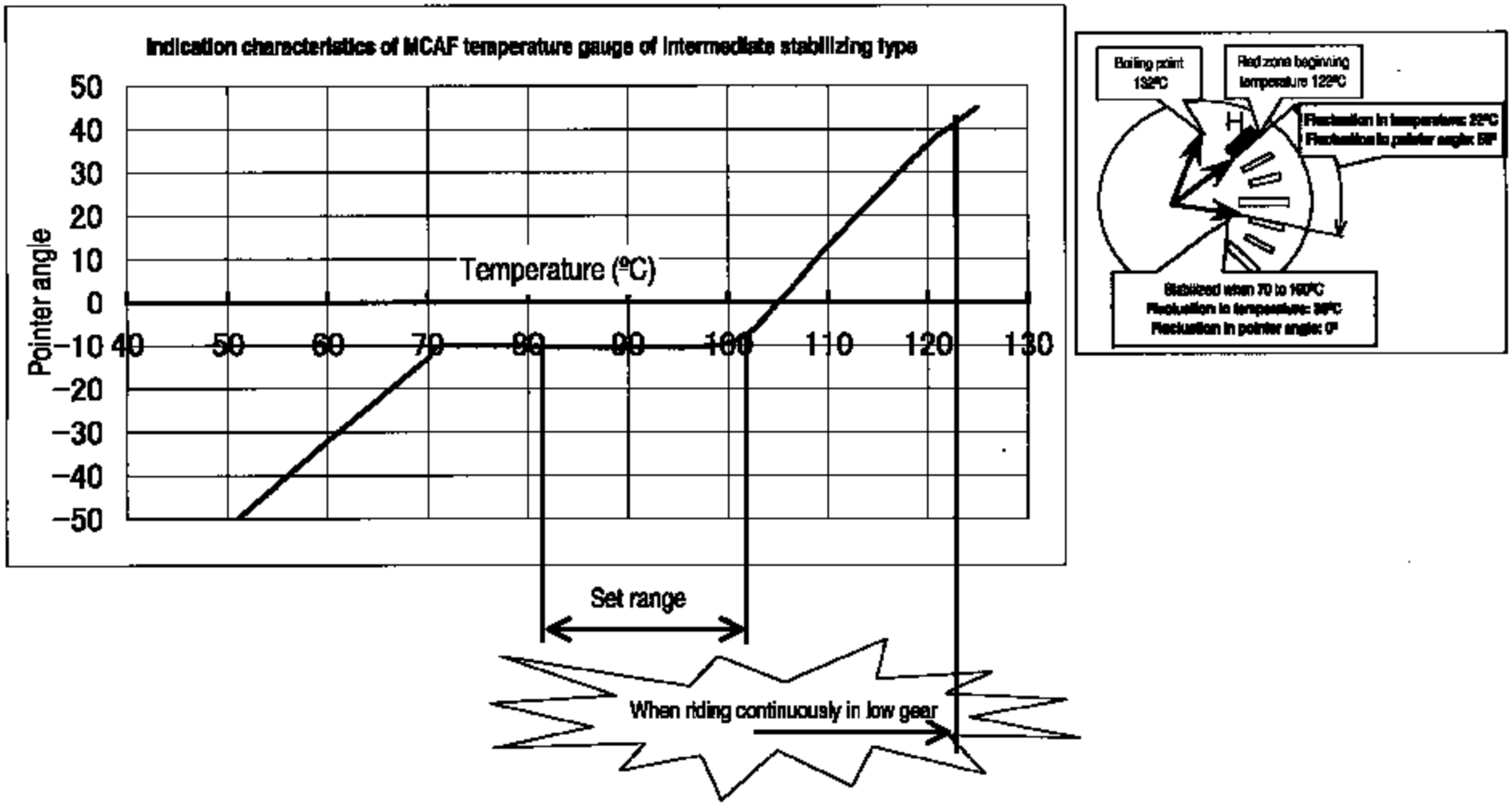
The intermediate stabilizing type has been applied to motorcycles since MCAA adopted it for the first time.

Aim of the adoption of the intermediate stabilizing type :

The pointer of temperature gauge stays in the mid-zone under most conditions throughout the year and it makes customer feel safe. For this reason, this type has been widely applied to automobiles.

* However, there is a negative aspect that the pointer goes higher rapidly if the coolant temperature goes out of the stabilizing zone and it may cause customer anxiety.

* However, there is a negative aspect that the pointer goes higher rapidly if the coolant temperature goes out of the stabilizing zone and it may cause customer anxiety.

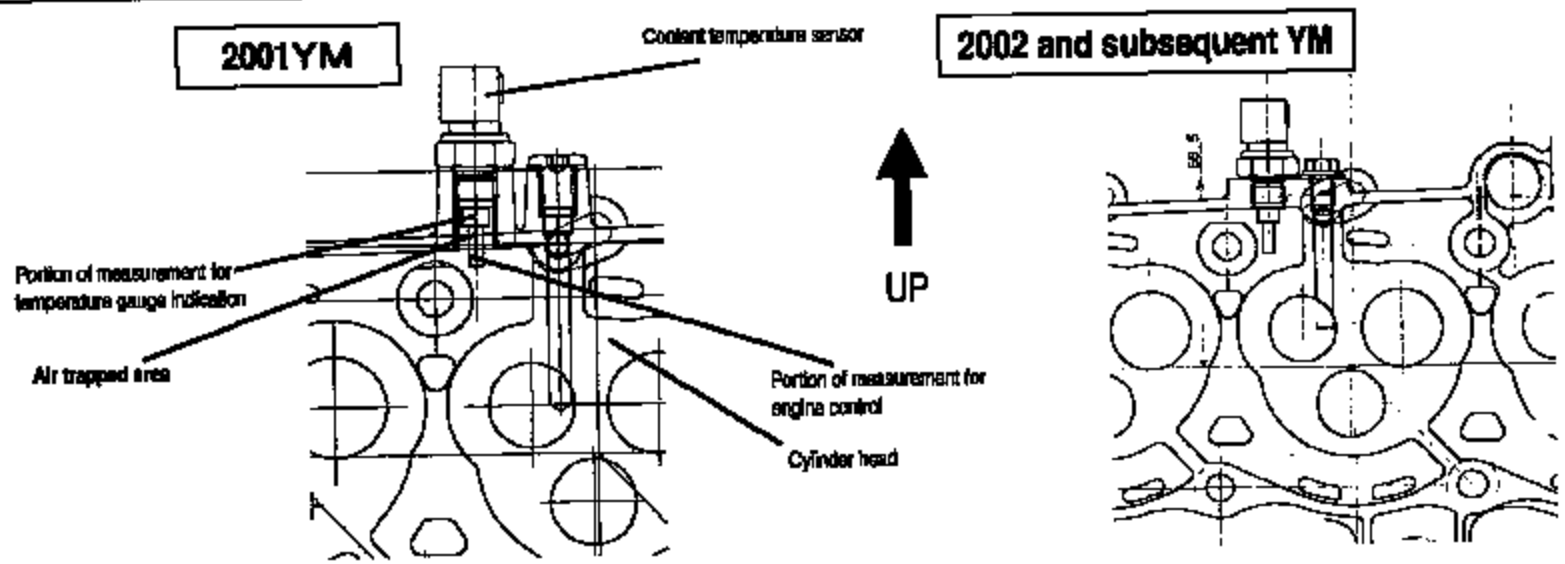


<The course of events in the stage of development>

- In the late stage of development, a problem was found that the air trapped in the coolant temperature sensor area of the cylinder head could cause the temperature gauge to indicate the red zone when riding at low speeds. At this time it was also revealed that there was lack of toughness against such situation that the coolant was heated to its boiling point during continuous running in low gear.

<Judgment in the stage of development>

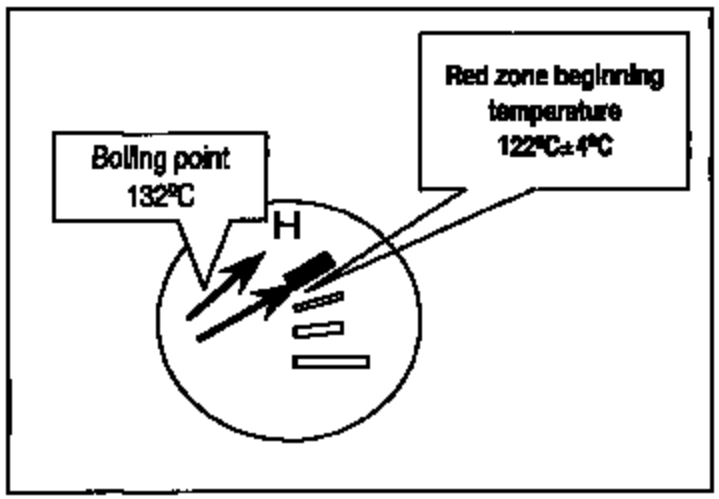
- On the ground that continuous low-speed running mode was not among the HGA development requirements (the requirements should have included the mode if there had been any trouble in that mode in the past), it was judged to be rarely the case that the vehicle would be ridden continuously in low gear.



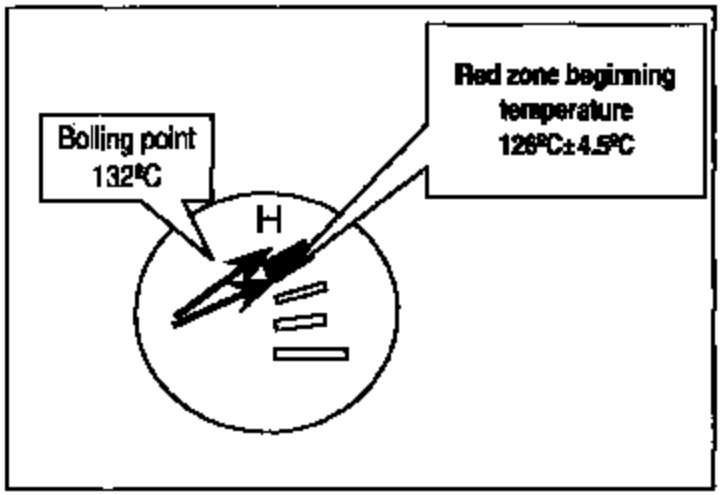
<The course of events in the stage of development of 02YM (MCAF) for use in Japan>

◎ For models intended for use in Japan where traffic congestion is of frequent occurrence, the temperature set for the temperature gauge to go into the red zone was changed (raised) based on a judgment drawn from the results of tests including public road test.

【Before changing the red zone beginning temperature set for the temperature gauge】
01YM and 02YM for A, ED

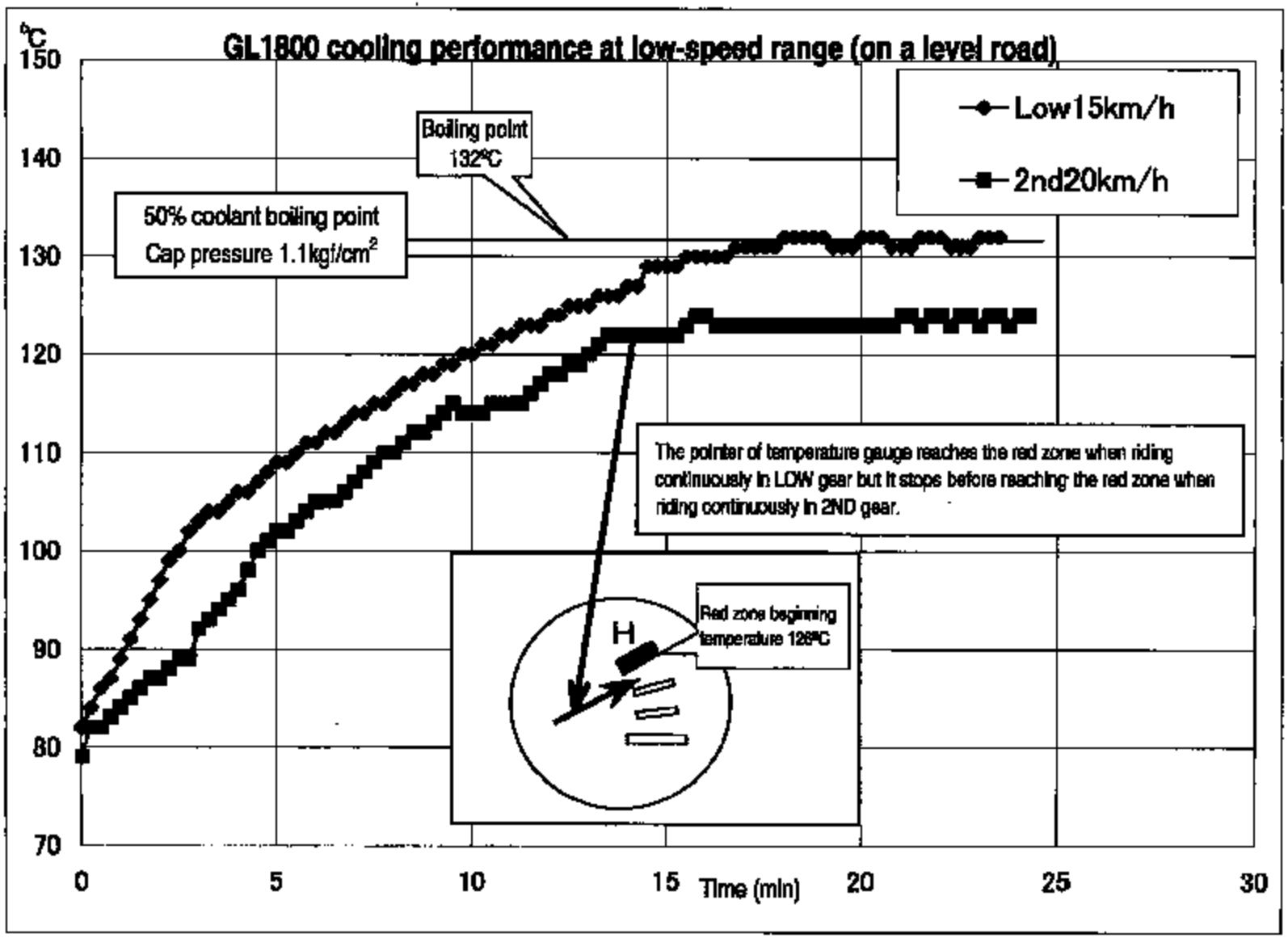


【After changing the red zone beginning temperature set for the temperature gauge】
02YM for K



Data-5. Indication by Temperature Gauge of Japanese Version of MCAF

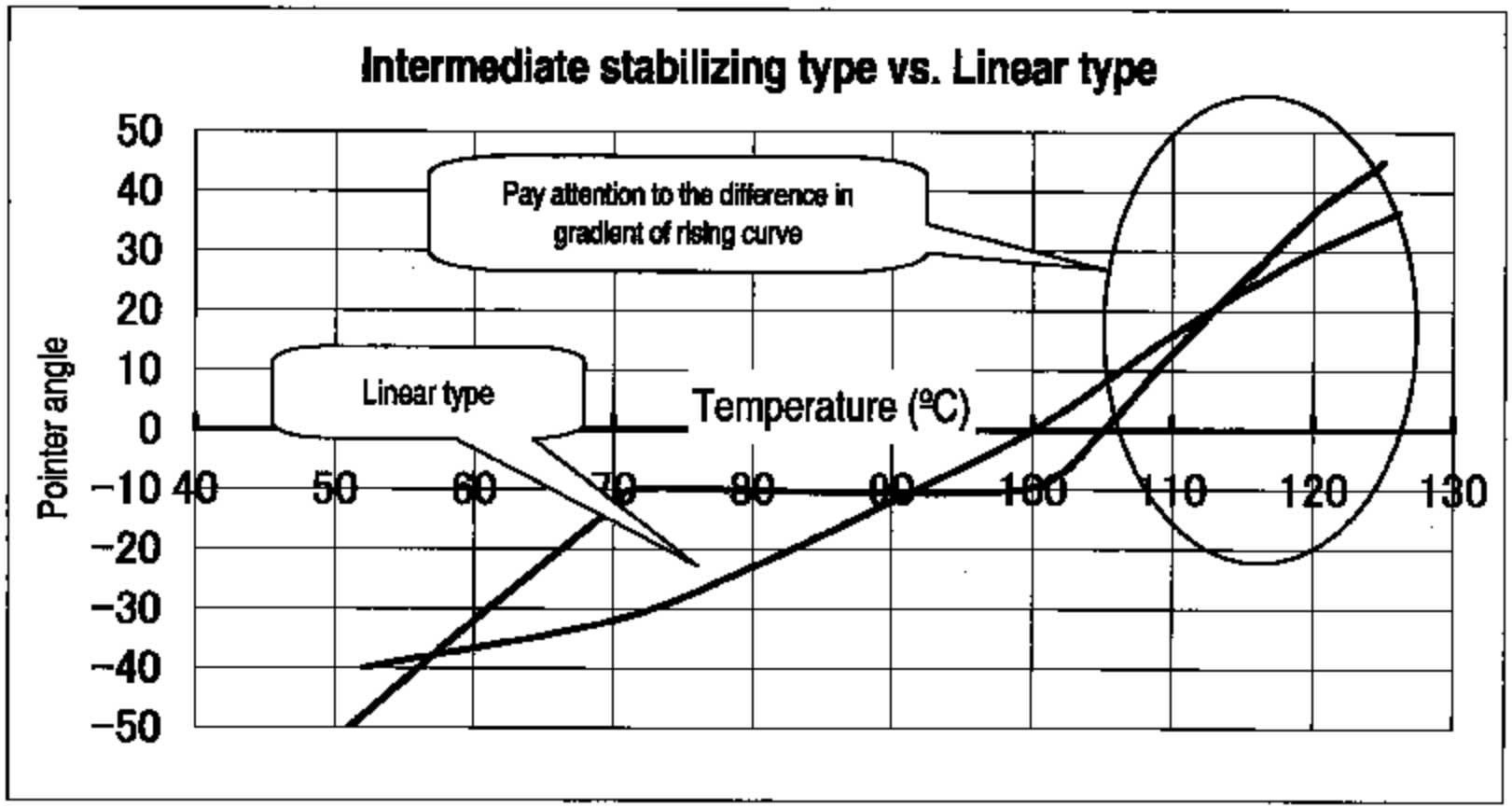
For MCAF (Japanese version), the temperature at which the temperature gauge would indicate the red zone was changed in consideration of a great likelihood that the vehicle would be used in congested



Data-6. Temperature Gauge Indication Characteristics – 2

If the conventional linear type of temperature gauge is adopted, there will be no longer rapid increase in temperature indicated by the temperature gauge and will give a feeling of security even at low speeds.

Customers' anxiety about this symptom is mostly affected by what they see as a rapid increase of the temperature gauge from the mid-zone to the red zone. Returning to the conventional linear type of temperature gauge may be an effective countermeasure.

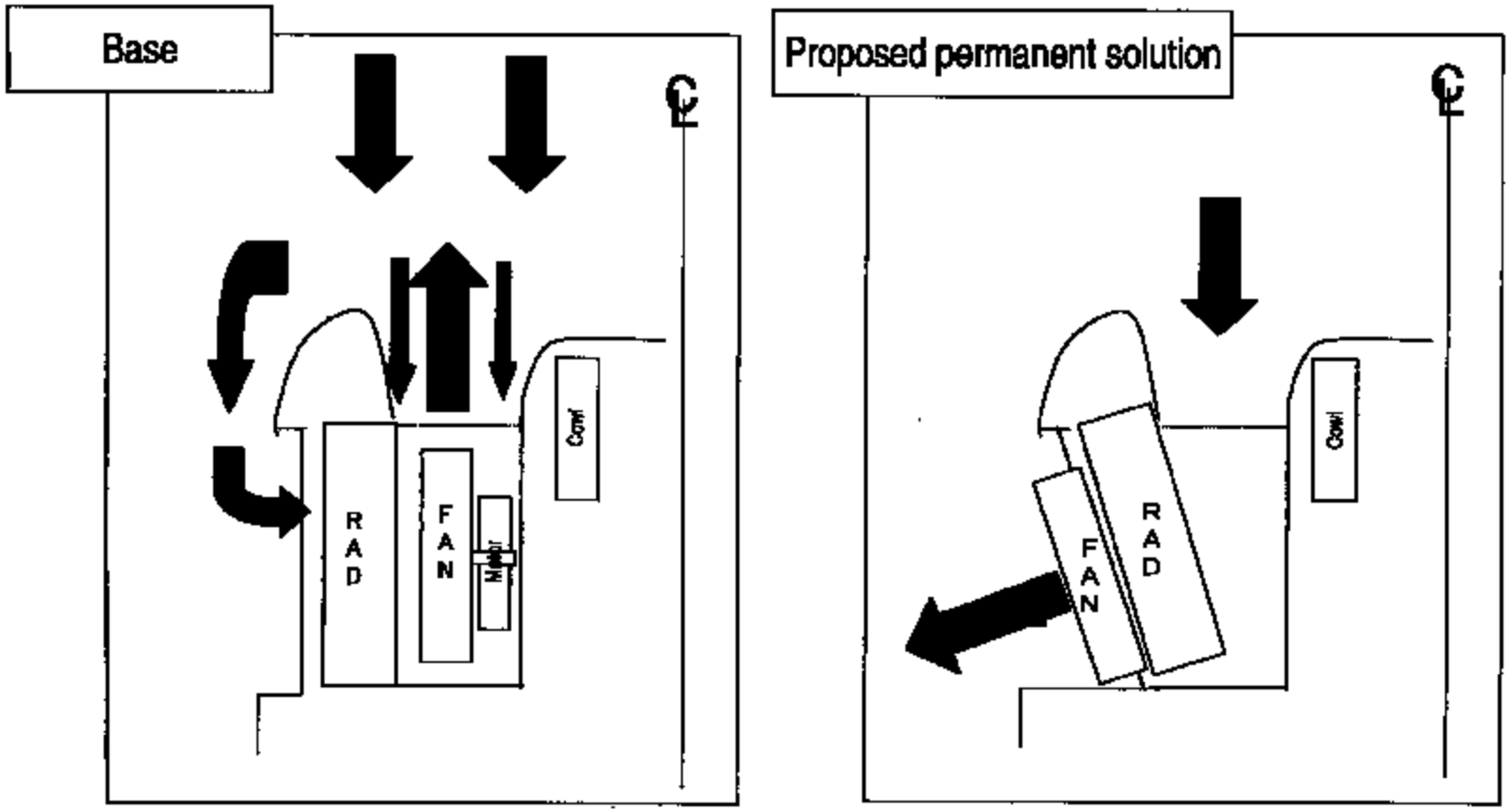


Data-8. Proposed Specifications for Permanent Solution

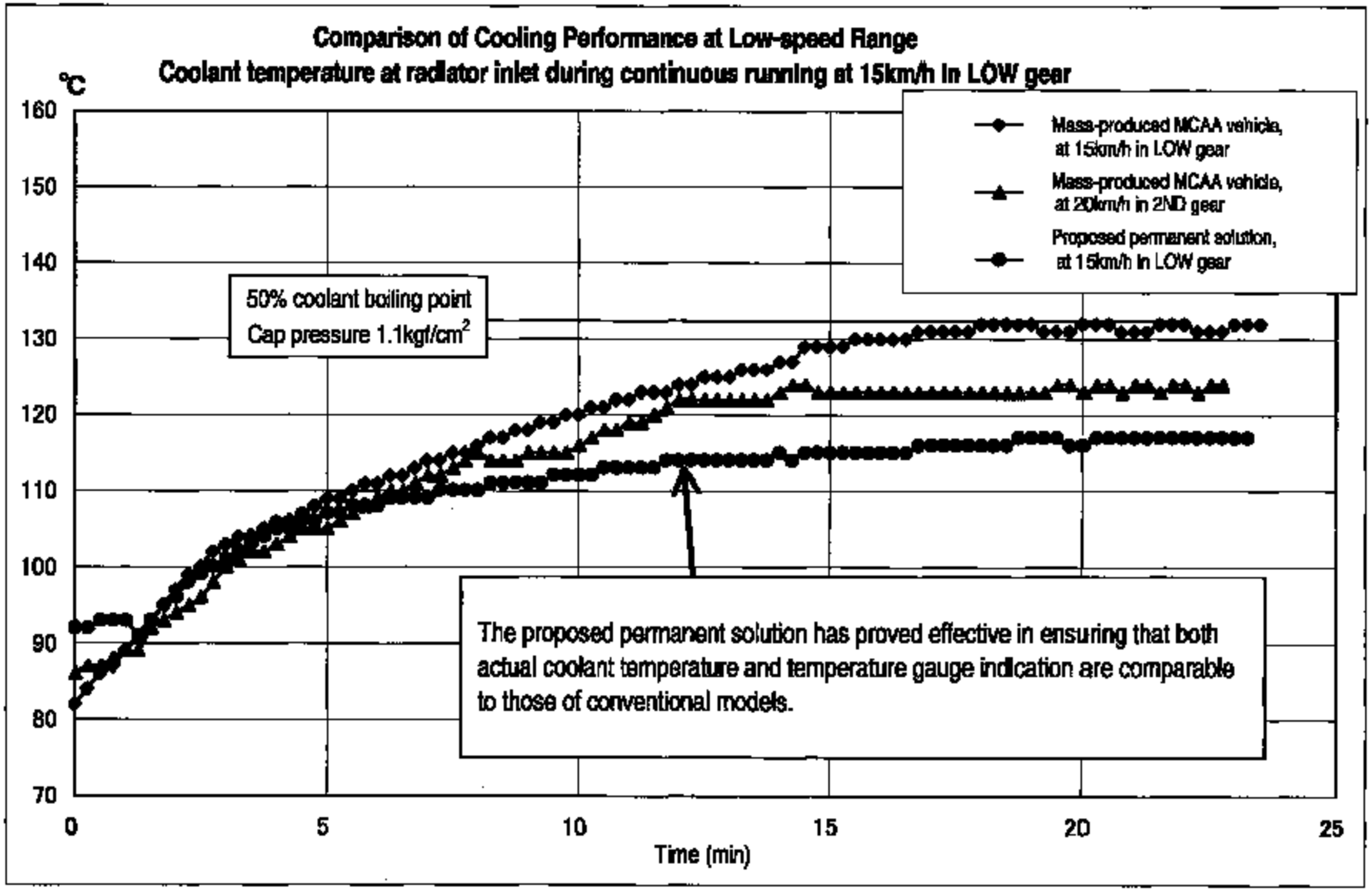
	Base	Proposed permanent solution
Radiator size	270*158	←
Fin pitch	2.75	2.25
Core width	24(1.5)	←
Fan layout	Internal	External
Fan type	Draw-in	←
Fan vane	MCF/MCJ	←
Fan motor	MCAA	MCFA

The proposed permanent solution entails change in exterior

When riding at low speeds (15mph or below)



Data-7. Examination of Proposed Permanent Solution



Specification Changes Related to Temperature Gauge and Remedial Action to Use on Future Models

Model	Flow	Development purpose	Destination	Coolant temperature sensor	Temperature gauge type	Corrective resistor	Red zone beginning temperature	Cooling fan layout
2001 (MCAA)	PD	FMC	All	Temperature of trapped air	Intermediate stabilizing type		122℃	
2002 (MCAF)	M	Color stripe VA Local content increase Addition of desired models Market problem solving	A, EC		↑	———	↑	
			K		↑		126℃	
2003 (MCAH)	C	Color stripe VA Local content increase Market problem solving	All		Linear type	———	↑	
2004	CorM	Color stripe VA Local content increase Market problem solving	All		↑	———	↑	
2005	MorPD	Addition of the 30th anniversary commemorative version	All	↑	Linear or intermediate stabilizing type	———	122℃	External fan

Considering that 2005 model can undergo exterior change, drastic measures to effect change in cooling fan layout should be taken on that occasion.

Proposed Remedial Action to Use on Affected Vehicles in the Field

【Change of red zone beginning temperature to 126ºC】

Model	Application	Destination	Outlet temperature sensor	Temperature gauge type	CBU harness spec	Red zone beginning temperature	Remedial action plan	Technique to execute remedial action plan
2001 (MCAA)	~19/NOV/'00	A, ED	Temperature of trapped air	*Intermediate stabilizing type	Sub harness with a 2.7Ω resistor is added	122°C	Change the red zone beginning temperature to 126ºC	[redacted]
	20/NOV/'00~	A, ED	↑	↑	Fairing harness has a 2.7Ω resistor built-in	↑		
2002 (MCAF)	25/MAY/'01~	A, ED	[redacted]	↑	———	↑		
	??~	K		↑	Sub harness with a 1.2Ω resistor is added	126°C	———	It is necessary to make a proper choice from among the 3 types of sub harnesses according to production serial number.
	??/OCT/'01~	K		↑	Fairing harness has a 1.2Ω resistor built-in	126°C		———

GL1800 水温計示度

1. 発生事象
2. 再現結果
3. 解析結果
4. 次期モデル以降の対応

2002/2/12

不具合発生状況

QIC No.	Title	Vin# 1HF3C47	Eng	Deliver	Occurrence	DLR	Mileage	Complaint			Coolant Loss	Temp Gauge
2SH-2001-041	Engine overheating	A31A000189	2000808	04-10-01	04-20-01	Italy	1000km	While riding at very low speed about 25-30km/h on mountain road, suddenly customer noticed coolant temp gauge needle on the highest zone and coolant flowing out from the coolant reserve tank.	NG setting of cooling fan operating system. Proceeding at low speed with low gear on climbing roads or during procession of M/C in occasion of	Glodwing Members use to make trip together, so this problem in the same time has been noticed by several people.		Red Zone
2SH-2001-041	Engine overheating	A01A001141	2011448	06-06-01	06-07-01	Italy	200					
2SH-2001-005	Overheating of engine	A31A000033	2000815	03-28-01	07-29-01	Switzerl	1200	To stop the bike to avoid the water boil and flow outwards by reserve tank.	In extreme hot condition, high air temp. slow hill up drive, traffic jam in city areas.			
		A41A000278	2013274	03-28-01	06-05-01		1500					
		A41A001182	2011535	06-01-01	06-02-01		1700					
		A11A002122	2013170	06-01-01	06-11-01		1300					
M1M057	Temp Gauge Reads High, After C/M	051A000048	2000199		06-27-01	AH	12000		Complaints from Dealers and Customers. Temp Gauge indicates the value is overheating on units.	No actual colant loss. Normal street riding. Coolant level had risen slightly, but there was no	Coolant level is normal	Red Zone
M2CH028	Runs High on Temp Gauge	037A101162	2102592	06-10-01	06-21-01	XD4151	1081	The bike was overheating.	After 15min of running at any speed, the temp gauge would go into the red zone.	No actual coolant loss.	Coolant in the reserve tank and radiator was full.	Red Zone

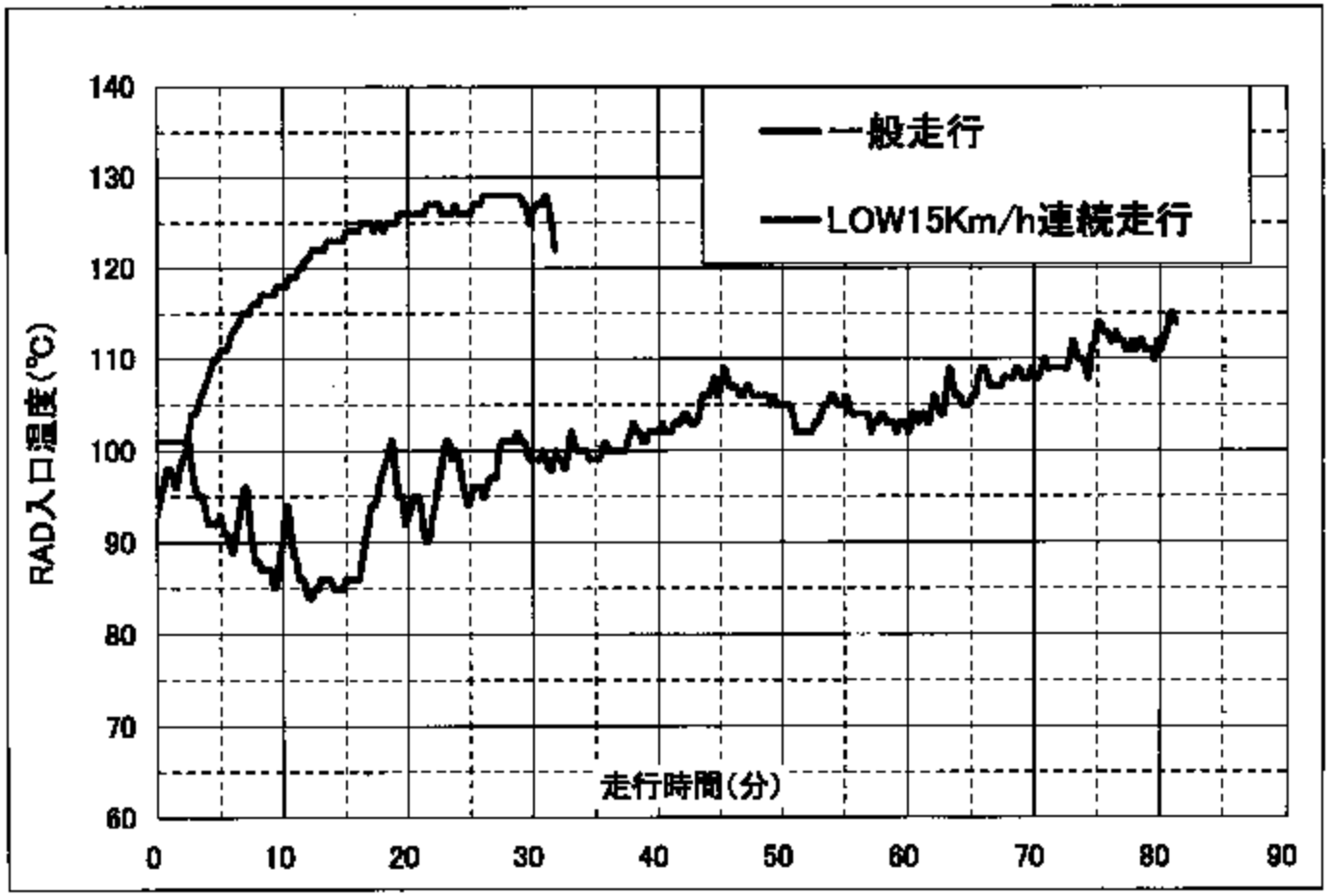
QICレポートからの情報では冷却水の吹き出し：1件　水温計指示が高く不安：7件　の報告がある

資料－1　再現テスト－1（一般公道テスト）

再現テストの確認結果、LOWギヤ固定による連続走行にて水温の沸点に達する可能性が有る事が判明した。

テスト条件
一般公道（外気30℃）：渋滞路含む

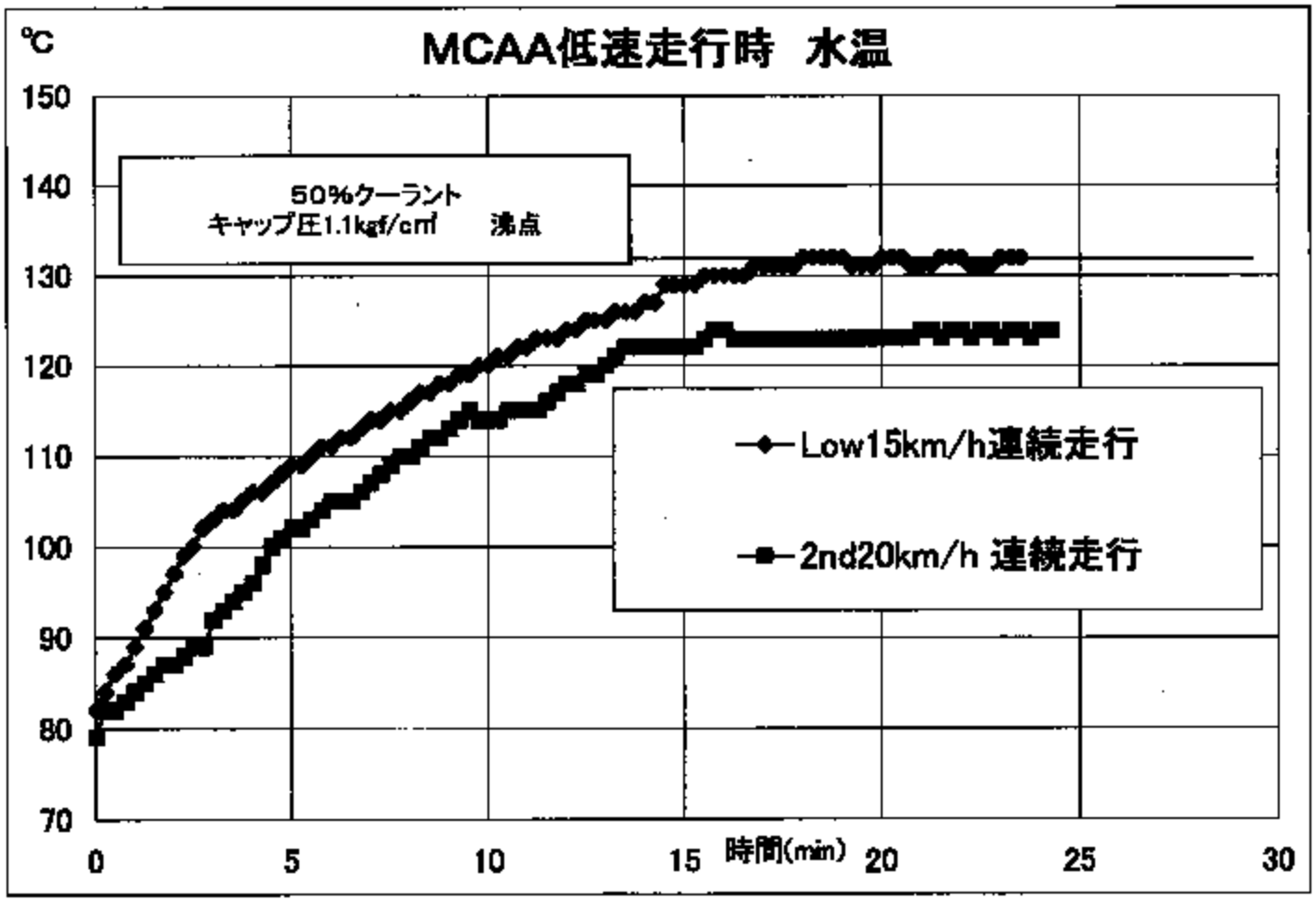
一般走行：GO／STOPの繰り返し時LOWギヤ～4THギヤまでを頻繁に使用。
LOWギヤ15k/h固定連続走行：但し、市外地では走行困難（信号ある）な為、郊外で走行。



資料ー2　再現テストー2(HGPテスト)

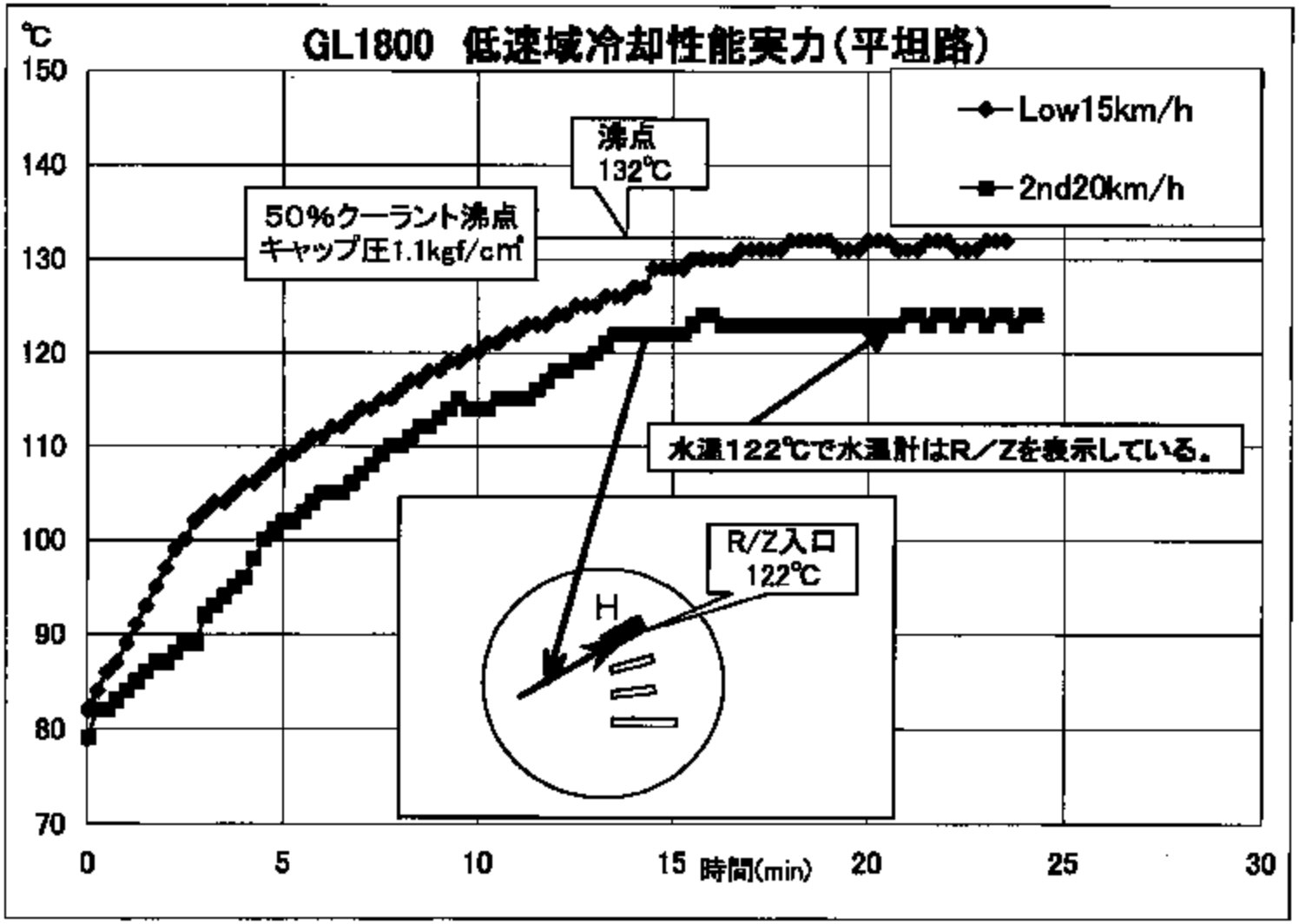
再現テストー2として、データーの安定するHGPにて確認結果、
●LOWギヤ固定による連続走行にて水温の沸点に達する。
○2ndギヤ固定では、沸点に達しない。

テスト条件
HGP(外気35℃補正)



資料－3　再現テスト－2（HGPテスト）

連続走行時の水温計表示 ‥‥水吹き前にR／Z表示近傍になる。

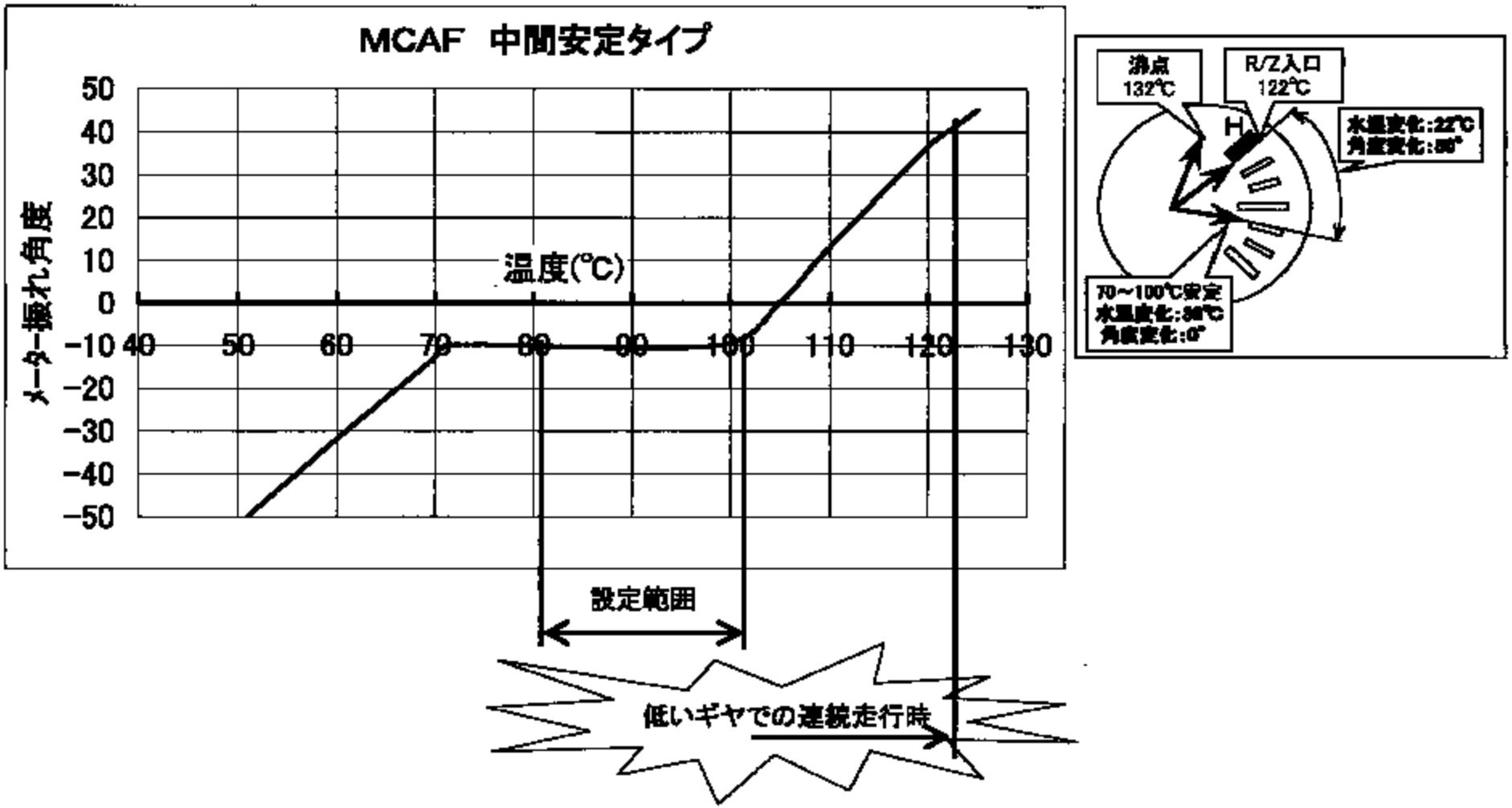


資料－4　水温計指示特性－1

MCAAより、2輪初の水温計指示特性として、中間安定タイプを採用している。

中間安定タイプの狙い　：　中間ゾーンを年間を通じ指示でき水温に対する安心感大。主に4Rが使用している。
＊ネガとしては、安定ゾーンを外れたた場合指示上昇が急で安心感は落ちる

●低速連続走行時水温上昇のタフネスがなく水温計表示はR／Z近辺（急激に上昇する部分）を示す事となった。



〈開発時経緯〉

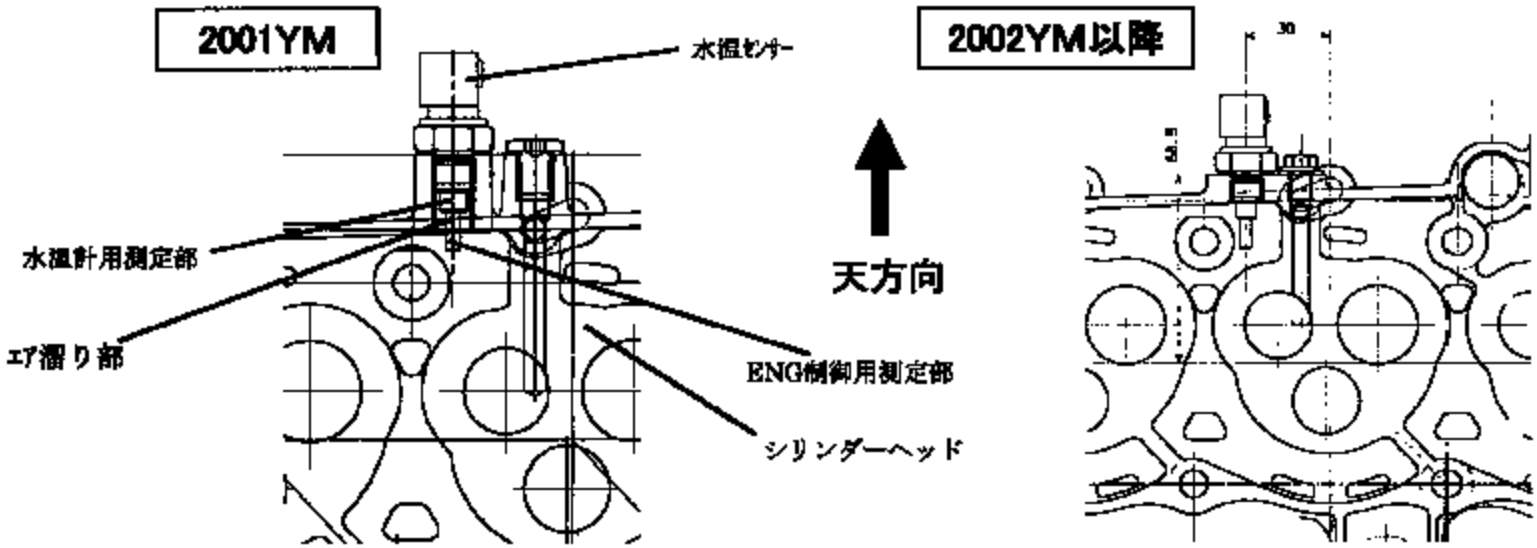
●開発後期、水温センサーのヘッド部にエア噛みがあり低速走行でR／Zを表示する不具合が発生した。

この時、同時に低速ギヤでの連続走行で沸点に対するタフネスが弱い事も顕在化された。

〈開発時の判断〉

●低速連続走行は、HGA開発要件モードには無い（過去トラ　があれば反映されている筈である）事から、

低ギヤでの連続走行の市場頻度は殆ど無いと判断した。



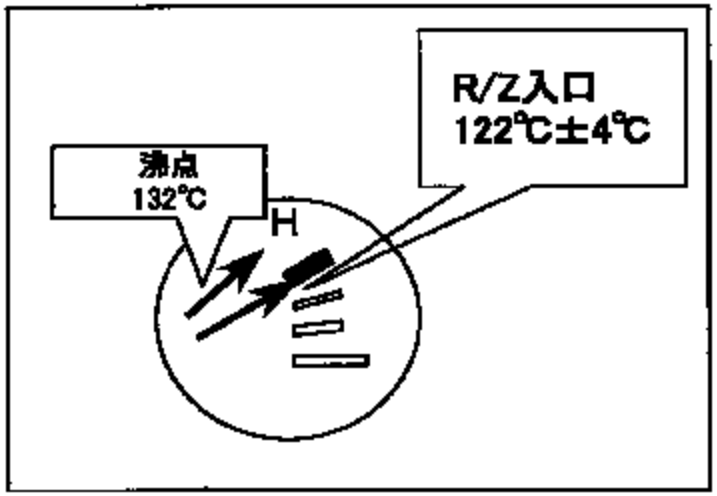
<02モデル(MCAF)国内向け開発時経緯>

◎特に渋滞頻度の多いと思われる国内仕様は、公道テストも含め、低速走行頻度大との判断より、

水温計設定を変更し、R／Z表示(突入)に対し、余裕を持たした。

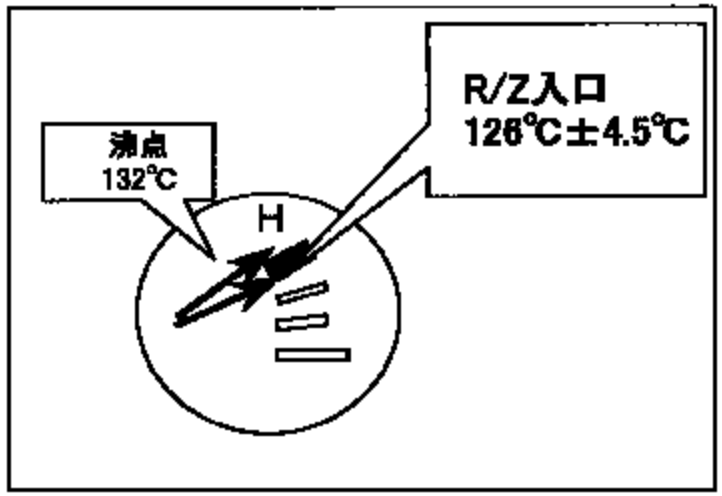
【水温計指度設定変更前】

01、02ﾓﾃﾞﾙ A、ED



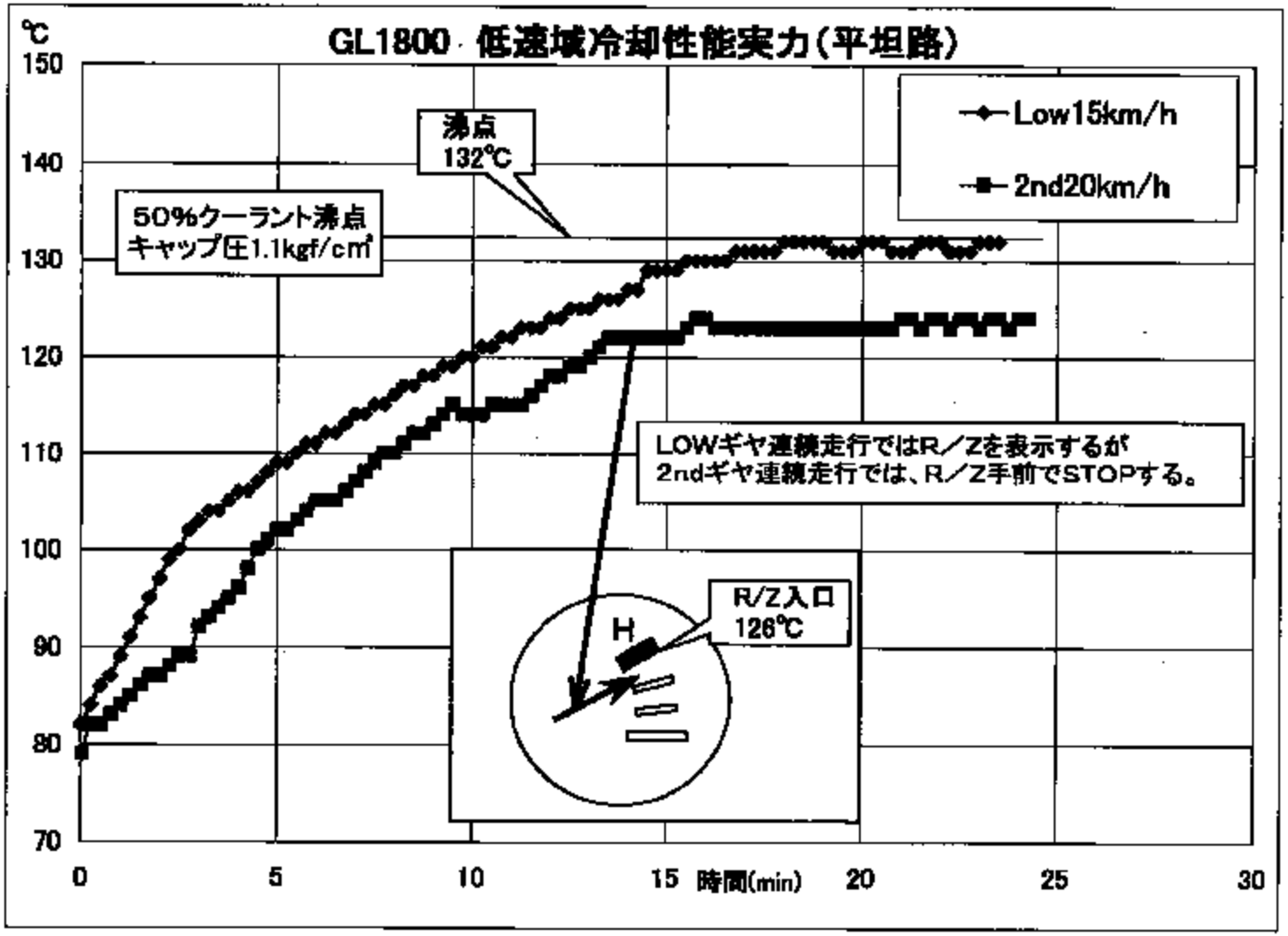
【水温計指度設定変更後】

02ﾓﾃﾞﾙ K向



資料－5　国内仕様(MCAF)水温計指示

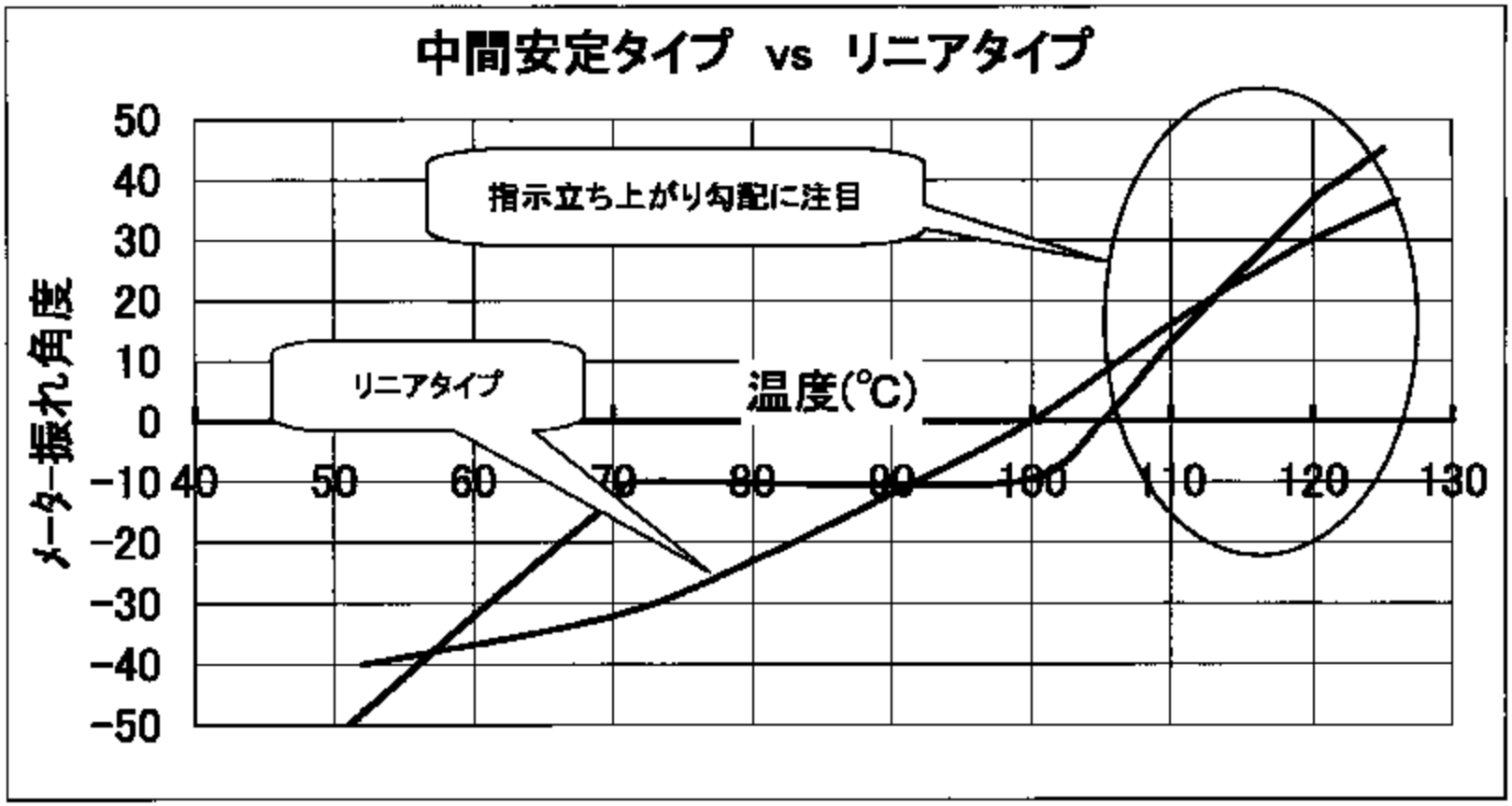
MCAF(国内)は、渋滞の頻度が多い事が予想される為、水温計指示を変更した。



資料－6　水温計指示特性－2

従来タイプの水温計特性を採用すると、指示上昇は急激でなくなり、低速時の水温表示としては安心感は増加する。

今回の発生事象は水温計表示に対する不安感の打ち上げが殆どである為、従来のリニアタイプの
水温計に戻す事が効果ある対策の一つと考えられる。

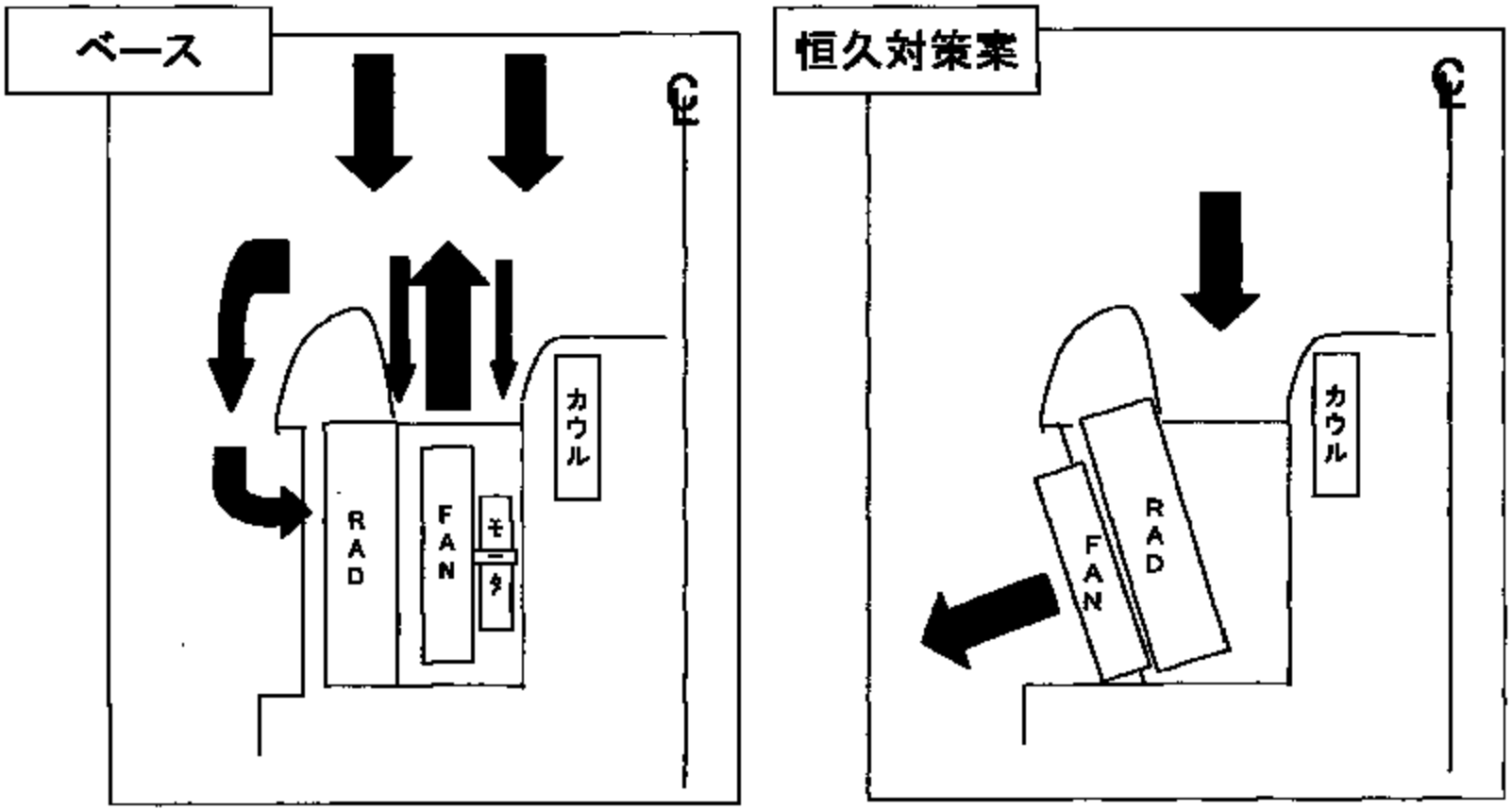


資料－8　恒久仕様案

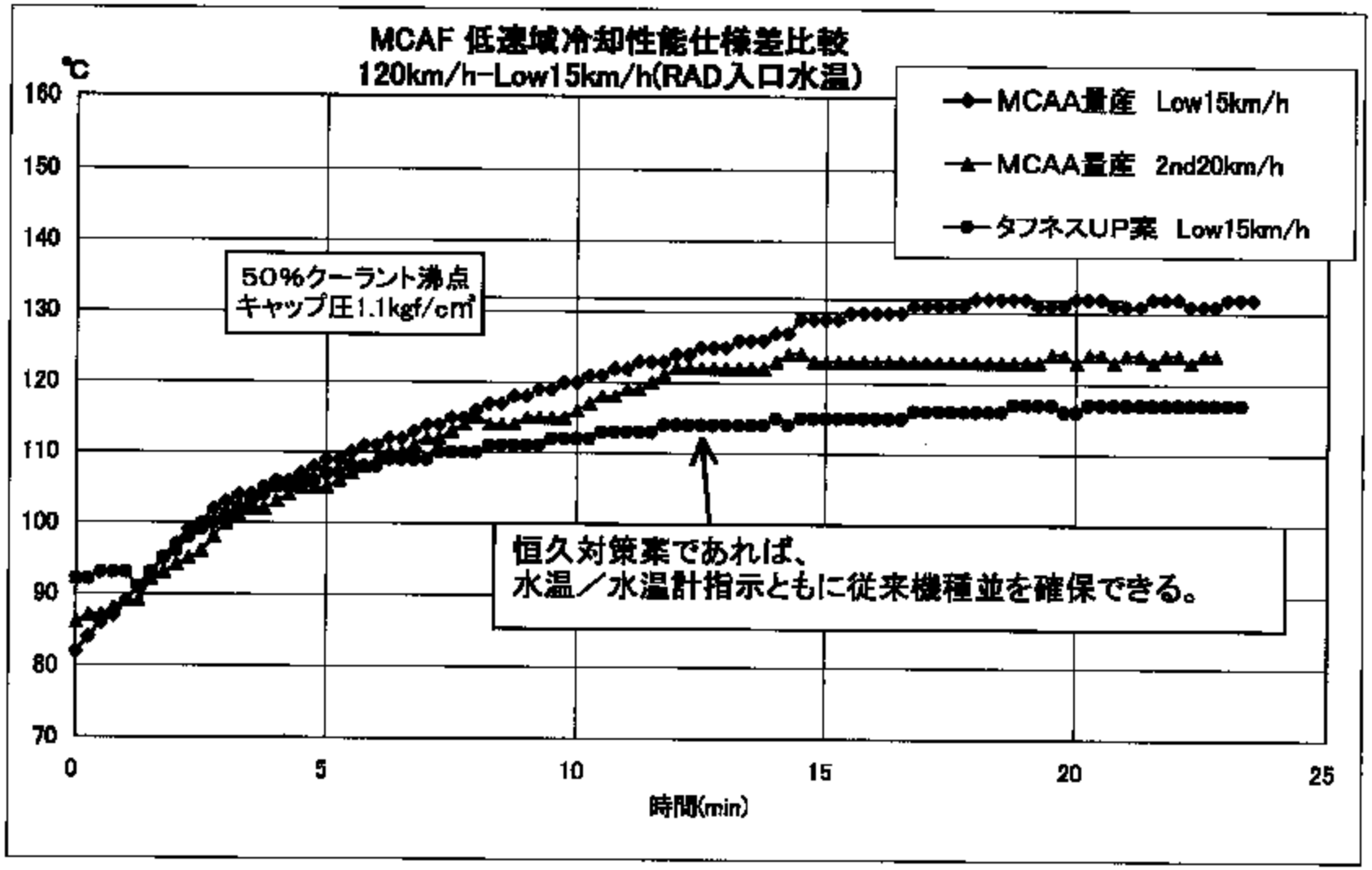
	ベース	恒久対策案
RAD ｻｲｽﾞ	270×158	←
ﾌｨﾝﾋﾟｯﾁ	2.75	2.25
ｺｱ幅	24(1.5)	←
FAN　L／O	内側	外側
FAN TYPE	引き	←
羽根	MCF/MCJ	←
ﾓｰﾀｰ	MCAA	MCFA

恒久対策案は外観形状変更要

低速走行時（15mph以下）



資料－7　恒久対策案検討


MCAF 低速域冷却性能仕様差比較
120km/h-Low15km/h(RAD入口水温)
℃
160
150
140
130
120
110
100
90
80
70
0
5
10
15
20
25
時間(min)
MCAA量産　Low15km/h
MCAA量産　2nd20km/h
タフネスUP案　Low15km/h
50%クーラント沸点
キャップ圧1.1kgf/cm²
恒久対策案であれば、
水温／水温計指示ともに従来機種並を確保できる。

水温計廻りの仕様変化と今後の対応

モデル	フロー	開発内容	仕向	水温センサー	水温計タイプ	補正抵抗	R／Z入口温度	冷却ファンL／O
2001年 (MCAA)	PD	FMC	全	エア温度	中間安定		122℃	
2002年 (MCAF)	M	カラスト VA 現調拡大 派生追加 市場問題対応	A, EC		↑	――――	↑	
			K		↑		126℃	
2003年 (MCAH)	C	カラスト VA 現調拡大 市場問題対応	全			――――	↑	
2004年	CorM	カラスト VA 現調拡大 市場問題対応	全			――――	↑	
2005年	MorPD	30周年記念 バージョン追加	全	↑	リニアor 中間安定	――――	122℃	ファン外置

2005年外観変更が可能となる為、冷却ファンL／O変更にて抜本的に対策する。

既販車対応案 その？ 【R／Z温度を126℃に変更する】

モデル	適用	仕向	水温センサー	水温計タイプ	完成車ハーネス仕様	R／Z入口温度	対策案	対策手法
2001年 (MCAA)	～19/NOV/'00	A, ED	エア温度	中間安定	2．7Ω抵抗付 サブハーネス追加	122℃	R／Z入口温度を 126℃に変更する	[redacted]
	20/NOV/'00～	A, ED	↑	↑	フェアリングハーネス に 2．7Ω抵抗を内蔵	↑		
2002年 (MCAF)	25/MAY/'01～	A, ED	[redacted]	↑	――――	↑		号機に合わせ 3種類のサブハーネスの 使い分けが必要
	??～	K		↑	1．2Ω抵抗付 サブハーネス追加	126℃	――――	
	??/OCT/'01～	K		↑	フェアリングハーネス に 1．2Ω抵抗を内蔵	126℃		――――

GLX1800 (MCA)

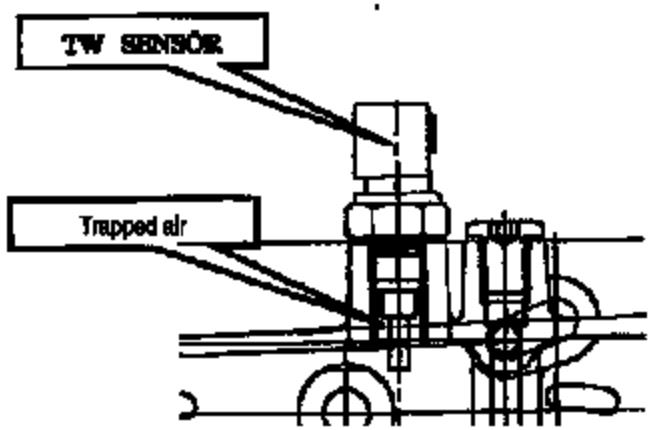
Remedial Plan to Improve Cooling Performance

1. MCAA ('01) Trouble and Tentative Solution
2. MCAA ('02) Permanent Solution and Recurrence Prevention
3. Customer Complaints (as of January 2002)
4. Actual Cooling Performance of Mass-produced Vehicles
5. Actual Cooling Performance of Mass-produced Vehicles – 2
6. Proposed Measures to Improve Cooling Performance
7. Remedial Action to Use on '03 Model
8. Remedial Action to Use on Future Models (Proposal)
9. Advanced Application of Remedied Specification to '05 Model (Proposal)

2002/5/27 2K YAMASHITA

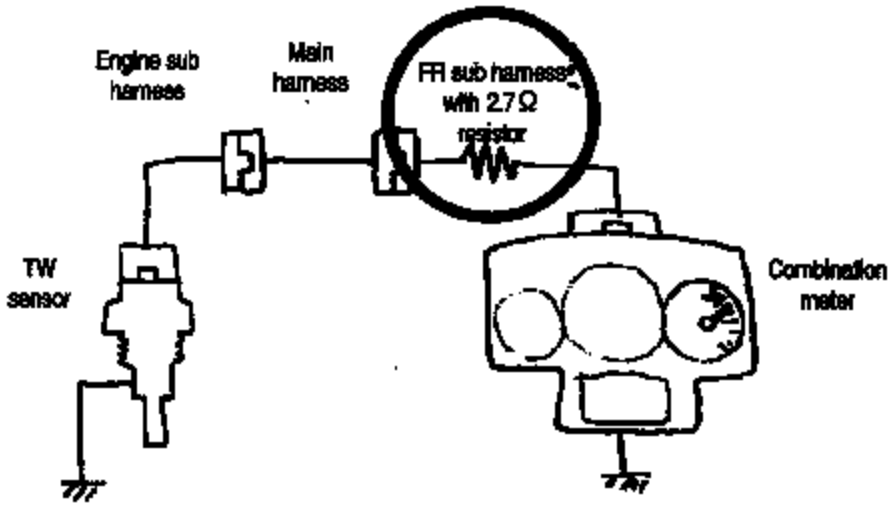
MCAA Trouble – Symptom and Cause

- The TW sensor is installed to the engine cylinder head, but the installation position was inappropriate and air was thereby trapped in the coolant temperature detecting area of the TW sensor. Due to the trapped air, the TW sensor was unable to detect coolant temperature properly, which caused the temperature gauge to indicate higher temperature than actual.
  - The temperature gauge goes into the red zone, though the actual coolant temperature is still within the white (normal) range.



Tentative Solution

- A 2.7 Ω resistor was added between the temperature gauge and the TW sensor.



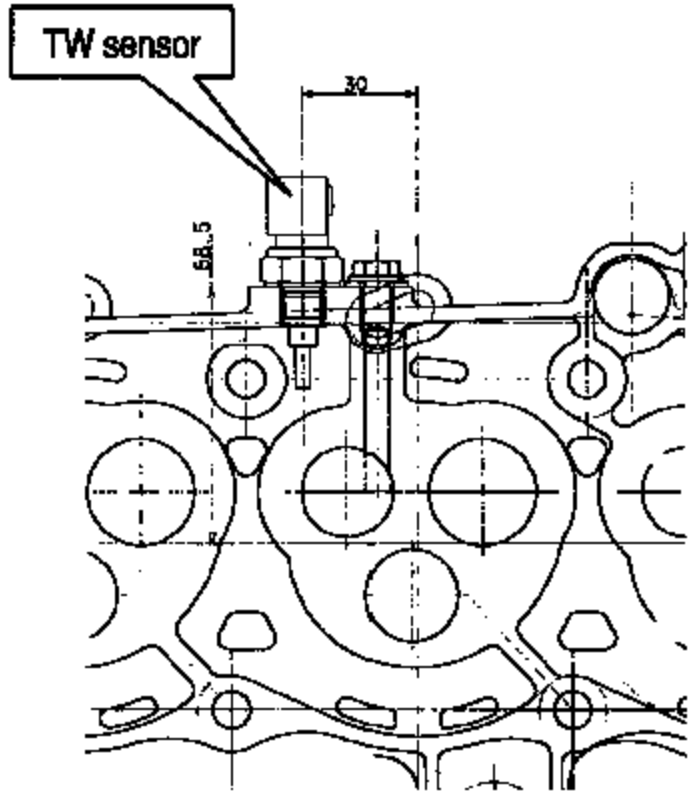
- For vehicles off the line : Existing sub harness was replaced with sub harness with a 2.7 Ω resistor
- For vehicles on the line : Application of fairing harness with a built-in 2.7 Ω resistor was started from 11/20

Permanent Solution & Recurrence Prevention

1. TW sensor position change

   Change the TW sensor installation position so that the coolant temperature detecting portion of the sensor is submerged in coolant

   ⇒ Applied from MCAF ('02)



2. Clarification of TW sensor L/O standard

   ⇒ Technical bulletin issued

   Review of existing models revealed that no model was pertinent to the problem

Customer Complaints

·Customer complaints as of January 2002

Information from QIC reports

Coolant expulsion : 1 case

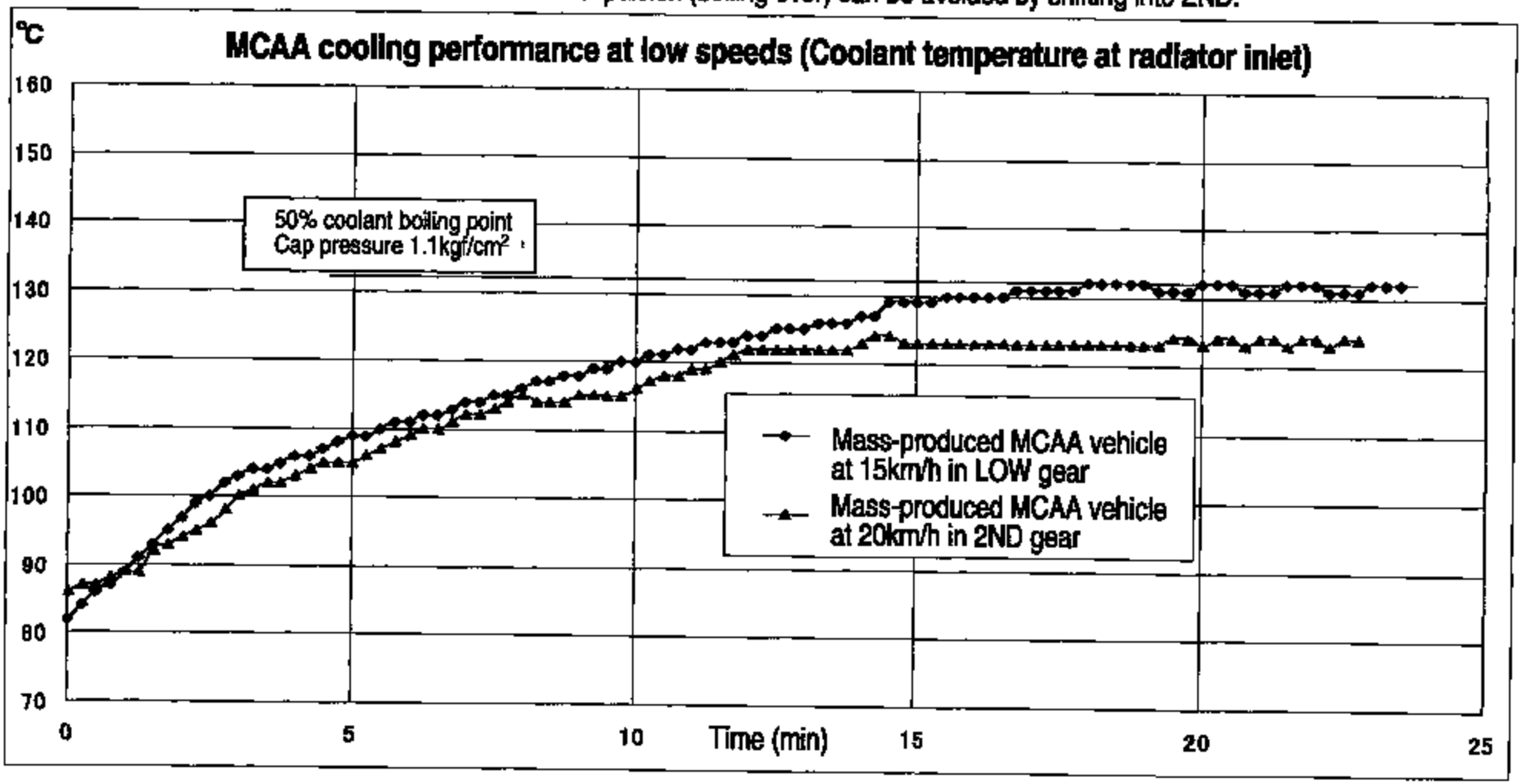
Erratic temperature gauge indication : 7 cases

QIC No.	Title	Vin#	Eng	Deliver	Occurrence	DLR	Milage	Complaint		
		1HFSC47								
2H-2001-041	Engine overheating	A61A000169	2006805	04-19-01	04-20-01	Italy	1000km	While riding at very low speed about 25-30km/h on mountain road, suddenly customer noticed coolant temp gauge needle on the highest zone and coolant flowing out from the coolant rserve tank.	NG setting of cooling fan operating system. Proceeding at low speed with low gear on climbing roads or during procession of M/C in occasion of M/C rally.	Glodwing Members use to make trip together, so this problem in the same time has been noticed by several people.
2H-2001-041	Engine overheating	A01A001141	2011449	06-60-01	06-07-01	Italy	200			
2SH-2001-005	Overheating of engine	A31A000033	2006615	03-29-01	07-29-01	Switzerla	1200	To stop the bike to avoid the water boil and flow outwards by reserve tank.	In extreme hot condition, high air temp. slow hill up drive, trafic jam in city areas.	
		A61A002276	2013274	03-28-01	08-05-01		1500			
		A61A001192	2011535	06-01-01	08-02-01		1700			
		A11A002122	2013170	06-01-01	08-11-01		1300			
M1M057	Temp Gauge Reads High, After C/M	061A000048	2000199		08-27-01	AH	12000		Complaints from Dealers and Customers. Temp Gauge Indicates the velice is overheating on units.	No actual colant loss. Normal street riding. Coolant level had risen slightly, but there was no evidence of boil over.
M2CH028	Runs High on Temp Gauge	037A101162	2102592	06-10-01	06-21-01	104151	1081	The bike was overheating	After 15min of running at any speed, the temp gauge would go into the red zone.	No actual coolant loss.

Actual Cooling Performance of Mass-produced MCAA Vehicles

- Cooling performance during continuous running at low speeds

【Result of measurement】
It has been ascertained by measurement that the coolant reaches its boiling point during continuous running at low speed (15km/h in LOW gear).
It has been also ascertained that coolant expulsion (boiling over) can be avoided by shifting into 2ND.

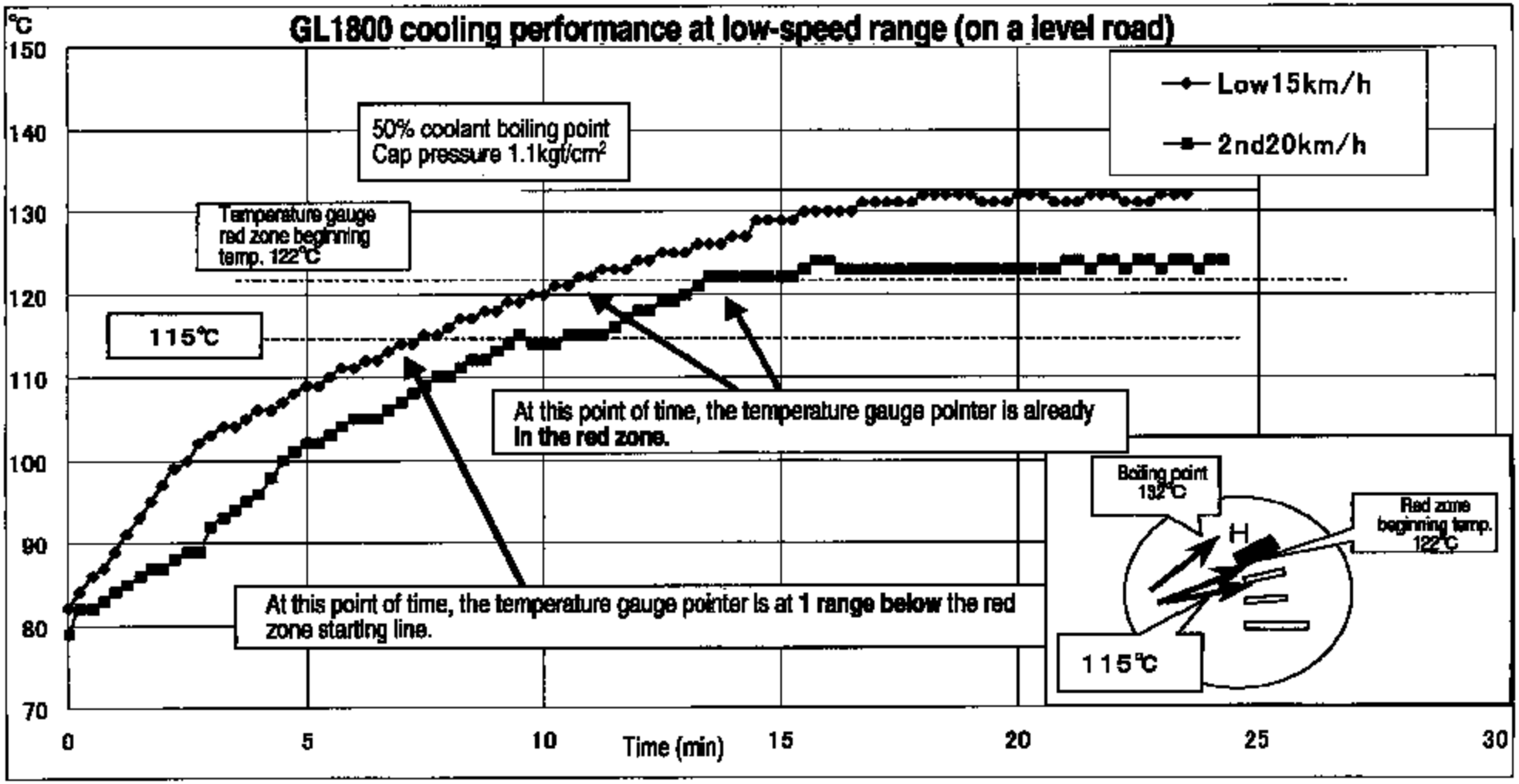


Customer Complaints (Assumed Cause)

The information from QIC reports can be summed up as follows:

Temperature gauge pointer position during continuous running at low speeds
... Reaches the position 1 range below the red zone starting line after 7 minutes (in LOW gear)
... Reaches the red zone starting line after 11 minutes (in LOW gear)

It is assumed that frequent temperature rise near to the red zone is the reason for customer complaints.

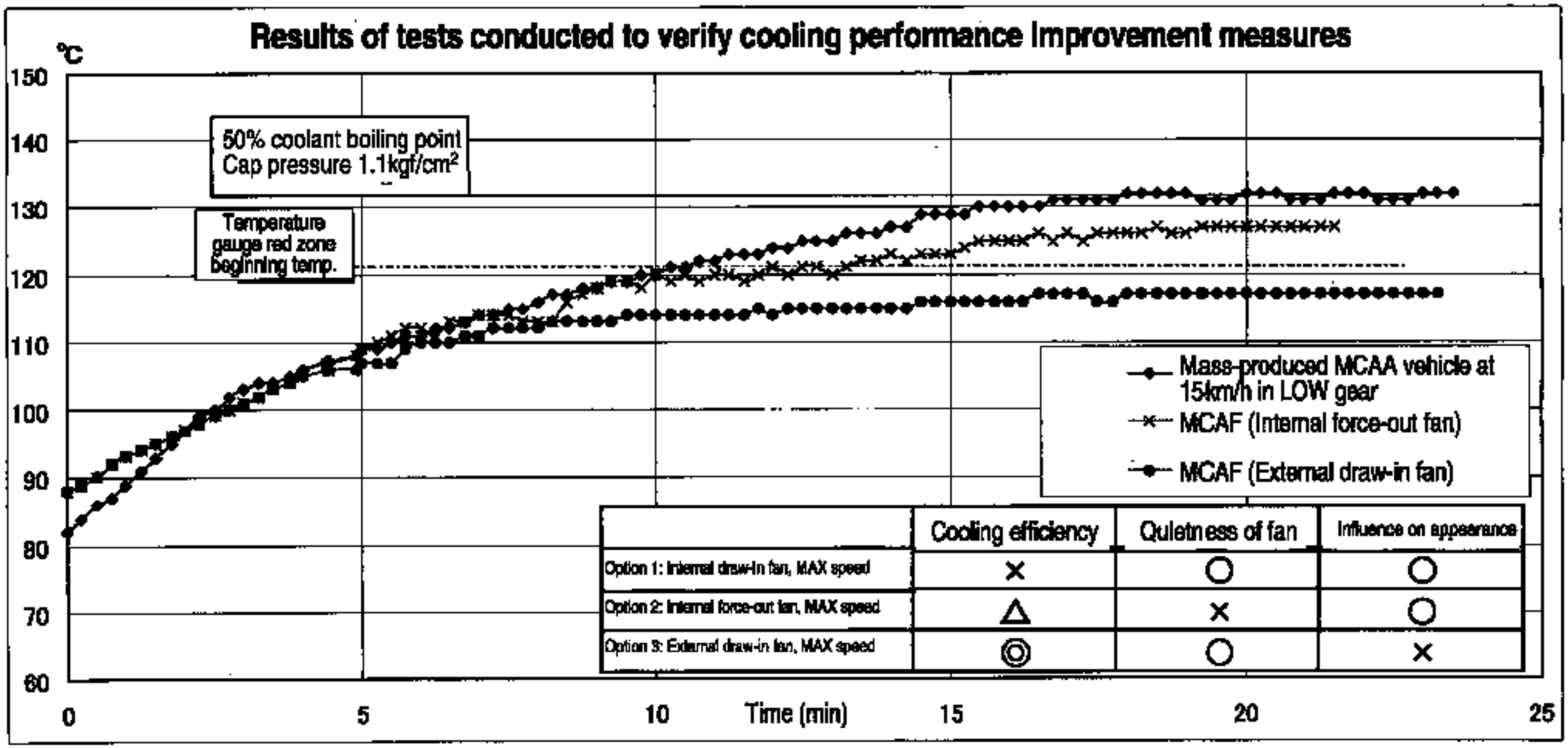


Proposed Measures to Improve Cooling Performance of MCAF

- Consideration of measures to improve toughness during continuous running at low speeds

【Result】

1) Option 1 and option 2 (internal fan) have not been altogether effective.
2) Option 2 (external fan) has proved effective in ensuring that both actual coolant temperature and temperature gauge indication are comparable to those of conventional models.

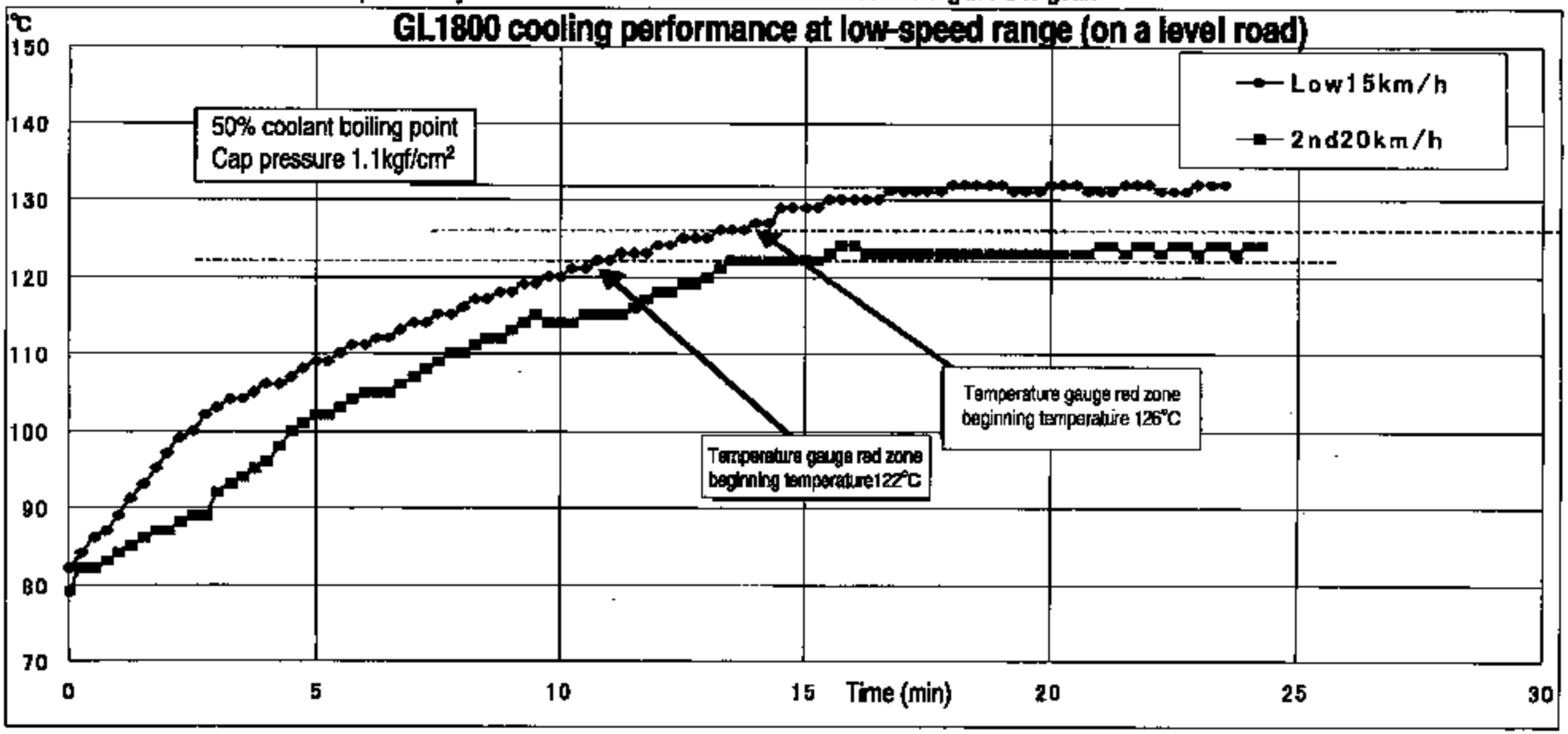


Remedial Action to Use on '03 Model MCAH

·Apply the following specification to MCAH (for all destinations)

The same specification as that of domestic version of MCAF
Temperature gauge red zone beginning temp. 122°C±4°C → 126°C±4.5°C

* As the following graph shows, this measure is effective in prolonging the time until reaching red zone by about 4 minutes as against the base.
  - → This will be effective in reducing the possibility that we'll have complaints from customers who are concerned about temperature gauge indication.
  - → This will be particularly effective in such a situation as continuous running in LOW gear.



Specification Changes Related to Temperature Gauge and Remedial Action to Use on Future Models (Proposal)

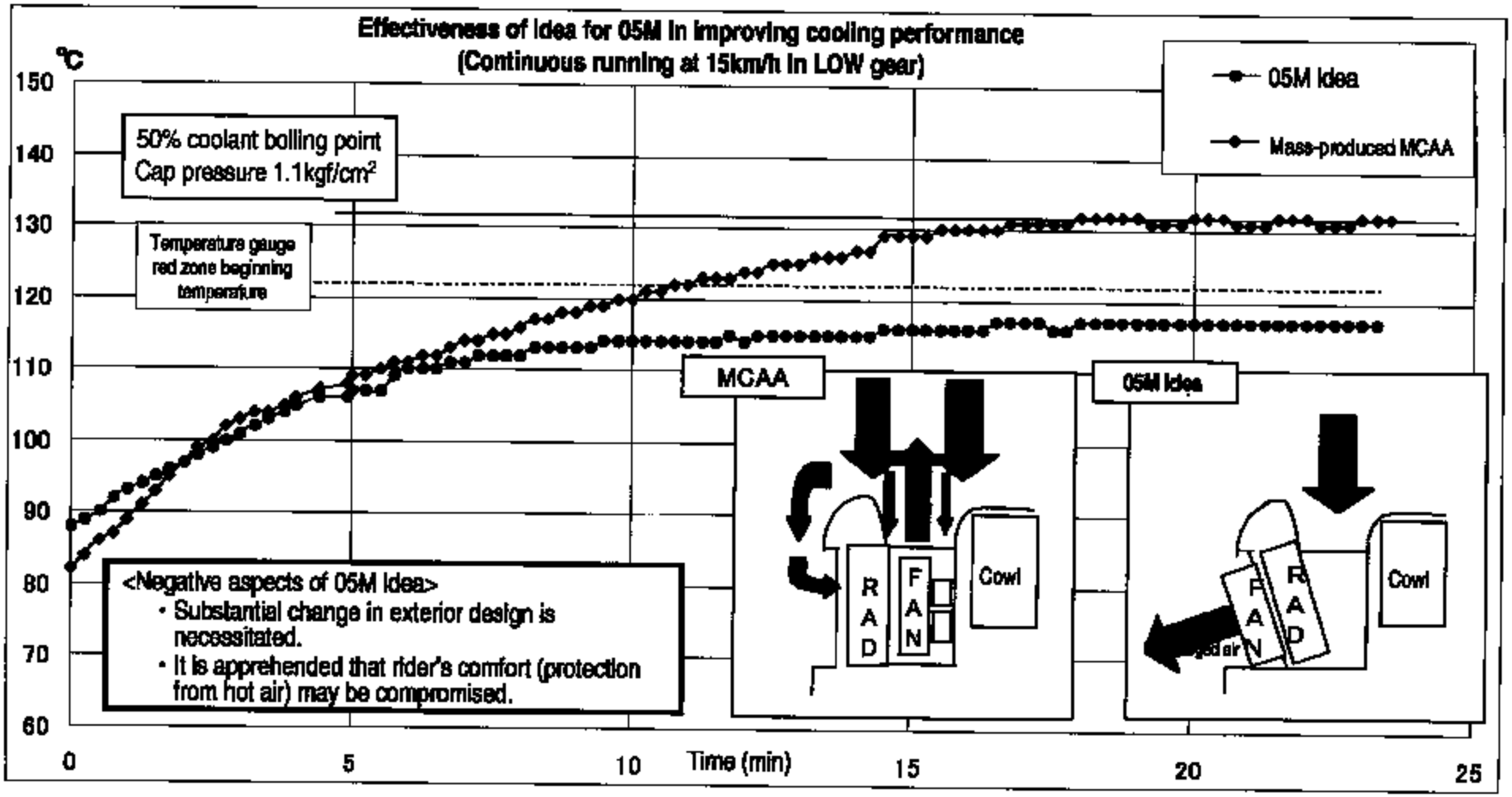
* Considering that 2005 model is to undergo exterior change, drastic measures to effect change in cooling fan layout should be taken.

Model	Flow	Development purpose	Destination	Coolant temp. sensor	Temperature gauge type	Corrective resistor	Red zone beginning temperature	Cooling fan layout
2001	PD	FMC	A, EC	Temperature of trapped air	Intermediate stabilizing	2.7Ω resistor added (Sub harness with 2.7Ω resistor) (Pairing harness with built-in 2.7Ω resistor)	122°C	Internal fan
2002	M	Color stripe VA Local content increase Addition of derived models Market problem solving	A, EC		↑	——	↑	↑
			K		↑			↑
2003	C	Color stripe VA Local content increase Market problem solving	All		↑	——		↑
2004	CorM	Color stripe VA Local content increase Market problem solving	All		↑	——		↑
2005	MorPD	Addition of the 30th anniversary commemorative version	All	↑	Linear or intermediate stabilizing	——	122°C	External fan

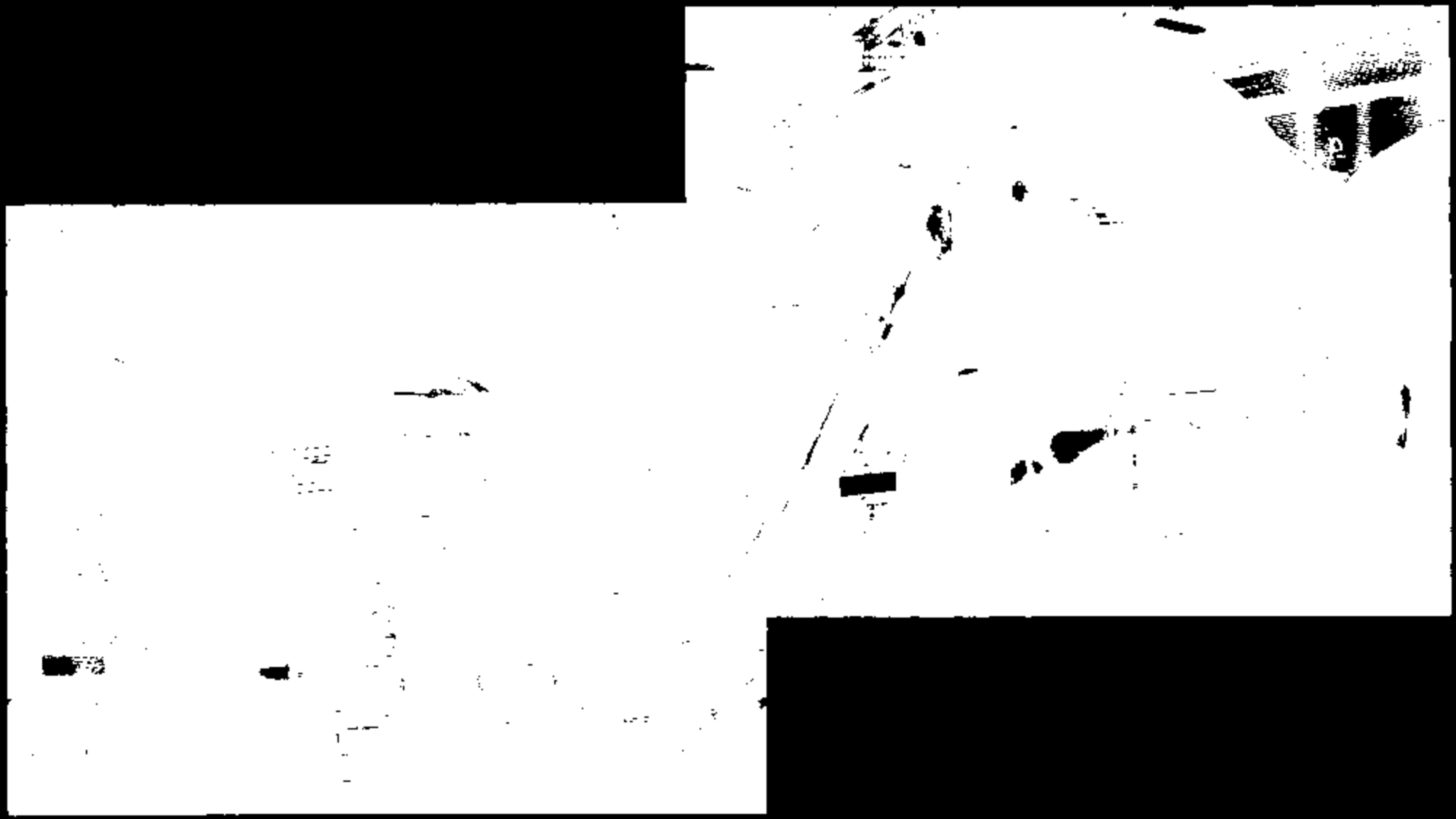
Specification Intended for Cooling Performance Improvement of 2005 Model

Radiator mounting angle change and external fan layout will enable '05M to ensure that both actual coolant temperature and temperature gauge indication are comparable to those of conventional models.

・Temperature gauge red zone beginning temperature: 122℃±4℃ as set for conventional models



Advanced Application of Remedied Specification to '05 Model (Proposal)



END

GLX1800(MCA)

冷却性能　今後の対応計画

1、MCAA('01)　・トラブルと対策

2、MCAA('02)　・恒久対策と再防

3、コンプレーン発生状況　(02-1月現在)

4、水温量産実力把握

5、水温量産実力把握－2

6、水温改善案検討

7、'03モデル対応

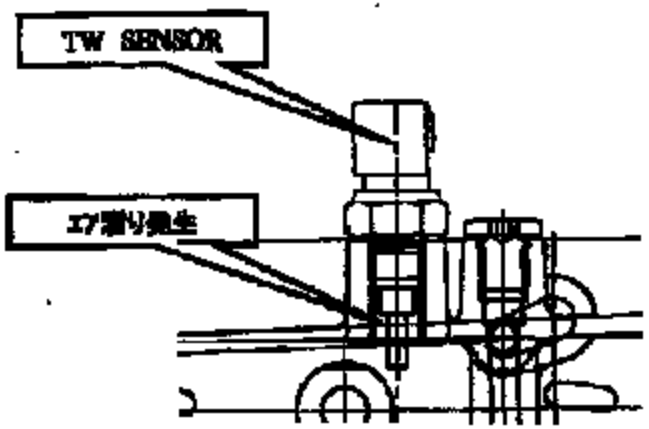
8、次期モデル対応(案)

9、'05モデル先行仕様(案)

2002/5/27　2K　YAMASHITA

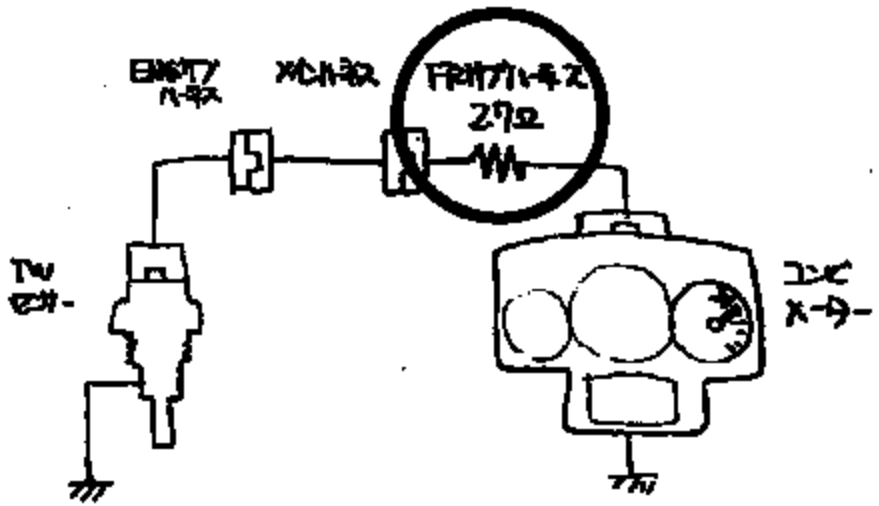
MCAAトラブル　発生事象／原因

・ENG Cylヘッドに取り付けられている
TWセンサーの位置が悪く、適正な水温が
測定できなかった為、水温計指度が高めに
指示された。
＊実水温が正常範囲で水温計がR/Zに突入する



対策

・水温計 ←→ TWセンサー 間に、
2.7Ωの抵抗を追加する。



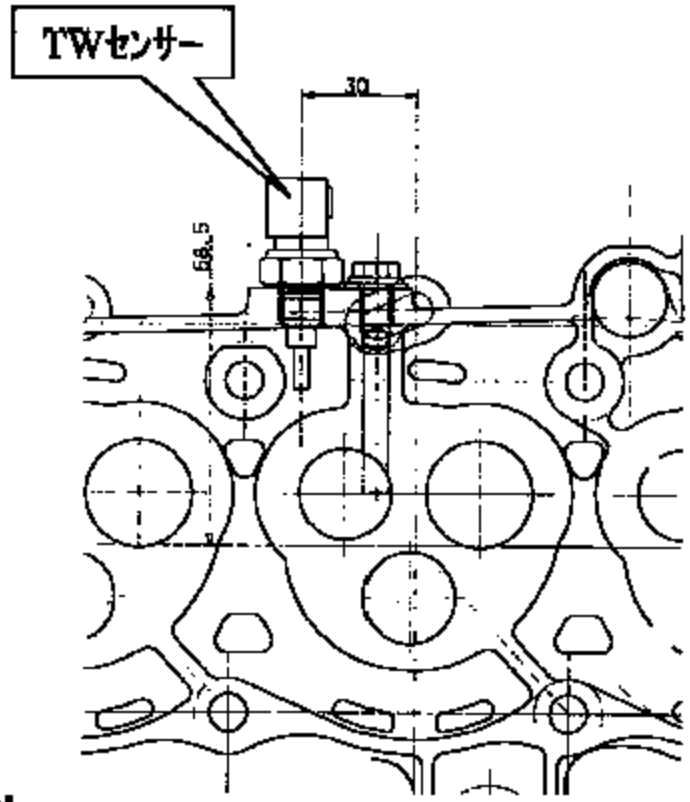
・既生産分；サブハーネス追加（組替済）
・ライン対応；11/20生産分より適用済み

恒久対策　&　再発防止

1；Twセンサー位置変更

センサー部が水中になるように取り付け変更

⇒MCAF('02)より適用



2；TwセンサーL/O基準の明確化

⇒技連発行済み

既存機種の見直し結果は問題該当機種なし

コンプレーン発生状況

·不具合発生状況　～'02／1月現在

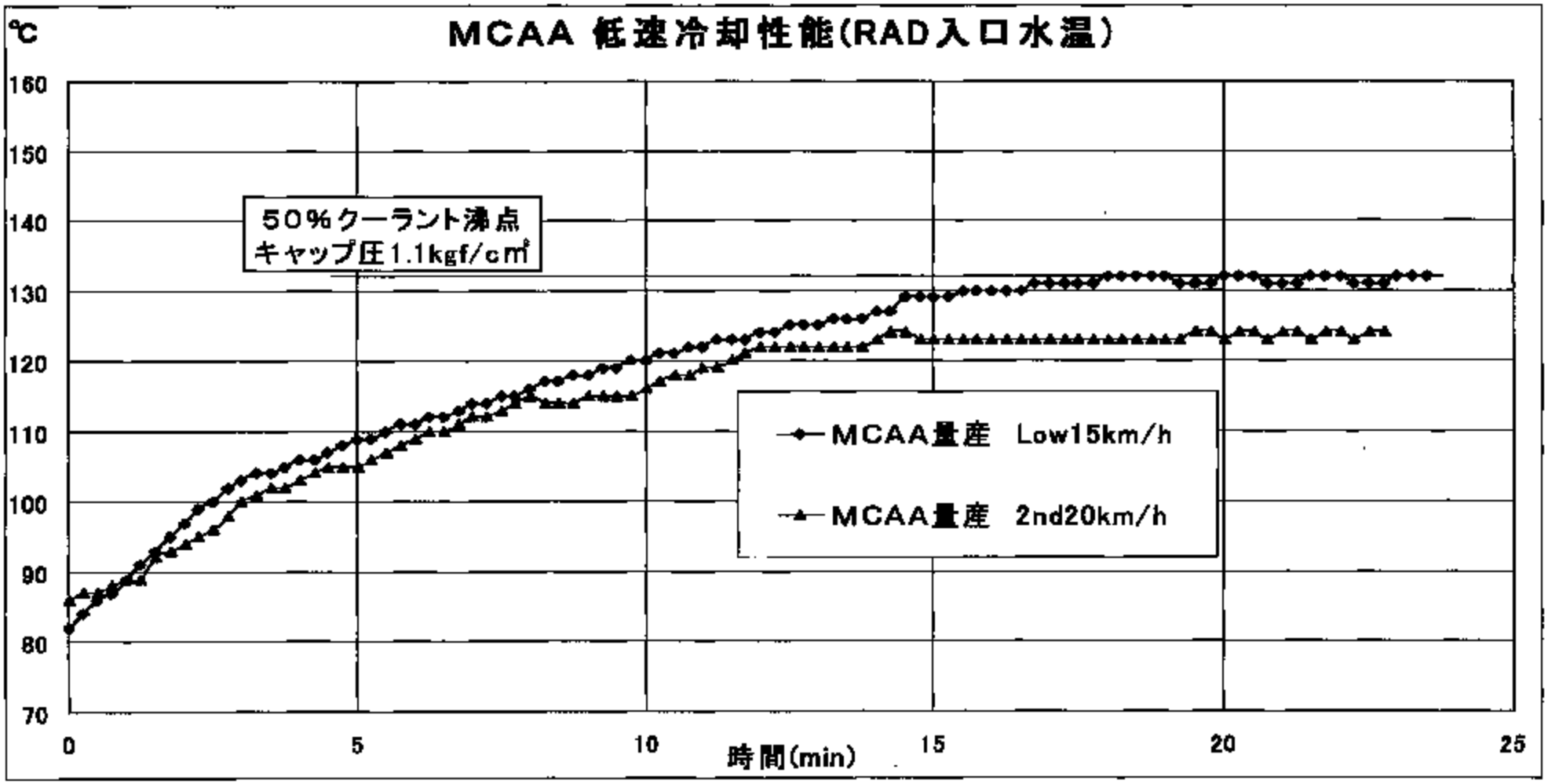
QICレポートからの情報　　冷却水の吹き出し:1件
水温計指示不安　:7件

QIC No.	Title	Vin#	Eng	Deliver	Occurrence	DLR	Milage	Complaint		
		1HFSC47								
2IH-2001-041	Engine overheating	A61A000169	2006805	04-18-01	04-20-01	Italy	1000km	While riding at very low speed about 25-30km/h on mountain road, suddenly customer noticed coolant temp gauge needle on the highest zone and coolant flowing out from the coolant reserve tank.	NG setting of cooling fan operating system. Proceeding at low speed with low gear on climbing roads or during procession of M/C in occasion of M/C rally.	Glodwing Members use to make trip together, so this problem in the same time has been noticed by several people.
2IH-2001-041	Engine overheating	A01A001141	2011449	06-60-01	06-07-01	Italy	200			
2SH-2001-005	Overheating of engine	A31A000033	2006615	03-28-01	07-29-01	Switzerla	1200	To stop the bike to avoid the water boil and flow outwards by resreve tank.	In extreme hot condition, high air temp. slow hill up drive, trafic jam in city areas.	
		A61A002276	2013274	03-28-01	08-05-01		1500			
		A61A001192	2011535	06-01-01	06-02-01		1700			
		A11A002122	2013170	06-01-01	08-11-01		1300			
M1M057	Temp Gauge Reads High, After C/M	061A000048	2000199		08-27-01	AH	12000		Complaints from Dealers and Customers. Temp Gauge Indicates the velice is overheating on units.	No actual colant loss. Normal street riding. Coolant level had risen slightly, but there was no evidence of boil over.
M2OH028	Runs High on Temp Gauge	037AI01162	2102582	09-10-01	09-21-01	104151	1081	The bike was overheating.	After 15min of running at any speed, the temp gauge would go into the red zone.	No actual coolant loss.

MCAA 量産車実力把握

・低速連続走行時冷却性能

【結果】
低速連続走行時(Low15Km/h)において冷却水沸点に達する事が確認された。
但し、2NDへシフトUPすることで沸点を回避できる。

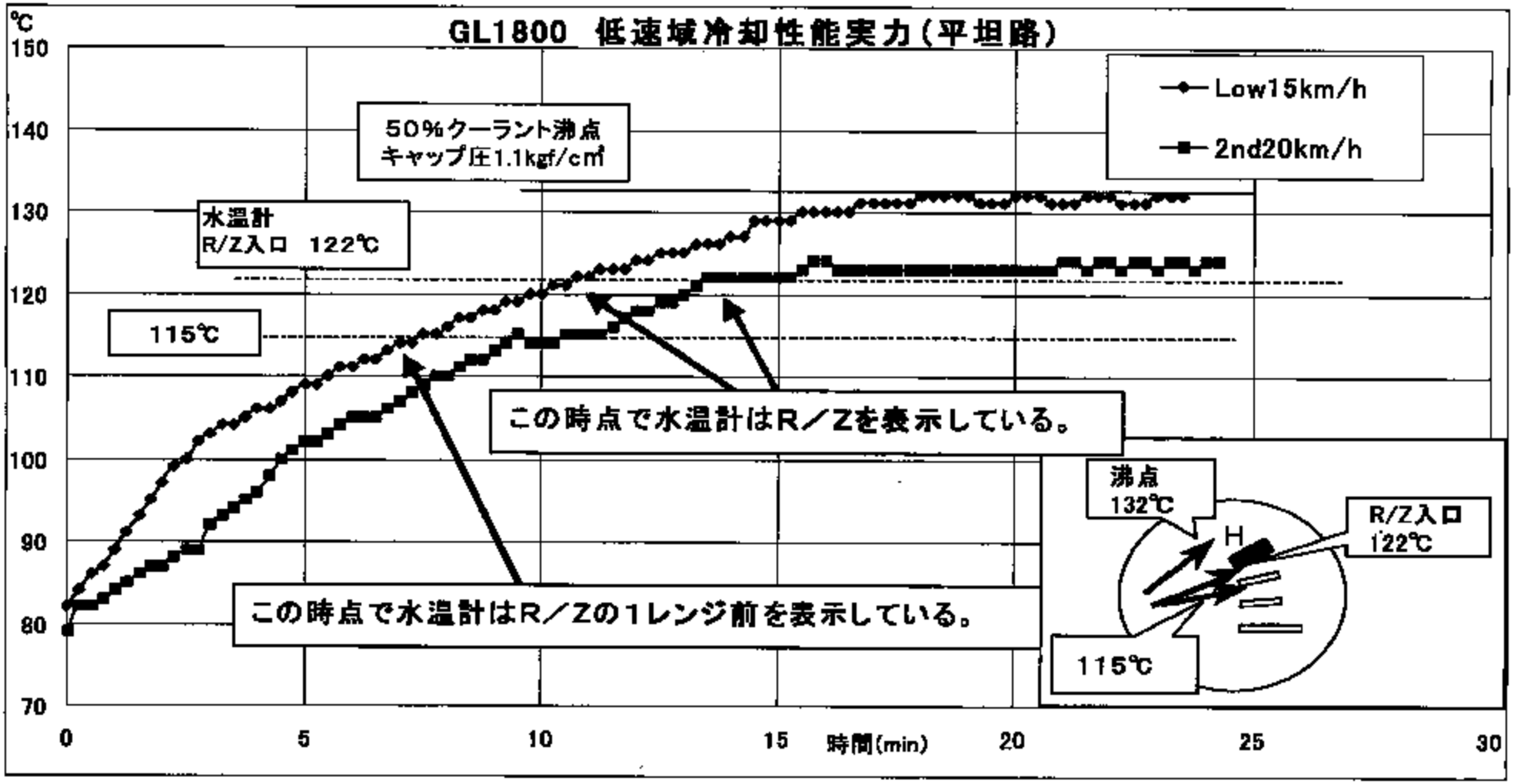


コンプレーン発生状況(推定)

QICレポートからの情報を整理すると低速連続走行では、グラフのように・・・

低速連続走行時の水温計表示・・・R／Z入口　1レンジ前　　7分後(Lowギヤ)
・・・R／Z入口　　11分後(Lowギヤ)

・・・以上の様に、レッドゾーン近傍となる頻度が多い為のコンプレーンであると推定する。



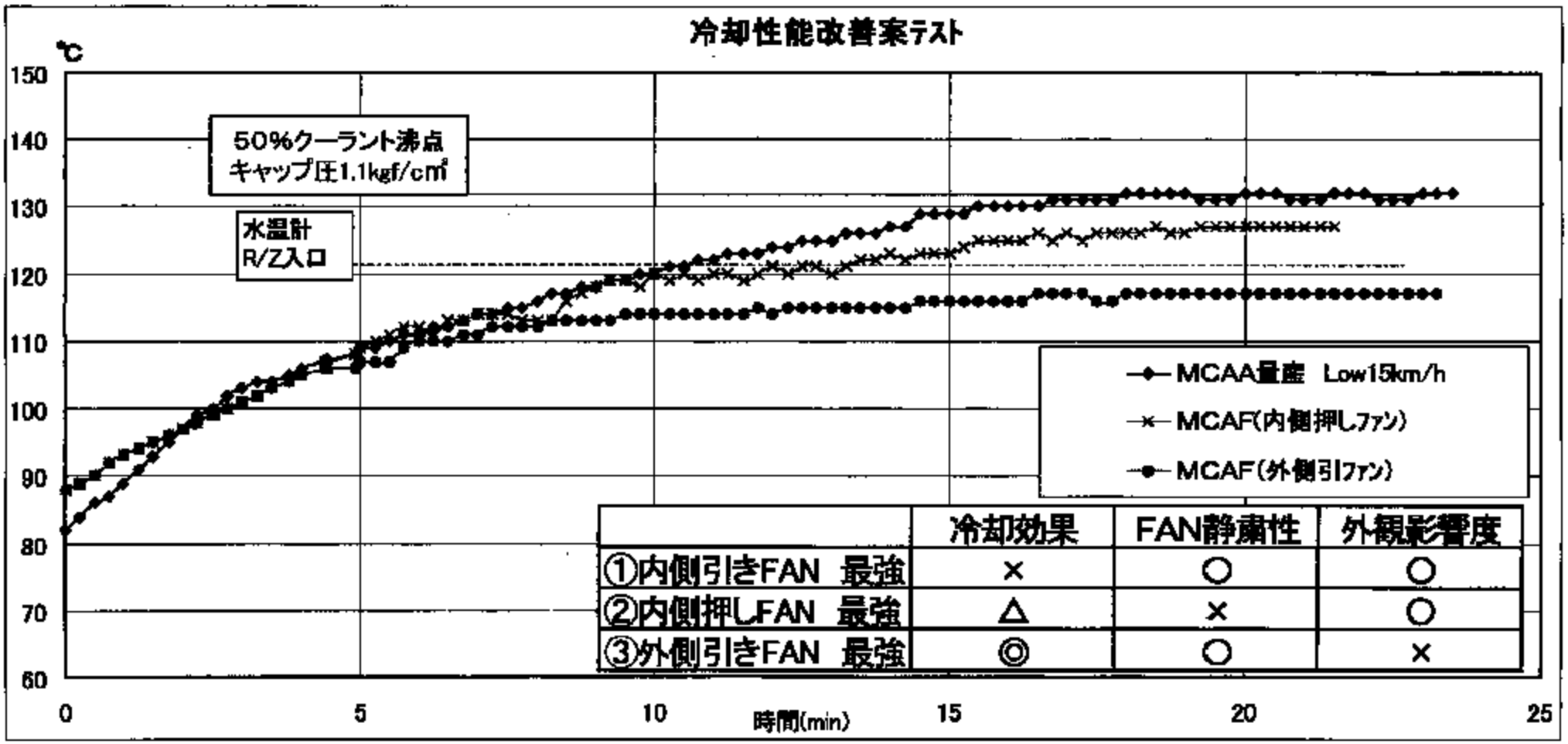
MCAF 冷却性能改善案検討

・低速連続走行タフネスUP案検討

【結果】

1） 内側ファンL/O①②では効果得られず。

2） 外側ファンL/O③であれば、実水温/水温計指度共に従来機種並を確保出来る。



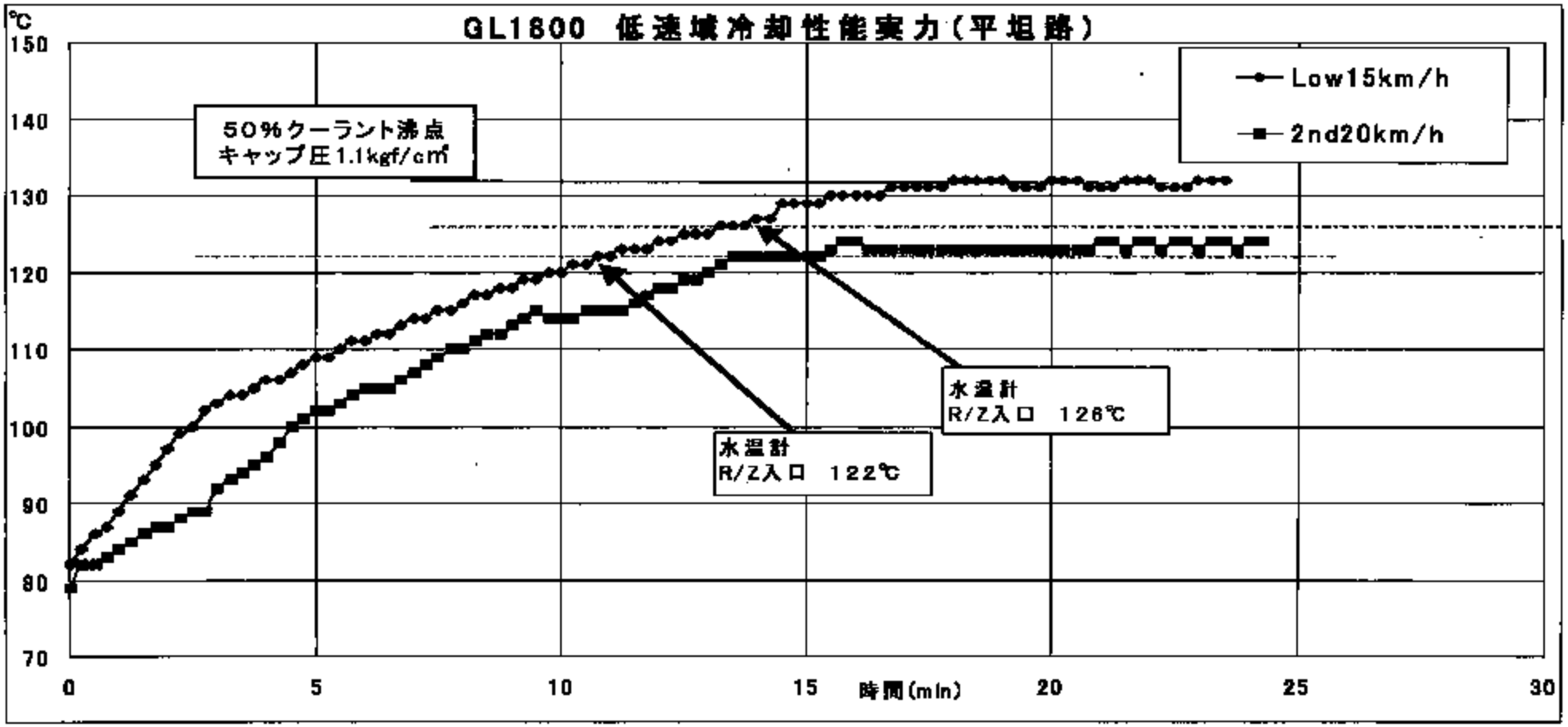
	冷却効果	FAN静粛性	外観影響度
①内側引きFAN 最強	×	○	○
②内側押しFAN 最強	△	×	○
③外側引きFAN 最強	◎	○	×

03モデル　MCAHでの対応

・下記仕様をMCAHにて対応する。(全仕向け地)

MCAF	国内仕様と同仕様 水温計R/Z入口温度　122℃±4℃　→　126±4.5℃

＊下記グラフで、ベースに対し4分程度の延命効果
→ 水温計指度に不安のあるユーザーに対しては効果あると判断する。
→ Lowギヤの連続走行という事も考えると更に効果あり。



水温計廻りの仕様変化と今後の対応（案）

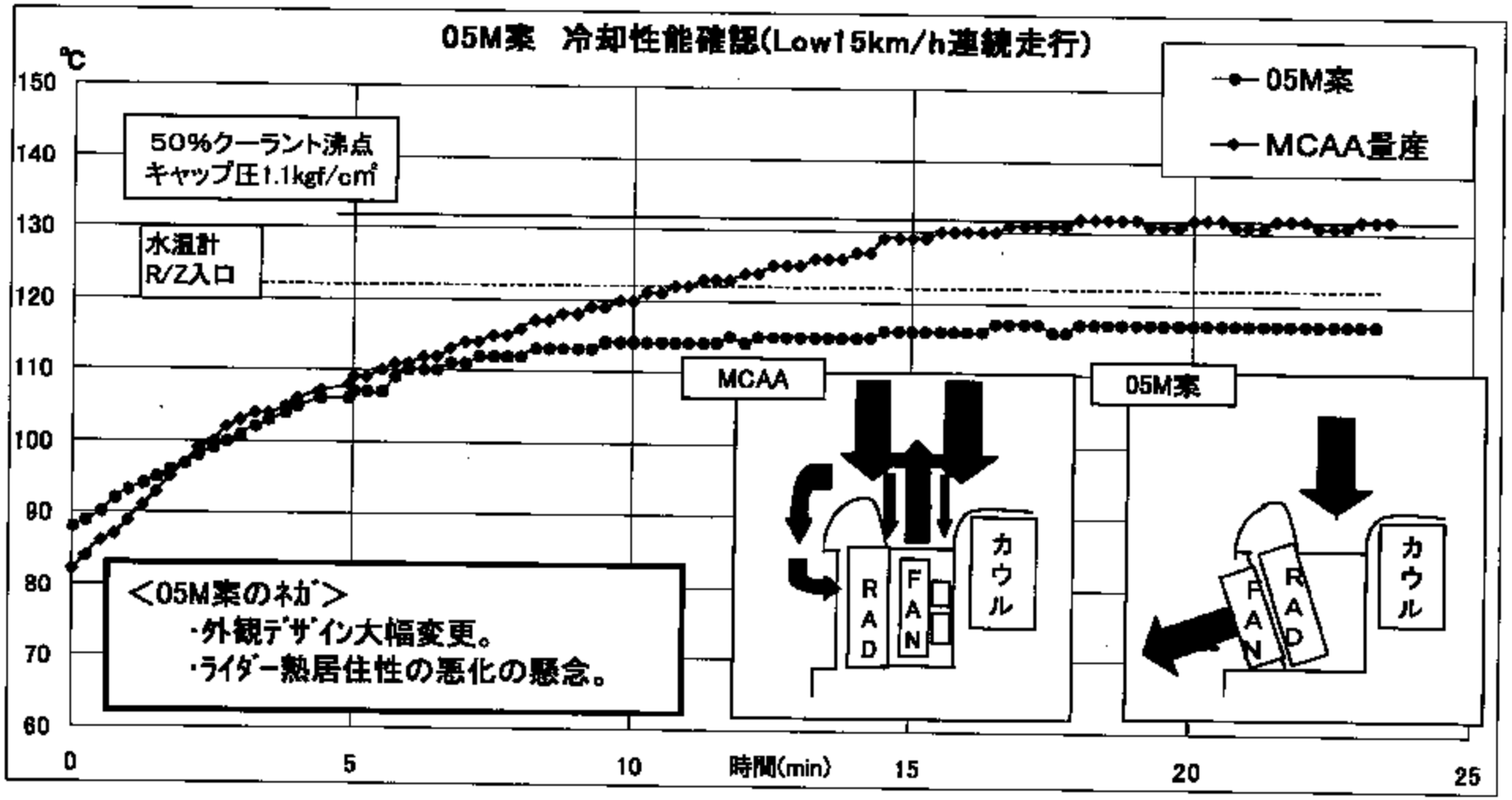
＊2005年外観変更が可能となる為、冷却ファンL／O変更にて抜本的に対策する。

モデル	フロー	開発内容	仕向	水温センサー	水温計タイプ	補正抵抗	角度補正	R／Z入口温度	冷却ファンL／O
2001年	PD	FMC	A, EC	エア温度	中間安定	2.7Ω追加 （サブハーネス追加） （フェアリングハーネス対応）	――	122℃	ファン内置
2002年	M	ガラスト VA 現調拡大 派生追加 市場問題対応	A, EC		↑	――	表示角度補正	↑	↑
			K		↑		――		↑
2003年	C	ガラスト VA 現調拡大 市場問題対応	全		↑	――	――		↑
2004年	CorM	ガラスト VA 現調拡大 市場問題対応	全		↑	――	――		↑
2005年	MorPD	30周年記念 バージョン追加	全	↑	リニアor 中間安定	――	――	122℃	ファン外置

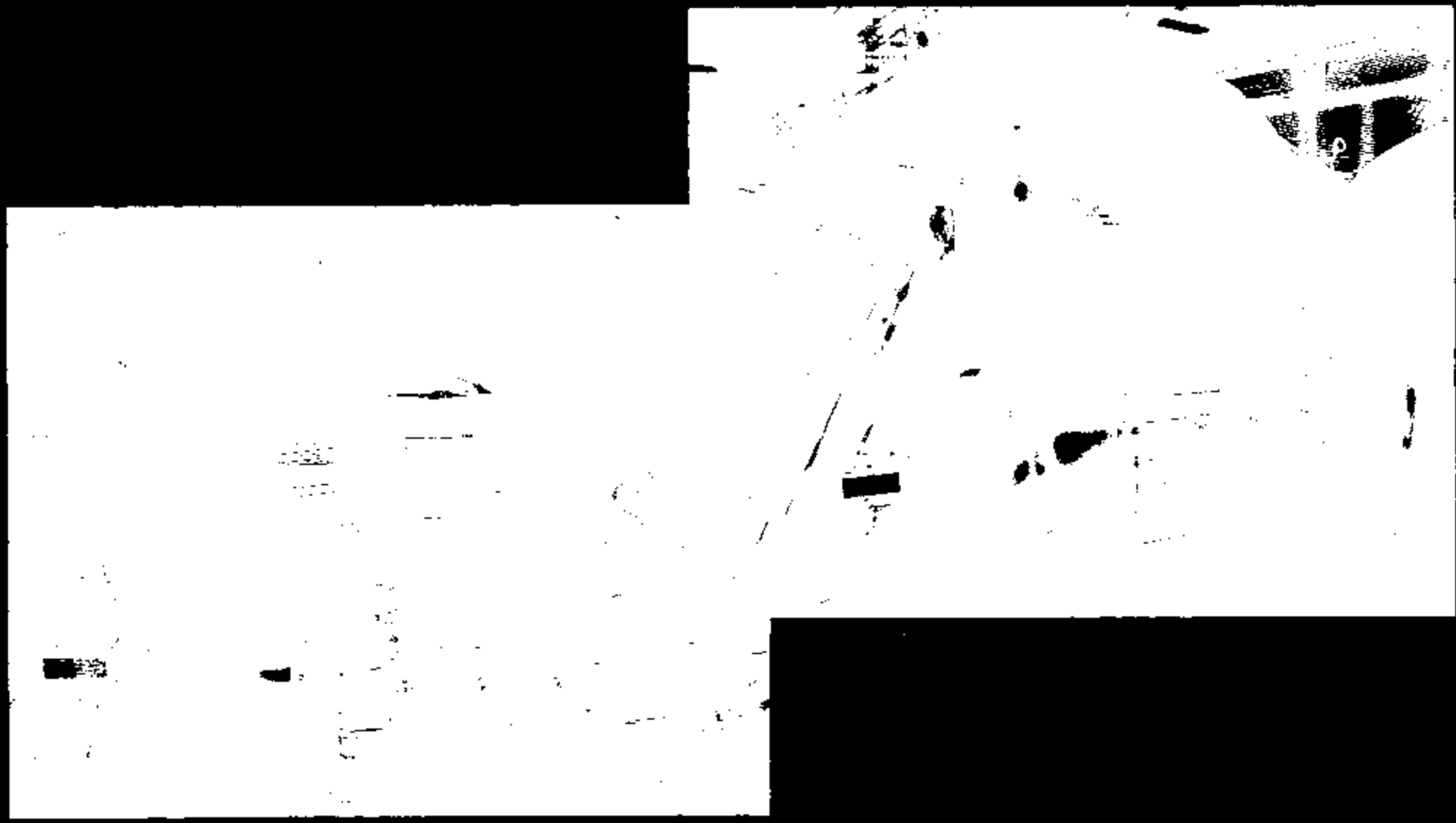
05M案　冷却性能向上仕様

'05Mは　ラジエター取り付け角度変更及び外側ファンL/O
にて水温/水温計指度共に従来機種並を確保出来る。

・水温計ﾚｯﾄﾞｿﾞｰﾝ入口温度　:従来機種通り　122℃±4℃



‘05モデル先行仕様（案）



終了

GLX1800 (MCA)

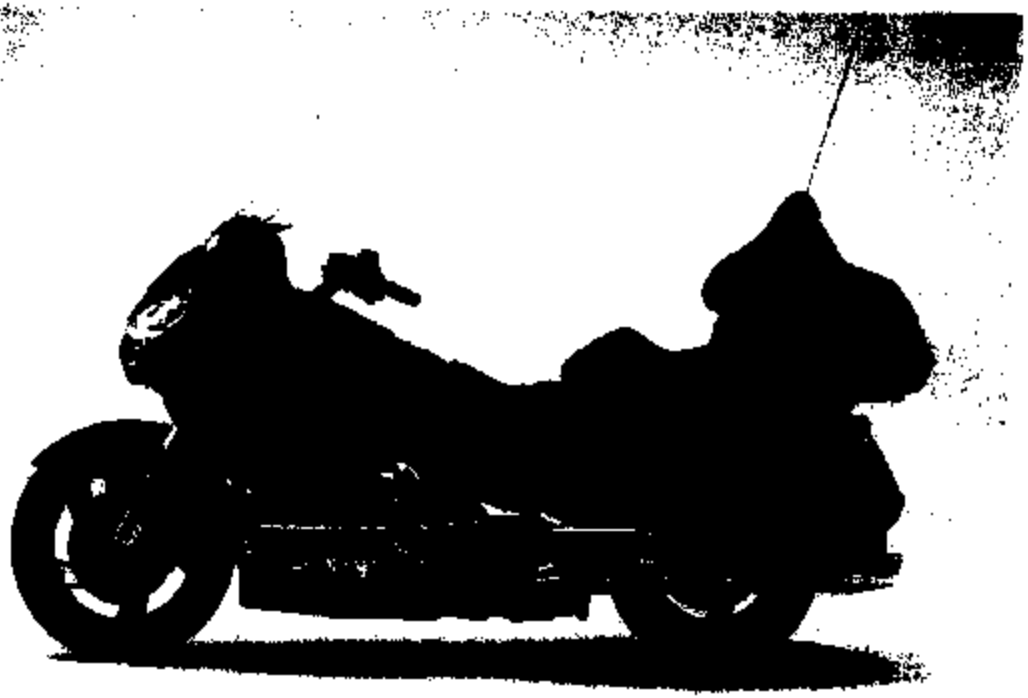
Q1 Report on High Coolant Temperature (91KR)

10/JUN 2002

~1) Digest of Market Information

~2) Outline of A/S Action Plans

~3) Future Activity Schedule



~1) Digest of Market Information

Market Information : GL1800 temperature gauge indicates high temperature

Complaints received from US market

	01YM	02YM
Customer Relations	42	21

Customer complaints alleging that radiator

	Number of complaints
01M	3

Road condition

Congested	56

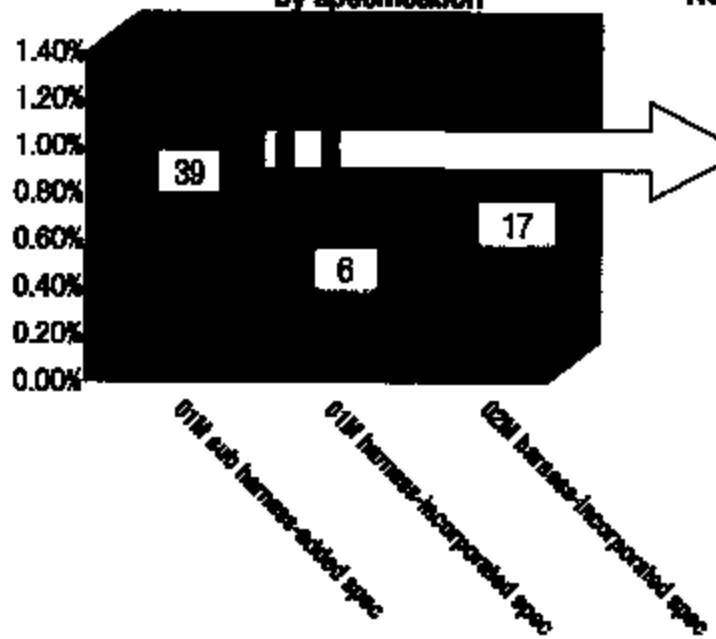
Most customers feel anxiety about the safety of their vehicles as the pointer of temperature gauge "indicates high temperature" or "goes into the red zone."

Number of complaints with definite information

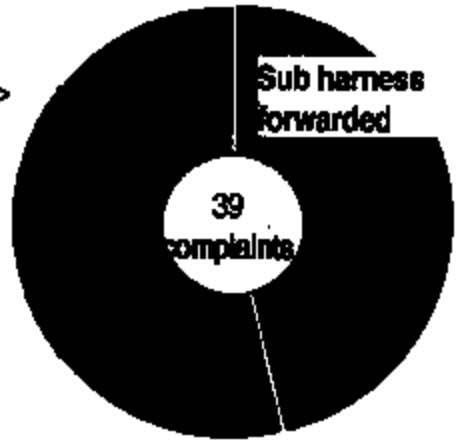
	01YM	02YM
Tech Line	45	17

We lack definite and reliable information; therefore, we prepare a Q&A sheet for asking about problems and send it to AH for use in investigating future customer complaint.

Number/percentage of complaints by specification



Number/percentage of complaints met with forwarding of sub harness



"Sub harness with resistor" specification was applicable to 01YM from the initial serial number and replacement with that sub harness has been carried out at warehouses and dealerships, however, some doubt exists as to whether dealers have conducted PDI thoroughly.

~2) Outline of A/S Action Plans

Presentation made on the occasion of Q Planning

A/S Action Plans - Summary of Proposed Measures against Overheating Problem

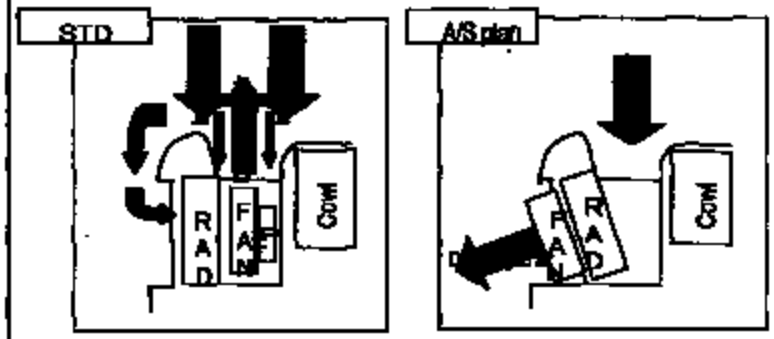
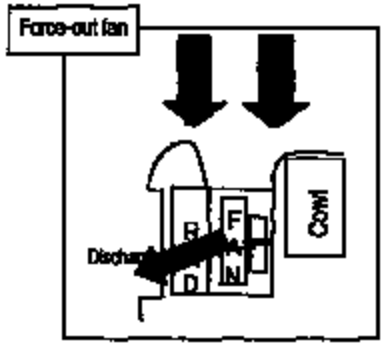
		Cooling performance				Fan noise	Influence on appearance	Comfort (Protection from hot air)	Heat resistance of accessories	Other
		Idling	Low-speed running		High-speed running					
			Effectiveness in preventing hot-soak reading and noise	Effectiveness against coolant expulsion						
1	Mass production spec	○	×	×	○	○ 63dB	○	○	○	
2	Fan ON-OFF triggering speed change	○	×	×	○	○	○	○	○	
3	↑ + Reversed fan revolving	×	×	×	○	×	○	×	○	
4	No shroud	○	○	×	×	○	○	×	×	
5	Baffle plate	○	○	×	×	○	×	○	○	
6	Draw-in fan × 1 Force-out fan × 1	×	○	×	○	×	○	×	○	
7	Force-out fan × 2	×	○	×	○	× 69dB	○	×	○	
8	New layout for 05M (External fan)	○	○	○	○	○ 61dB	×	○	○	Enlarged radiator size

Measures additionally proposed this time

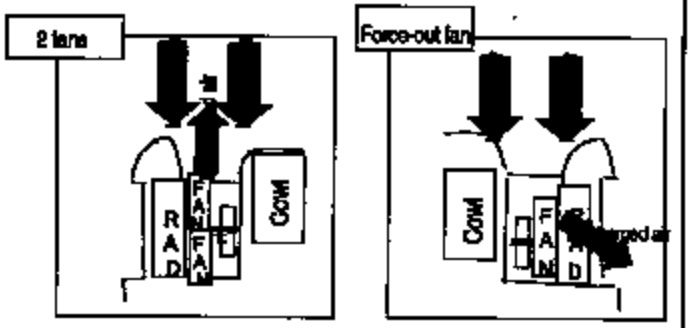
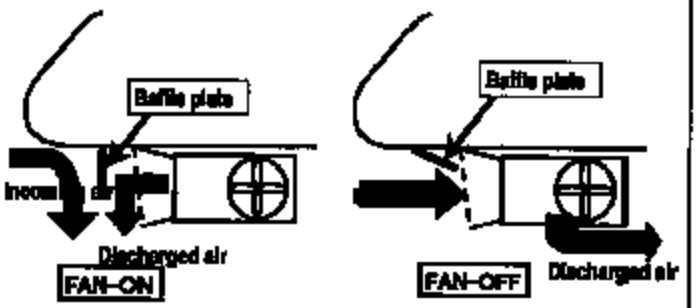
Reconsideration of 2002 A/S Specification

		Cooling performance				Feasibility (of spec)	Comment	Cost	Timing for application
		Idling	Low-speed running		High-speed running				
			Time taken for temperature gauge to go into red zone	Coolant expulsion					
	Mass production spec		7 min	17 min					
①	External cooling fan No apparent change in appearance when viewed from a distance		1 range below	Saturated at 120°C		○	(・The 05M idea proposed previously has met with saturation at 117°C)		
②	Force-out fan on one side		12 min	20 min		○			
	↑ + Cap pressure 1.8kgf/cm²		17 min	Saturated at 134°C		×	・ Increase in frequency of use under high coolant temperature condition may give rise to anxiety about durability		
③	Baffle plate + Increased fan capacity		11 min	19 min		○			
	↑ + Cap pressure 1.8kgf/cm²		17 min	Saturated at 136°C		×	・ Increase in frequency of use under high coolant temperature condition may give rise to anxiety about durability		
④	2 fans on L side Force-out fan on R side		31 min	Saturated at 130°C		○			

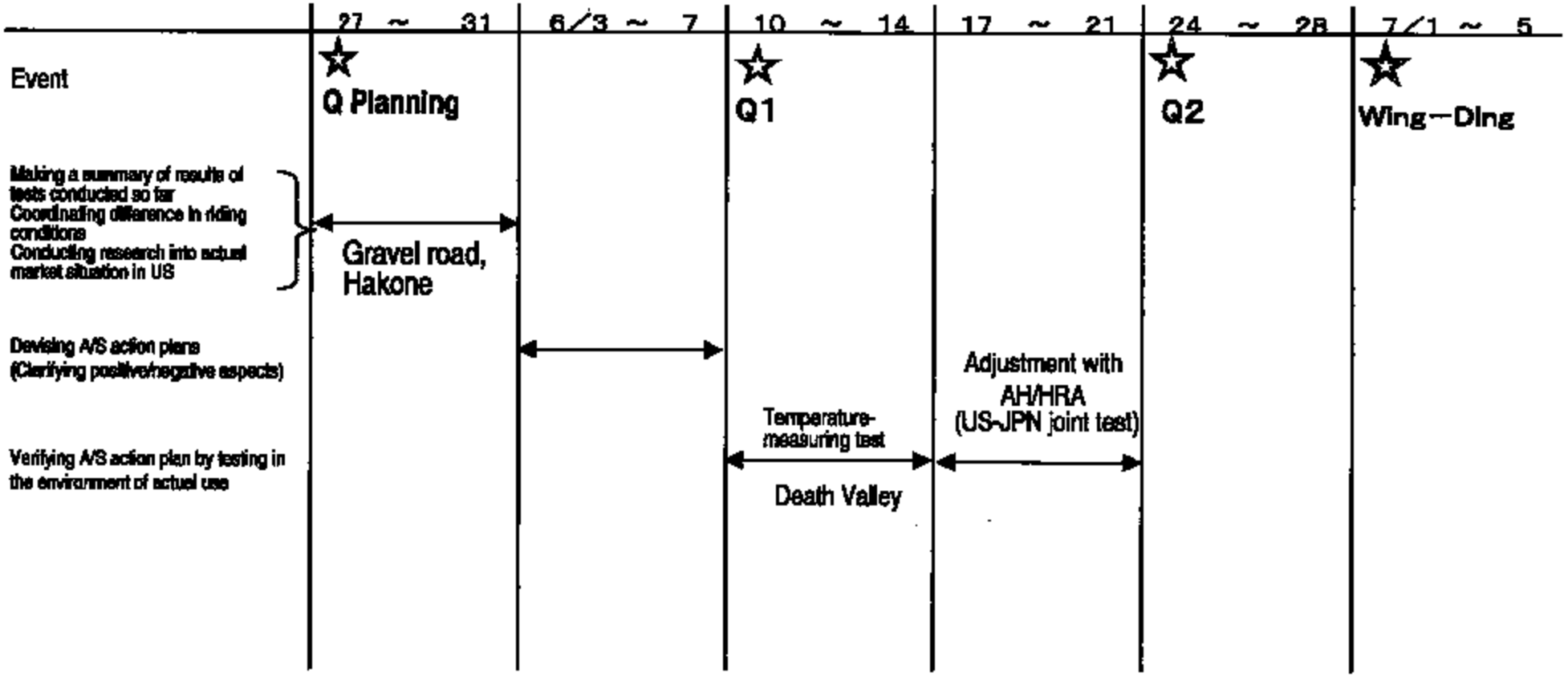
Outline of A/S Action Plans

	A/S Action Plan –① : External cooling fan	A/S Action Plan –② : Force-out fan on one side
Overview of action plan	Air is drawn by the fan from outside of the radiator so as to prevent adverse effect of incoming air. 	Force-out fan is provided only on one side. 
Time until reaching red zone	Mass pro 7 min 1 range below red zone	12 min
Time until coolant expulsion occurs	Mass pro 17 min Saturated at 120°C	20 min
Negative aspects	• Rider's comfort (protection from hot air) may be compromised (to such extent as is judged acceptable as an effect of A/S action). • Change in fan layout is perceptible if looked closely.	• Toughness at idling compares poorly with that of STD. • Increase in frequency of use under high coolant temperature condition may give rise to anxiety about durability. • Heat resistance of temperature gauge, coolant temperature sensor and other related parts is not verified yet.
Parts to be changed	• Fan shroud (R/L) • Fan motor (R/L) • Fan motor stay (R/L) • Wire netting (R/L) • Louver (R/L) • Radiator (Shroud mounting stay) • R radiator outlet hose (to be cut short) • Speed sensor removal (but not necessarily) • Rubber plate for rider's comfort (protection from hot air) • Resistor (to correct temperature gauge red zone beginning temperature to 126°C)	• Fan motor (R/L) • Fan motor stay (on one side) • Fan vane (on one side, MBB) • Fan motor stay (on one side) 1.6 cap • Rubber parts change to C3YM heat resistance spec • Resistor (to correct temperature gauge red zone beginning temperature to 126°C) • Radiator fin pitch change (from 2.75 to 3.5) • Baffle plate addition (on draw-in side)
Cost	Work underway to make an approximate estimate	Work underway to make an approximate estimate
Timing for application	Under consideration	Under consideration

Outline of A/S Action Plans

	A/S Action Plan –④ : 2 fans on L side, a force-out fan on R side	A/S Action Plan –③ : Mass production base BEST
Overview of action plan	2 fans on one side, a force-out fan on another side 	Mass production base 
Time until reaching red zone	31 min	11 min
Time until coolant expulsion occurs	Saturated at 130°C	19 min
Negative aspects	• There may be yet other negative aspects to examine than the following. • Increase in frequency of use under high coolant temperature condition may give rise to anxiety about durability. • Heat resistance of temperature gauge, coolant temperature sensor and other related parts is not verified yet.	• Increase in frequency of use under high coolant temperature condition may give rise to anxiety about durability. • Heat resistance of temperature gauge, coolant temperature sensor and other related parts is not verified yet.
Parts to be changed	• Fan motor (R/L) • Fan motor stay (on one side) • Fan vane (on one side, MB8) • Fan motor stay (on one side) 1.6 cap • Rubber parts change to 03YM heat resistance spec • Resistor (to correct temperature gauge red zone beginning temperature to 128°C) • Radiator fan pitch change (from 2.75 to 3.5)	• Baffle plate addition (on draw-in side) • Fan motor (R/L) • Resistor (to correct temperature gauge red zone beginning temperature to 128°C)
Cost	Work underway to make an approximate estimate	Work underway to make an approximate estimate
Timing for application	Under consideration	Under consideration

~3) Future Activity Schedule



GLX1800 Coolant Temperature Test Plan (Death Valley)

1) Test specifications (Proposed countermeasures)

(1) External cooling fan + α
(2) Cap pressure change to raise boiling point + α

2) Test vehicles

No.1 : Standard (02YM)
No.2 : Vehicle incorporating the above countermeasure (1)
No.3 : Vehicle incorporating the above countermeasure (2)

3) Test members

HRA : Kimura TMG and a rider
AH : Tim Heaven (to be present on 13th and 14th days)
HGA : Yamashita and Ota

4) Necessary equipment

- All the necessary measuring instruments shall be hand-carried from HGA (and those in HRA shall be standby reserve).
- All the replacement parts necessary for the change to the remedial specifications shall be hand-carried from HGA.
- Each member shall bring his own personal protective gears necessary for the test.
- Power source (100V) for personal computer and tools shall be prepared by HRA.

Schedule

	10		11		12		13		14	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Content		Previous arrangements as to test	Preparation for test	←	Travel to Death Valley	Test	←	←	←	Travel to Los Angeles
Location		HRA	←	←	By car	Death Valley	Death Valley	Death Valley	Death Valley	By car
Members										
HRA Kimura		○	○	○	○	○	○	Travel	×	×
+1 rider		×	×	×	○	○	○	○	○	○
HGA Yamashita		○	○	○	○	○	○	○	○	○
Ota		○	○	○	○	○	○	○	○	○
AH Tim		×	×	×	×	×	Travel	○	○	○

Schedule of Meeting for Joint Verification of A/S Action Plans

1) Purpose : A/S action plans verified by tests conducted by the 17th day and the test results are presented to AH, based on which joint verification of effectiveness and negative aspects of the plans is conducted to agree on the outline of the optimum A/S action (hardware & software).

2) Participating members : HRA Mobara
HGA Yamashita and Ota
AH Selection of members is entrusted to Mr. Kawanami

3) Vehicles for test rides : Three vehicles used for testing

Arrangements as to matters within this period are entrusted to Mr. Mobara

Arrangements as to matters within this period are entrusted to Mr. Kawanami. Explanation of specifications may be on the 17th day.

	17		18		19		20	
	AM	PM	AM	PM	AM	PM	AM	PM
Content	Temperature-measuring test (in parade mode)		Joint verification meeting		←		Roundup	
Location	Los Angeles urban area (Locational arrangement will be made by Mr. Mobara)							
Members								
HRA Mobara	○		○		○		○	
HGA Yamashita	○		○		○		○	
Ota	○		○		○		○	
AH A								
B								
C								
D								
E								

GLX1800(MCA)

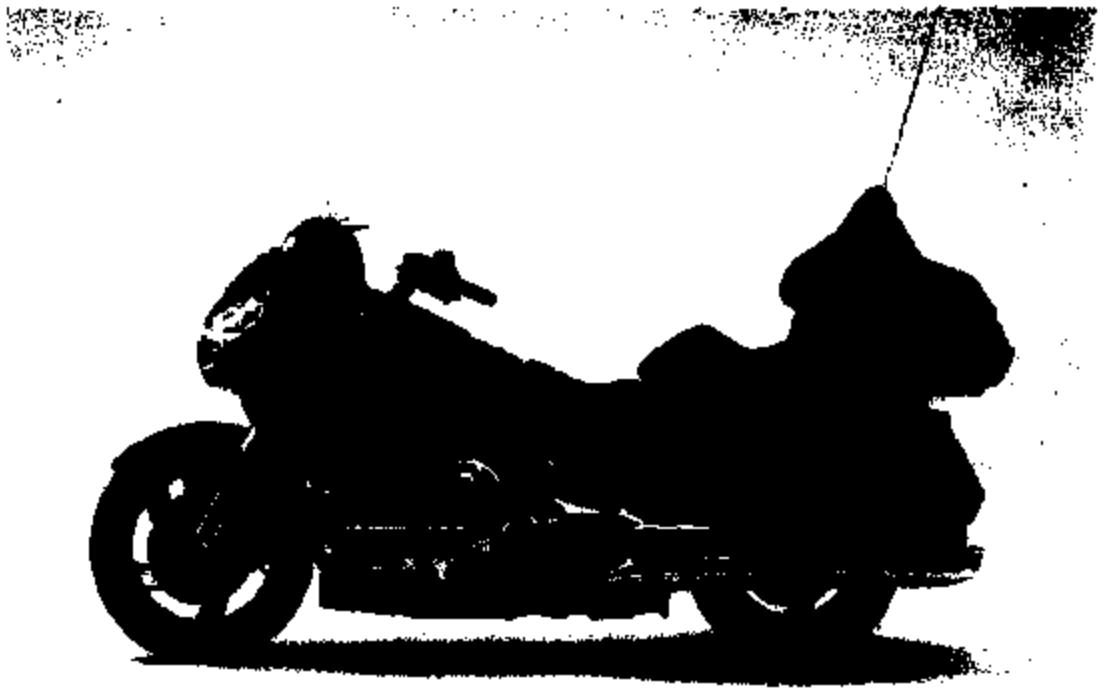
水温高い(91KR) Q1報告

10／JUN 2002

～1)市場情報の整理

～2)A/S対応案の概要

～3)今後の展開計画



～1）市場情報の整理

市場情報　GL1800水温計が高温を示す

アメリカ市場

	01YM	02YM
客相の苦情	42件	21件

ラジエター液が吹いたと訴えのお客様

	吹いた件数
01M	3件

道路状況

渋滞	56件

水温計の指示が"高温を示す""R／Zに入る"事で不安に感じているお客様が大半である。

情報内容が明確な件数

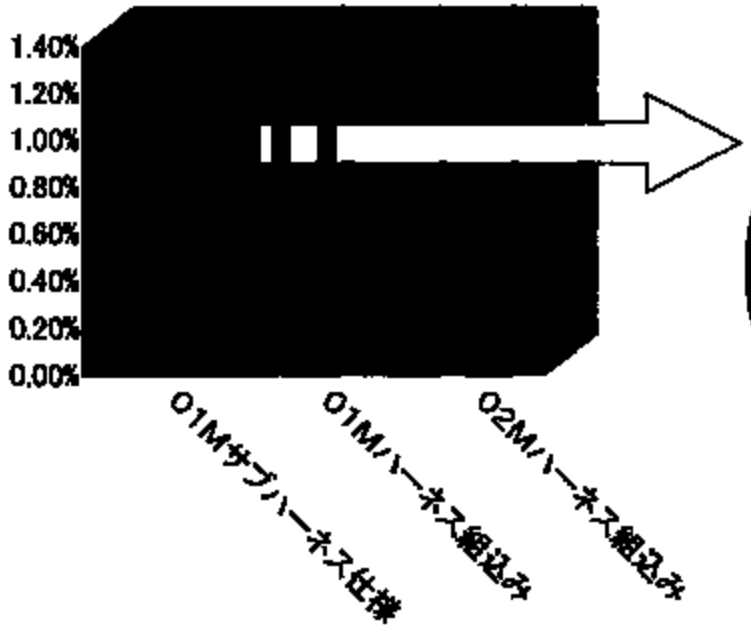
	01YM	02YM
テックライン	45件	17件

必要な情報が的確に得難い為

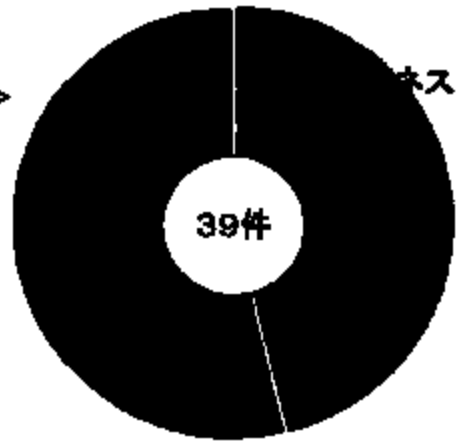
今後の訴えに対しての調査として

問診票を作成しAHへTossする

仕様別コンプレーン発生率



訴え後サブハーネス発送



01YM初号機よりサブハーネスで抵抗追加仕様を適用し、ウエアハウス、ディーラーで改修実施しているがディーラーでのPDIが確実に行われたか疑問が残る。

～2）A/S対応案の概要

Q企時に提示

AS対応策　水温対策案　現状まとめ

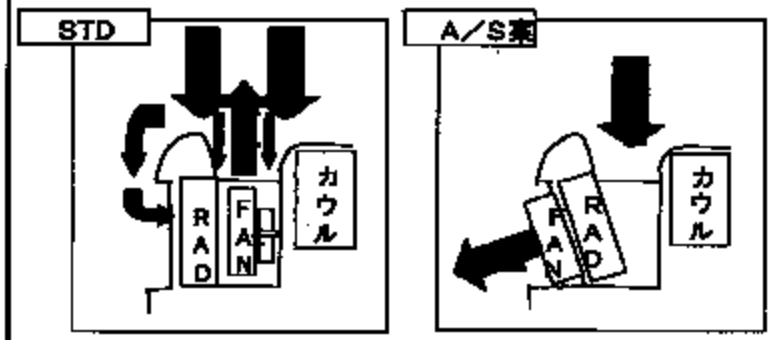
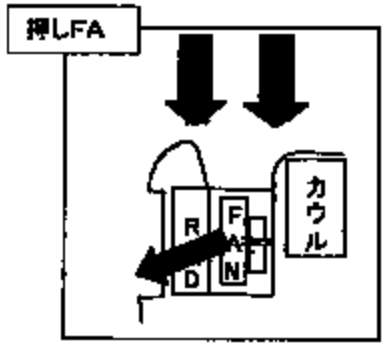
		冷却性能				ファン騒音	外観影響	熱居住性	補機類耐熱	その他
		アイドル	低速走行		高速走行					
			延命効果	水漏き						
1	量産仕様	○	×	×	○	○ 63dB	○	○	○	
2	ファンCUT速度変更	○	×	×	○	○	○	○	○	
3	↑＋ファン逆転	×	×	×	○	×	○	×	○	
4	シュラウド無し	○	○	×	×	○	○	×	×	
5	じゃま板	○	○	×	×	○	×	○	○	
6	引きファン×1 押しファン×1	×	○	×	○	×	○	×	○	
7	押しファン×2	×	○	×	○	× 69dB	○	×	○	
8	05モデルL/O （ファン外付け）	○	○	○	○	○ 61dB	×	○	○	RADサイズUP

今回追加

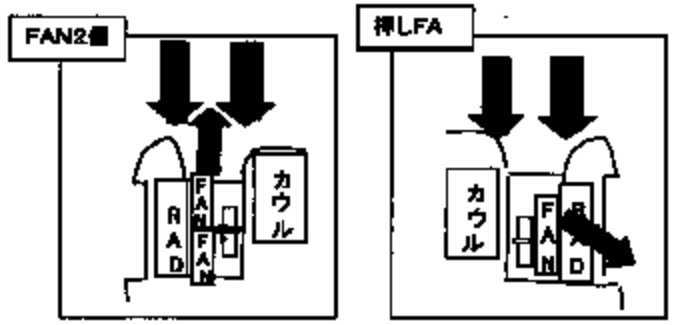
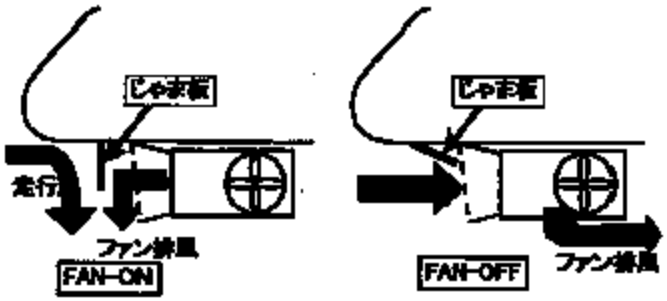
2002年 再AS仕様検討(一品料理前提)

		冷却性能				実現性(仕様の)	コメント	コスト	適用時期
		アイドル	低速走行		高速走行				
			水温計R/Zに入る時間	水沸き					
	量産仕様		7分	17分					
①	冷却FAN外付け 速め外観変更無し		1レンジ前	120℃ サチレート		○	(・前回提示の05案は117℃でサチレート)		
②	片側のみ押しファン		12分	20分		○			
	↑ +キャップ圧1.8		17分	134℃ サチレート		×	・高水温状態での使用頻度が増え、耐久性の心配		
③	じゃま板 +FAN能力UP		11分	19分		○			
	↑ +キャップ圧1.8		17分	136℃ サチレート		×	・高水温状態での使用頻度が増え、耐久性の心配		
④	L側FAN2個 R側押しFAN		31分	130℃ サチレート		○			

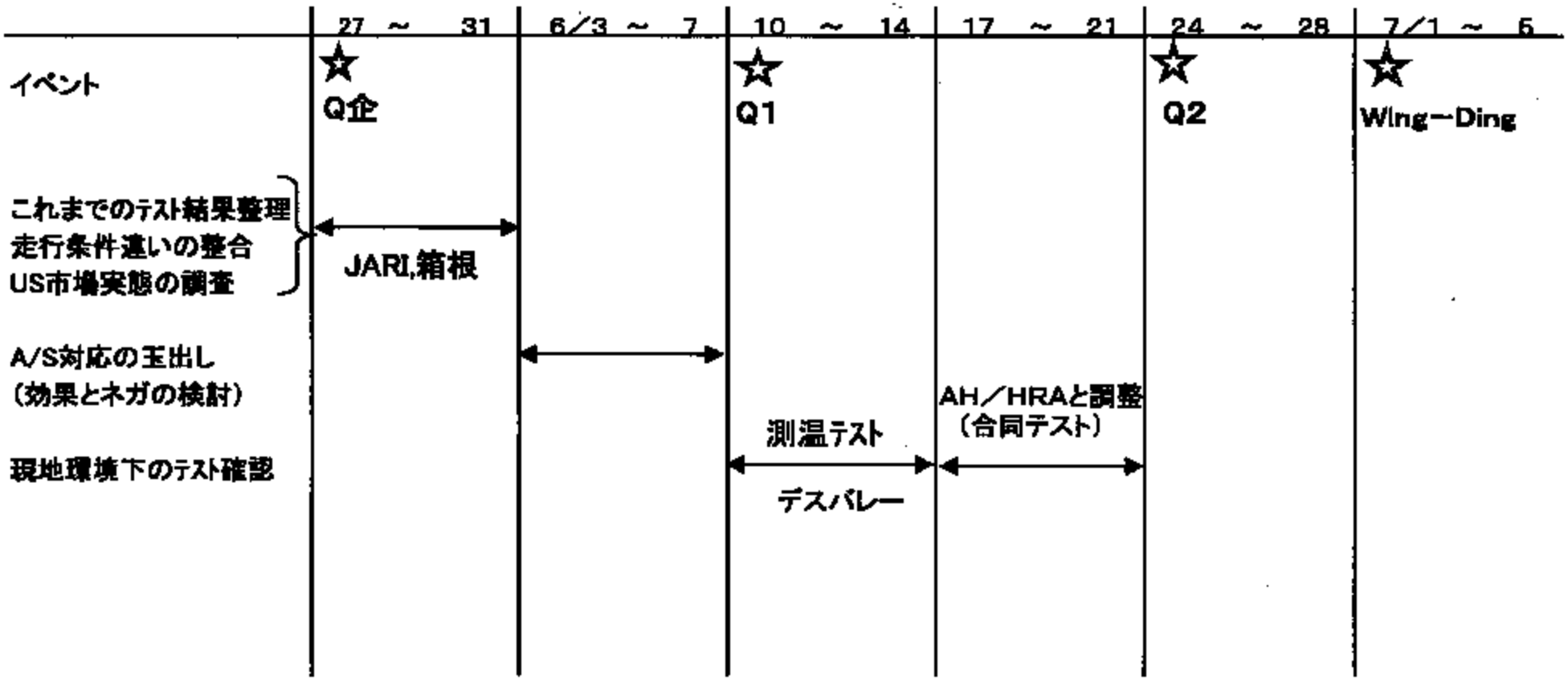
A/S対策案の概要

	A／S対策案－① ： 冷却ファン外配置	A／S対策案－② ： 片側押しFAN
対策概要	ラジエターの外側からファンで風を引っ張り、 走行風の悪影響を防ぐ 	片側のみ押しファンにする 
延命効果（R／Zに入る時間	量産 7分 1レンジ前	12分
水沸きに至る時間	量産 17分 120℃サチレート	20分
ネガ	・熱居住性の低下（A/S対応としては、許容レベルと判断する） ・外観で、よく見るとファンの配置変更に気付く	・IDLEタフネス悪化（STD比） ・水温が高い状態での使用頻度が増え、耐久性の心配 ・水温計、水温センサー、他部品の耐熱性未確認
変更部品	・FANシュラウド（R／L） ・FANモーター（R／L） ・FANモーターステー（R／L） ・金網（R／L） ・ルーバー（R／L） ・RAD（シュラウド取り付けステー） ・R側　RAD出口ホースCUT ・車速センサー無し（有りでOK） ・居住性対応ゴム板設置 ・水温計指度126℃（抵抗）	・FANモーター（R／L） ・FANモーターステー（片側） ・FAN羽根（片側MBB） ・FANモーターステー（片側）1，8キャップ ・ゴム類を03YMの耐熱仕様に変更 ・水温計指度126℃（抵抗） ・RADフィンピッチ（2.75→3.5） ・じゃま板（引き側）
費用	概略を検討中	概略を検討中
適用可能時期	概略を検討中	概略を検討中

A/S対策案の概要

	A／S対策案－④ ： L側FAN2個／R側押しFAN	A／S対策案－③ ： 量産ベースBEST
対策概要	片側FAN2個 片側のみ押しファンにする 	基本量産ベース 
延命効果（R／Zに入る時間）	31分	11分
水漏きに至る時間	130℃サチレート	19分
ネガ	・他のネガ確認未 ・水温が高い状態での使用頻度が増え、耐久性の心配 ・水温計、水温センサー、他部品の耐熱性未確認	・水温が高い状態での使用頻度が増え、耐久性の心配 ・水温計、水温センサー、他部品の耐熱性未確認
変更部品	・FANモーター（R／L）　・RADフィンピッチ（2.75→3.5） ・FANモーターステー（片側） ・FAN羽根（片側MBB） ・FANモーターステー（片側）1．6キャップ ・ゴム脚をO3YMの耐熱仕様に変更 ・水温計耐度126℃（抵抗）	・じゃま板（引き側） ・FANモーター（R／L） ・水温計耐度126℃（抵抗）
費用	概略を検討中	概略を検討中
適用可能時期	概略を検討中	概略を検討中

～3）今後の展開計画


27 ～ 31
6/3 ～ 7
10 ～ 14
17 ～ 21
24 ～ 28
7/1 ～ 5
イベント
Q企
Q1
Q2
Wing－Ding
これまでのテスト結果整理
走行条件違いの整合
US市場実態の調査
JARI,箱根
A/S対応の玉出し
（効果とネガの検討）
AH／HRAと調整
（合同テスト）
測温テスト
現地環境下のテスト確認
デスバレー

GLX1800水温テスト計画(デスバレー)

1)テスト仕様(対策案)

①冷却ファン外配置(外に排気) ＋ α
②キャップ圧変更にて、沸点を上げる ＋ α

2)テスト車

NO1: STD(02YM)
NO2: 上記対策①案
NO3: 上記対策②案

3)テストメンバー

HRA: 木村TMG、現適ライダー1名
AH: ティムヘブンさん(13～14日に参加)
HGA: 山下主研、大田

4)備品

・必要な計測器は全てHGAからH/C(HRA分は予備)
・対策仕様への組替え部品は、全てHGAからH/C
・テスト用の防具は各自が持参する
・パソコン用の電源(100V)、工具類はHRAで準備願い

スケジュール

	10		11		12		13		14	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
業務内容		テスト 打合せ	テスト準備	←	移動 toデスバレー	テスト	←	←	←	移動 toロス
場所		HRA	←	←	車中	デスバレー	デスバレー	デスバレー	デスバレー	車中
メンバー										
HRA木村		○	○	○	○	○	○	移動	×	×
＋1名		×	×	×	○	○	○	○	○	○
HGA山下		○	○	○	○	○	○	○	○	○
大田		○	○	○	○	○	○	○	○	○
AHティム		×	×	×	×	×	移動	○	○	○

A／S対応案の合同確認会　スケジュール案

1）目的：　17日までにテスト確認されたA／S対応案、及びテスト結果をAHに提示し、
対策効果確認、ネガの洗出しを行い、A／S対応（ハード＆ソフト）のアウトラインを決定する。

2）参加メンバー：　HRA茂原さん
HGA　山下主研、大田さん
AHメンバーについては、川浪さんに選出をお願いします

3）試乗車：　前日までのテスト車3台を使用する。

この間のアレンジは
茂原さんにお願いします

この間のアレンジは川浪さんにお願いします。
仕様説明等は17日でも可能です。

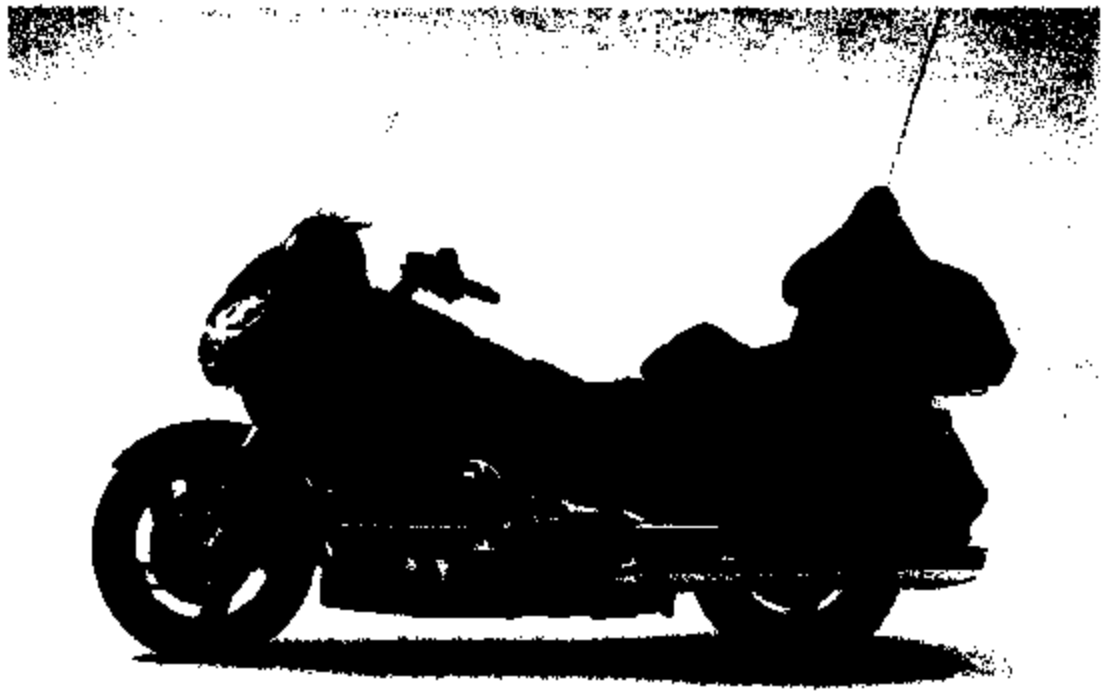
	17		18		19		20	
	AM	PM	AM	PM	AM	PM	AM	PM
業務内容	測温テスト（パレード走行）		合同確認会		←		まとめ	
場所	ロス市街（茂原さんアレンジ）							
メンバー								
HRA茂原	○		○		○		○	
HGA山下	○		○		○		○	
大田	○		○		○		○	
AH A								
B								
C								
D								
E								

GLX1800 (MCA)

Q2 Report on High Coolant Temperature (91KR)

24/JUN 2002

1. Analysis of Market Information
2. Tabular Summary by Model/Specification
3. A/S Action Plans
4. Results of Tests Conducted to Verify A/S Action Plans
5. Outcome of SED Meeting Held at AH
6. Market Action
7. Remedial Technique
8. Future Activity Schedule



1-1. Analysis of Market Information

GL1800 Temperature Gauge

Complaints received from US market

	01YM	02YM
Customer Relations	42	21

Customer complaints alleging that radiator

	Number of complaints
01M	3

Road condition

Congested	56

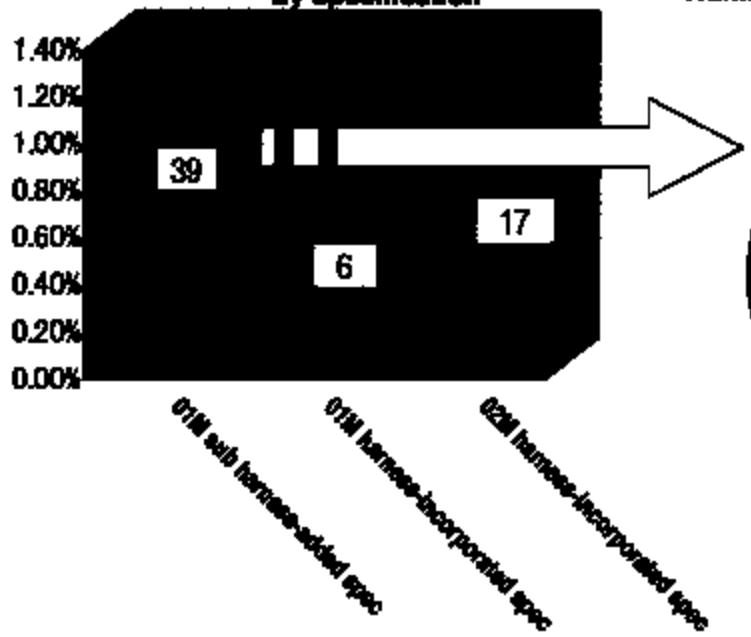
Most customers feel anxiety about the safety of their vehicles as the pointer of temperature gauge "indicates high temperature" or "goes into the red zone."

Number of complaints with definite information

	01YM	02YM
Tech Line	45	17

We lack definite and reliable information; therefore, we prepare a Q&A sheet for asking about problems and send it to AH for use in investigating future customer complaint.

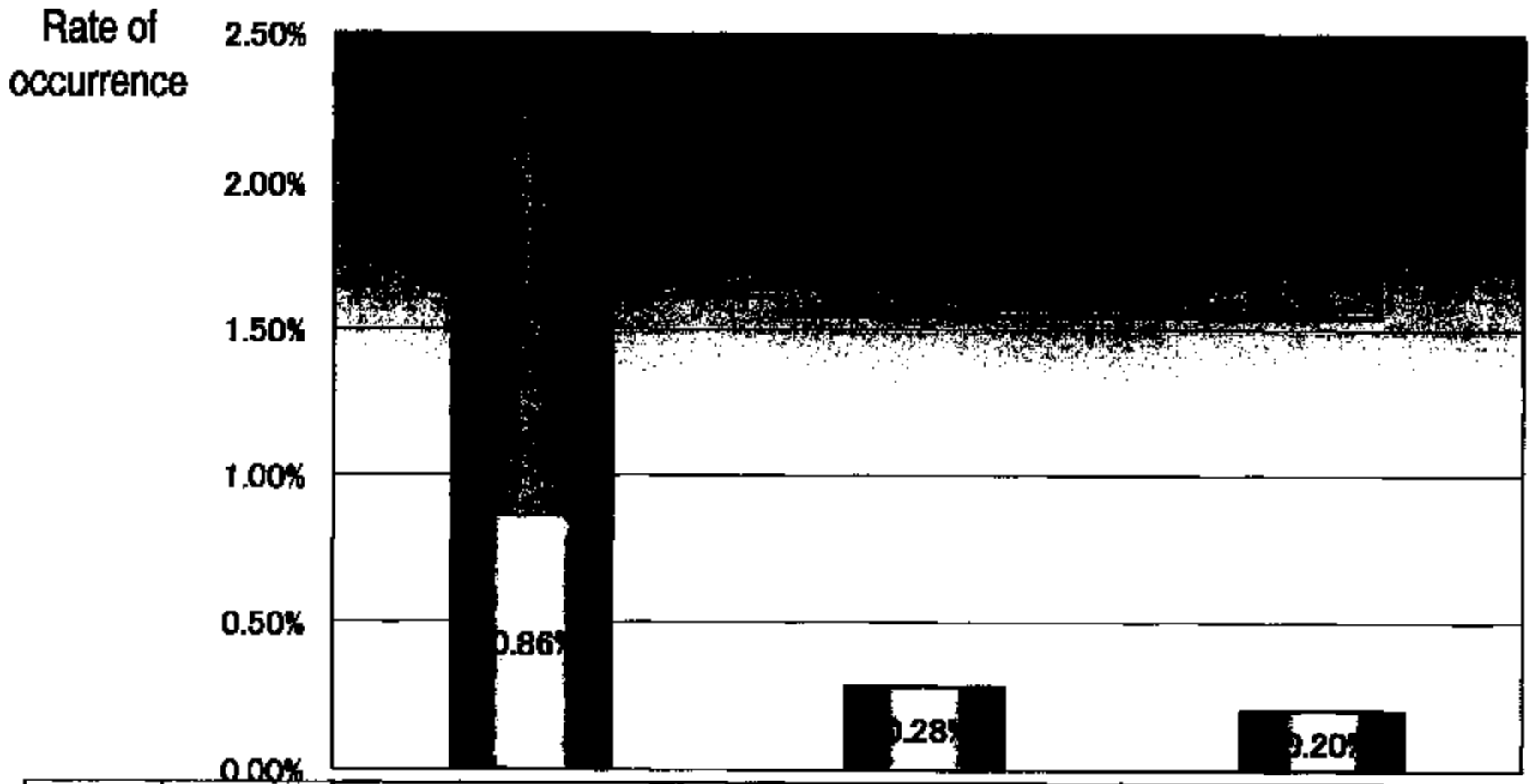
Number/percentage of complaints by specification



Number/percentage of complaints met with forwarding of sub harness

"Sub harness with resistor" specification was applicable to 01YM from the initial serial number and replacement with that sub harness has been carried out at warehouses and dealerships, however, some doubt exists as to whether dealers have conducted PDI thoroughly.

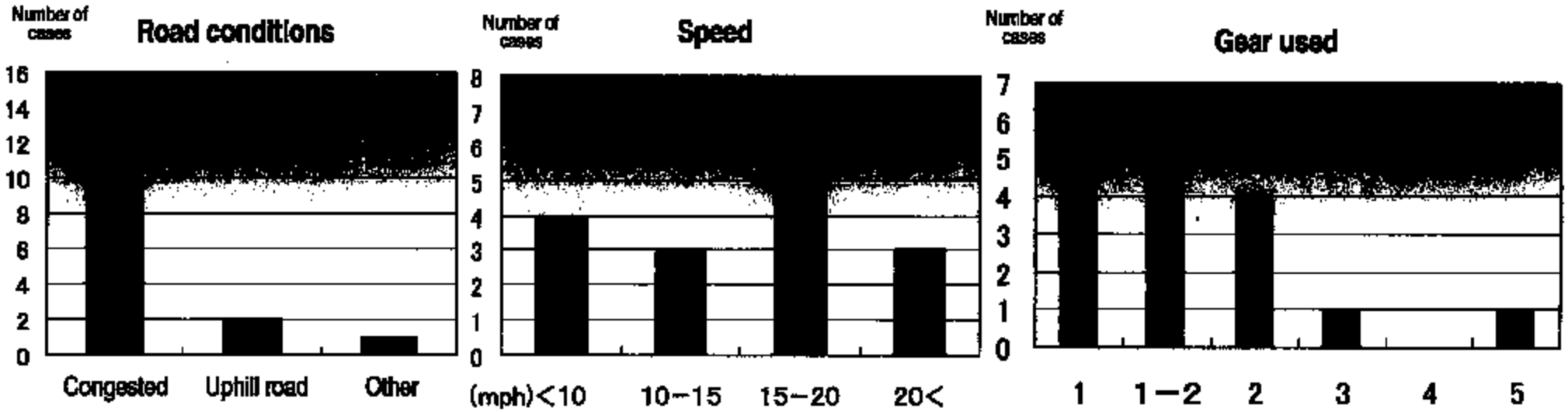
1-2. Analysis of Market Information GL1800 Temperature Gauge

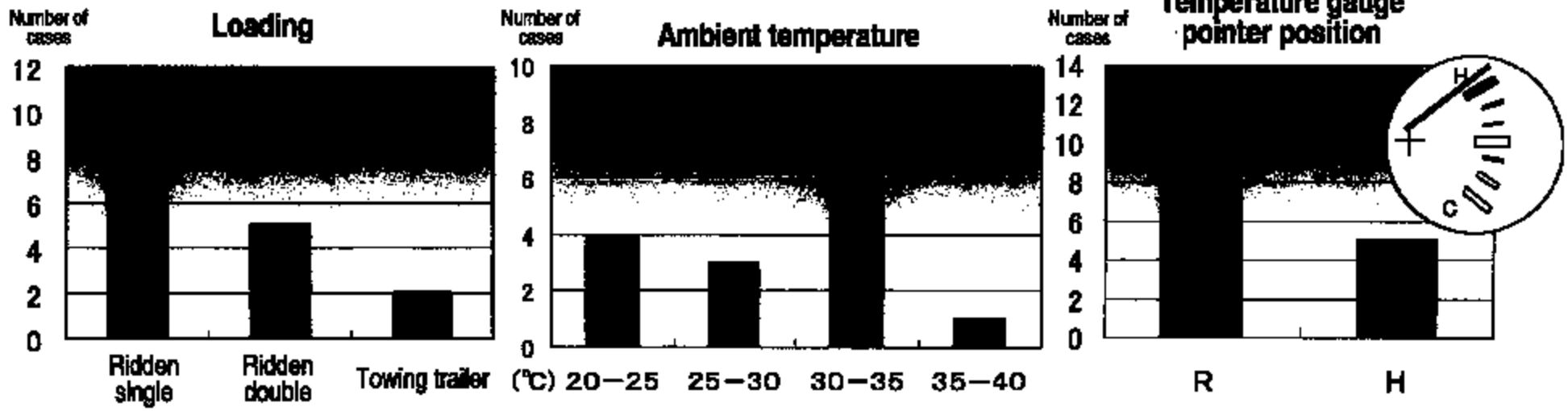


		01YM Sub harness-added spec	01YM Harness-incorporated spec	02YM TW sensor-remedied spec
Number of vehicles sold		2800	6032	8548
Number of complaints	Fitted	24	17	17
	Not fitted	41	—	—
Rate of occurrence	Fitted	0.86%	0.28%	0.20%
	Not fitted	1.46%	—	—

1-3. Analysis of Market Information GL1800 Temperature Gauge

Analysis of the situations in which the temperature gauge problem is alleged to have arisen has shown that these situations are almost identical to the situations that can be created in the duplication modes established so far, except that the gear used most frequently has been found to be the 2nd gear.





2. Tabular Summary by Model/Specification

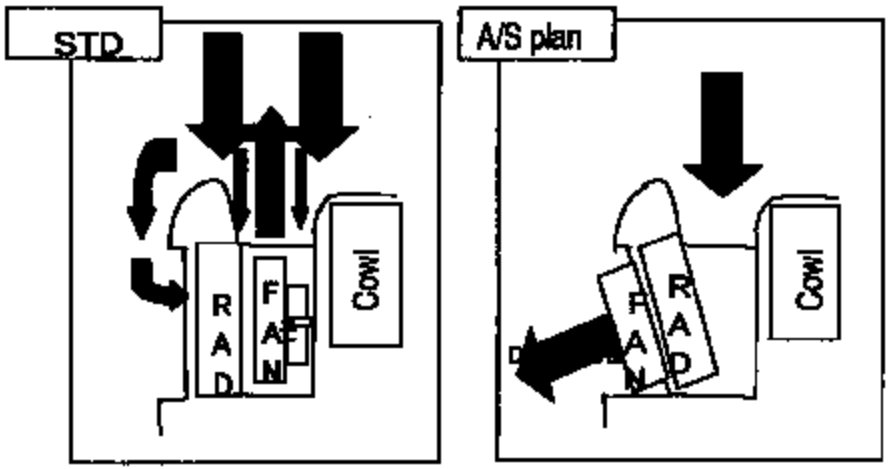
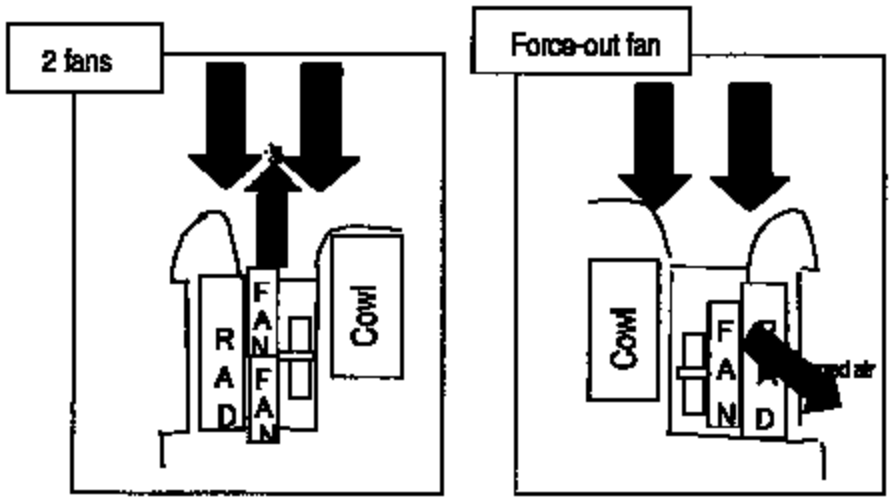
GL1800 Temperature Gauge

	Model	Coolant temperature sensor	Destination	Specification		Application	Number of vehicles sold	Number of complaints	
				Description of change	Red zone beginning temperature			Red zone	Coolant expulsion
[redacted]									
4	02M MCAF	Actual coolant temperature	K	Tentative solution Sub harness with a 1.2Ω resistor is added	Set at 126°C	Production in JUL 2001		0	0
5				Fairing harness has a 1.2Ω resistor built-in	Set at 126°C	Production in and after OCT 2001			
6	03M MCAH	Actual coolant temperature	K/A ED	Temperature gauge	Set at 126°C				
7	04M	Actual coolant temperature	K/A ED	Temperature gauge	Set at 126°C				
8	05M	Actual coolant temperature	K/A ED	Substantial L/O change					

		Cooling performance				Fan noise	Influence on appearance	Comfort (Protection from hot air)	Heat resistance of accessories	Other
		Idling	Low-speed running		High-speed running					
			Effectiveness in preventing bias and resulting hot zone	Effectiveness against overheat operation						
1	Mass production spec	○	×	×	○	○ 63dB	○	○	○	
2	Fan ON-OFF triggering speed change	○	×	×	○	○	○	○	○	
3	↑ + Reversed fan revolving	×	×	×	○	×	○	×	○	
4	No shroud	○	○	×	×	○	○	×	×	
5	Baffle plate	○	○	×	×	○	×	○	○	
	Baffle plate + Increased fan capacity	○	○	×	○	○	○	○	○	
7	Draw-in fan ×1 Force-out fan ×1	×	○	×	○	×	○	×	○	
			②	○						
8	Force-out fan ×2	×	○	×	○	× 69dB	○	×	○	
			①	○						
6	New layout for 05M (External fan)	○	○	○ Saturated at 117°C	○	○ 61dB	×	○	○	

■ A/S action plans introduced to US

Outline of A/S Action Plans

	A/S Action Plan –① : External cooling fan	A/S Action Plan –② : 2 fans on L side, a force-out fan on R side
Overview of action plan	Air is drawn by the fan from outside of the radiator so as to prevent adverse effect of incoming air. 	2 fans on one side, a force-out fan on another side 

3-3. Cost of A/S Action — GL1800 Temperature Gauge

Conditions

- Although the affected parts are those manufactured locally in the US, the cost shall be computed on the premise that A/S parts are made in and supplied from Japan.
- Cost of parts shall be computed on the premise that parts for 100 vehicles are manufactured and HGA prototype trial cost is added to the cost estimated by maker.
- Lead time shall be the number of days until the prototype parts are first delivered, and parts for 10 vehicles shall be delivered per day.
- Labor cost shall be computed on the basis of US labor cost ($50/hr) and by referring to the labor hour shown on the parts list.

A/S Action Plan -①	Responsibility	Build	Cost	Remark	Lead time	Labor cost
• Fan shroud (R/L)	1S	New prototype build	¥24,000	It is difficult to secure the required accuracy/quantity by rework	• 30 days including L/O and drawing preparation	• Replacement of radiator assembly • Modification of hose • Replacement of louver × R/L = 4.0 hrs × $50/hr **$200**
• Fan motor (R/L)	8S	MCA modification	¥48,000	Obtain MCA mass-produced parts from US and modify them by adding new stays		
• Fan motor stay (R/L)	1S					
• Radiator (Shroud mounting stay)	1S					
• Wire netting (R/L)	1S	New prototype build	¥3,000	Cut commercially available wire netting		
• Louver (R/L)	1S	MP part rework	¥10,000	Cut and add boss		
• R radiator outlet hose (to be cut short)	1S	MP part rework	¥0	Cut existing hose		
• Speed sensor removal (but not necessarily)	8S		¥0	$152 (FI unit) is required if speed sensor is removed		
• Rubber plate for rider's comfort (protection from hot air)	1S	New	¥3,000	Cut rubber into flat plate		
• Resistor (to correct temperature gauge red zone beginning temperature to 128°C)	8S		¥950	0.75h		
TOTAL			**¥88,950**			
A/S Action Plan -②						
• Fan motor (R/L)	8S	MCA modification	¥100,000	Pitch-changed new radiator is made by US maker and assembled with new stay/motor/fin in JPN	• 45 days including L/O and drawing preparation	• Replacement of radiator assembly • × R/L + Replacement of engine rubber = 6.0 hrs × $50/hr **$300**
• Fan motor stay (on one side)	1S					
• Fan vane (R or L M&B) + Radiator	1S					
• Radiator fin pitch change (from 2.75 to 3.5)	1S					
• 1.8 cap	1S	Common part	¥3,000	Common with NT7G (CR)		
• Rubber parts change to 09YM heat resistance spec	1SFRA/ENG		¥123.03	MP parts are used for this purpose but it entails considerable labor cost		
• Resistor (to correct temperature gauge red zone beginning temperature to 128°C)	8S		¥950	0.75h		
TOTAL			**¥104,073**			

4-1. Results of Tests Conducted to Verify A/S Action Plans

GL1800 Temperature Gauge

• Results of tests conducted in the US

			Ambient temp.	STD		03M	AS Action Plan -①		AS Action Plan -②	
				Time until reaching red zone	Occurrence of coolant expulsion	Time until reaching red zone	Time until reaching red zone	Occurrence of coolant expulsion	Time until reaching red zone	Occurrence of coolant expulsion
Vehicle in standard conditions	Level road		34℃	6.5 min	×	11.5 min	36 min	○	—	—
			43℃	6.5 min	×	8.5 min	15 min	○	17 min	×
		Head wind	47℃	5 min	×	6 min	1 range below	○	28 min	×
		Tail wind	48℃	3 min	×	3.5 min	6.5 min	×	5.5 min	×
	Uphill road	~1 (3%~5%) Tail wind	40℃	5 min	×	8 min	18 min	×	11 min	×
		~2 (5%~8%) Head wind	36℃	9 min	×	12 min	26 min	○	—	—
Towing a trailer	Level road	(Ridden double + 95kg)	41℃	—	—	—	11.5 min	×	—	—

4-2. Results of Tests Conducted to Verify A/S Action Plans

▪Summary of results

*** In view of the results of field tests, we recommend to adopt the A/S Action Plan -① which proved effective in prolonging life (i.e. the time until reaching the red zone).**

1) It is particularly effective in an ambient temperature of 34ºC or below.
2) Even in severely hot weather (35ºC or higher), effectiveness is twice or more as high as that of STD.
3) Comparison under uphill road/tail wind conditions also shows that effectiveness is twice or more as high as that of STD.

4) Rationale supporting propriety of A/S Action Plan -①
   The research conducted by HRA in Los Angeles urban area has shown that
   I. The time being caught in a congested traffic is 30 minutes at the longest (at the peak of everyday rush hour),
   II. The duration of parade-like running is about 30 minutes,
   III. Ambient temperature is 30ºC to 35ºC Max, and
   IV. The plan also proved effective in prolonging life when towing a trailer.
   (Comparison with STD vehicle towing a trailer is not made, but toughness proved greater than that of STD vehicle not towing a trailer)

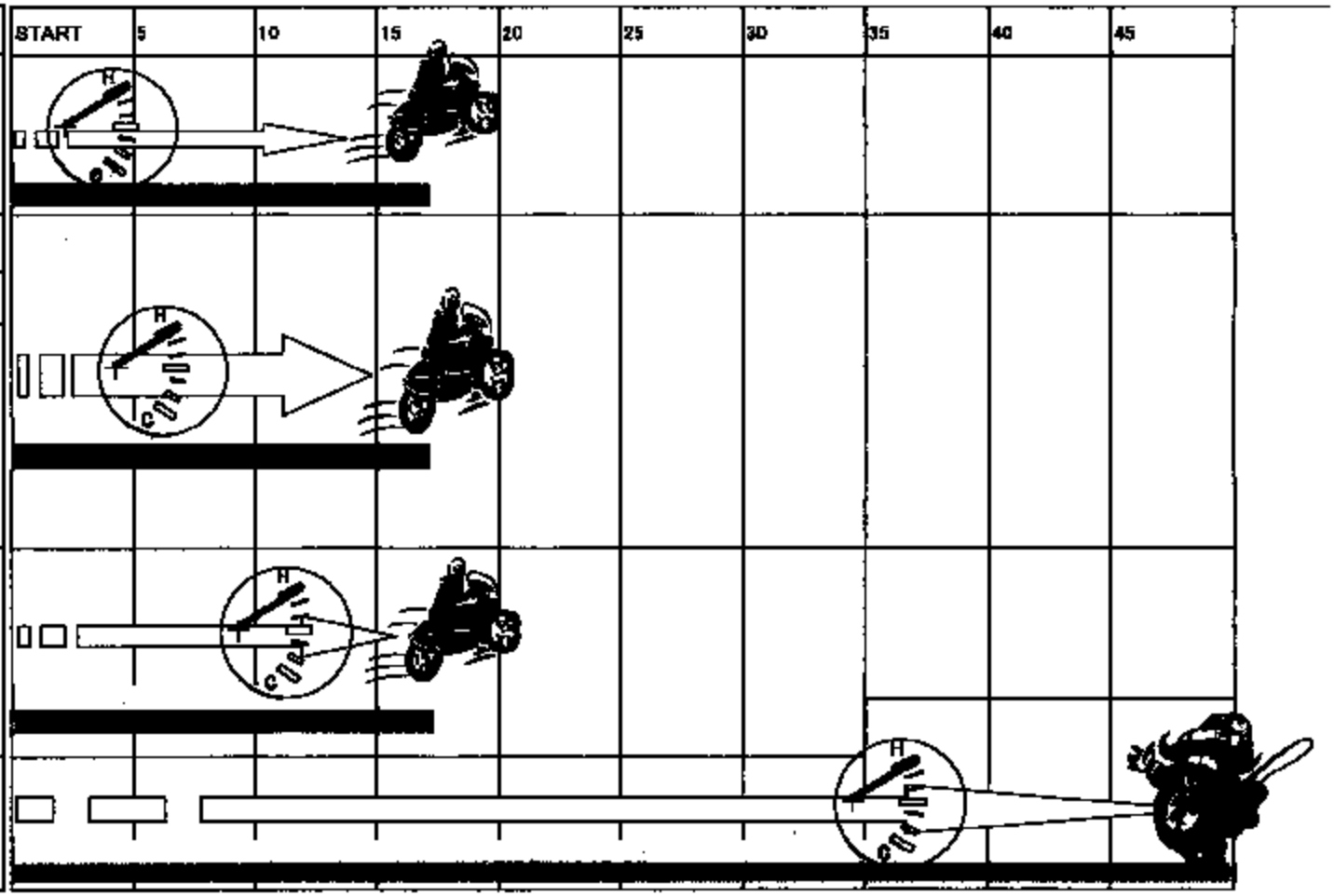
The vehicle which incorporated the A/S Action Plan -① had more than 30 minutes until the temperature gauge reached the red zone; therefore, the plan is judged highly effective in prolonging life.

4-2. Results of Tests Conducted to Verify A/S Action Plans

GL1800 Temperature Gauge

▪ Time until the temperature gauge reaches the red zone and coolant expulsion occurs

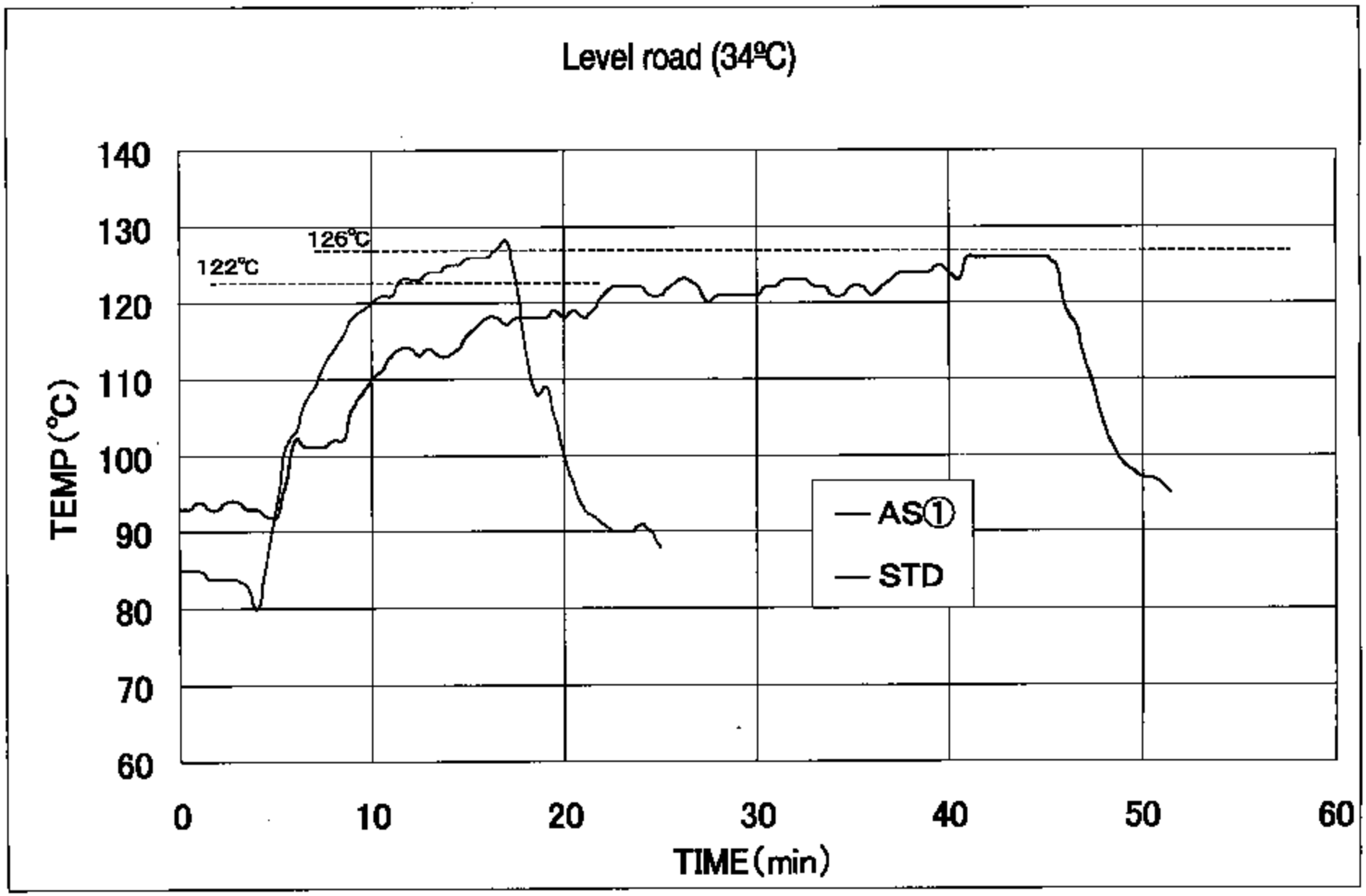
MY	Remedy	Red zone beginning temp.	Time until reaching red zone	Time until coolant expulsion
01	No remedy to temperature gauge indication problem	112°C	4 min	17 min
	Harness added	122°C	6.6 min	17 min
	Harness incorporated	↑	↑	↑
02	Coolant temperature sensor position changed	↑	↑	↑
03	Temperature gauge red zone beginning temperature changed	126°C	11.5 min	↑
A/S Action Plan -①		↑	36 min	Saturated at 126°C



4-3. Results of Tests Conducted to Verify A/S Action Plans

GL1800 Temperature Gauge

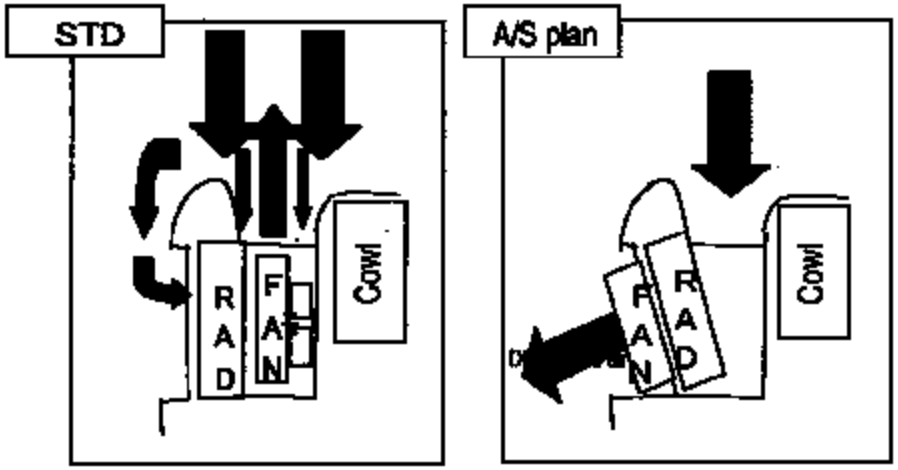
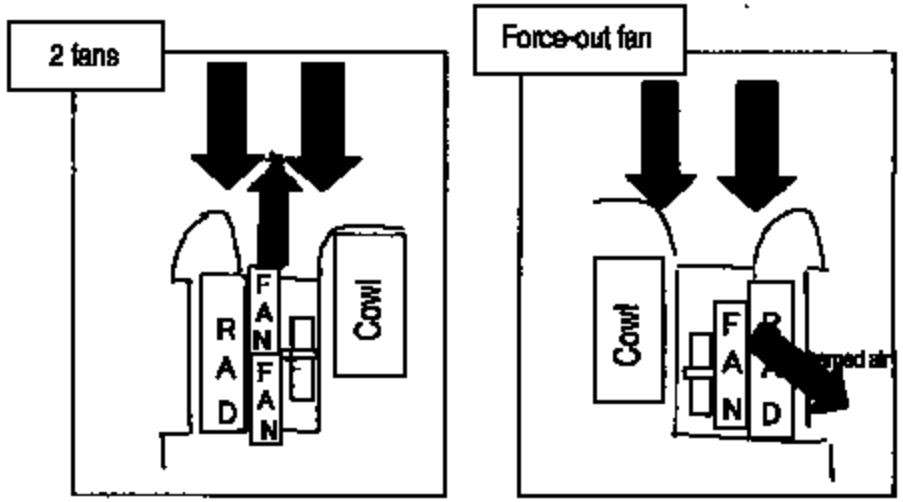
• STD vs. A/S Action Plan -① (Ambient temperature 34ºC)



4-4. Results of Tests Conducted to Verify A/S Action Plans

GL1800 Temperature Gauge

- **Impressions derived from test rides on vehicles which incorporated A/S Action Plan -① and A/S Action Plan -② respectively**

	A/S Action Plan –① : External cooling fan	A/S Action Plan –② : 2 fans on L side, a force-out fan on R side
Overview of action plan	Air is drawn by the fan from outside of the radiator so as to prevent adverse effect of incoming air. 	2 fans on one side, a force-out fan on another side 
Concerns expressed after test rides	• Appearance • Safety of fingers • Impairment in comfort (protection from hot air) for rider/passenger	• Fan noise

5. Outcome of SED Meeting Held at AH GL1800 Temperature Gauge

Conclusion

AH-SVC cannot agree to the A/S Action Plan -① suggested by HGA. However, we accept the concept of the plan that a change should be made from ventilation by forcing air out to ventilation by drawing air in. We request you to make further refinements in the plan with consideration given to AH's concerns expressed as below.

AH's comments on proposed specification

1. According to the results of tests conducted in the US, there is still the possibility that the pointer of temperature gauge might go into the red zone.
2. Protection of rider and passenger from hot air compares poorly with that of the current MCA. MCA carries the advantage of providing great comfort, and the advantage may be spoiled by the proposed action plan. It is imperative that comfort at least equal to that of GL1500 should be secured.
3. The proposed market action will entail higher cost than we think is reasonable.
   (AH-SVC hopes that a problem of this kind will be addressed not by complaint response on a case-by-case basis but by customer notification)
   * With relation to the 2. above, we should add that the vehicles tested in Death Valley showed considerable increase in temperature of plastic parts and the R louver was deformed possibly by heat.

AH-SVC requests that the proposed tentative measure (red zone beginning temperature change to 126ºC) should be introduced promptly to the customers (of 01YM and 02YM) from whom we received complaints.
AH-SVC hopes that you prepare and supply "200 remedial parts for 02YM + 100 each of remedial parts (sub harness with a resistor) and factory-installed remedial parts (harness with a built-in resistor) for 01YM" for this purpose. We will try these remedial parts on the complained customers' vehicles, monitor how it will work out and inform HGA of the results.

We will try remedial parts, which can make 01YM and 02YM comparable in specification to 03YM, on the complained customers' vehicles and monitor how it will wok out. At the same time, we will introduce a remedy in software aspect (e.g. advice to use the 2nd gear) and keep a careful watch on what happens in the market.

Number of parts to be supplied for monitoring purposes

1.01M sub harness-added spec	100
2.01M harness-incorporated sped	100
3.02M	200

HGA will keep working on the refinements in A/S Action Plan in hardware aspect.

• Remedial technique

Model	Application		Destination	Coolant temperature sensor	CSU harness spec	Red zone beginning temperature	Remedial action plan	Technique to execute remedial action plan
	Timing	Applied serial number						
2001 (MCA4)	~19/NOV/00		A, ED	Temperature of trapped air	Sub harness with a 2.7Ω resistor is added	122°C	Change the red zone beginning temperature to 105°C	
	20/NOV/00~		A, ED	↑	Pairing harness has a 2.7Ω resistor built-in	↑		
2002 (MCAF)	25/MAY/01~		A, ED		———	↑		
	??~		K		Sub harness with a 1.2Ω resistor is added	125°C	———	———
	??/OCT/01~		K		Pairing harness has a 1.2Ω resistor built-in	125°C		
2003 (MCAH)	??/APR/02~		A, ED K		———	125°C	———	———

Note 1: Because the temperature of trapped air is measured, adjustment to the proposed setting may result in a wide variation in temperature gauge indication. Assurance cannot be given to indication accuracy of temperature gauge. Set temperature should be raised to the maximum limit which, if exceeded, results in coolant expulsion, but this is practical impossibility.

Note 2: Resistance value needs re-verification. MCAH development needs to incorporate certain measures to ensure consistency of the temperature detected by sensor with the actual coolant temperature.

- Cost and labor hour

  Sub harness cost : ¥ 1,000
  Time required for replacement : 0.75 hours

- Time required for preparation

  Test to determine the resistance value : 1 week

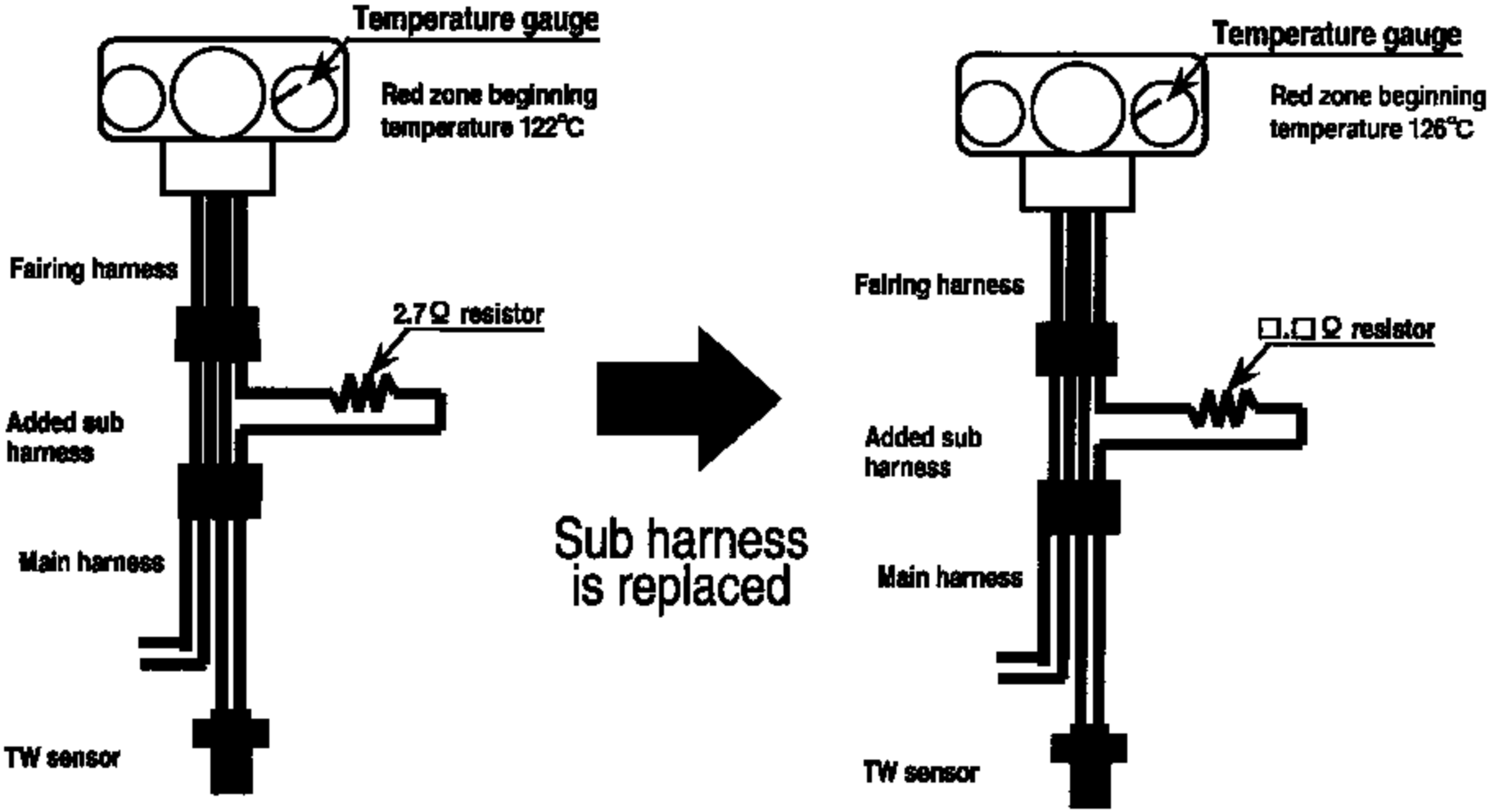
  ※ Because the temperature gauge (coolant temperature sensor) of MCAA measures the temperature of trapped air, it is necessary to verify the resistance value after assembling the sub harness to actual vehicle.

  Manufacture of parts : 1.5 weeks at the shortest

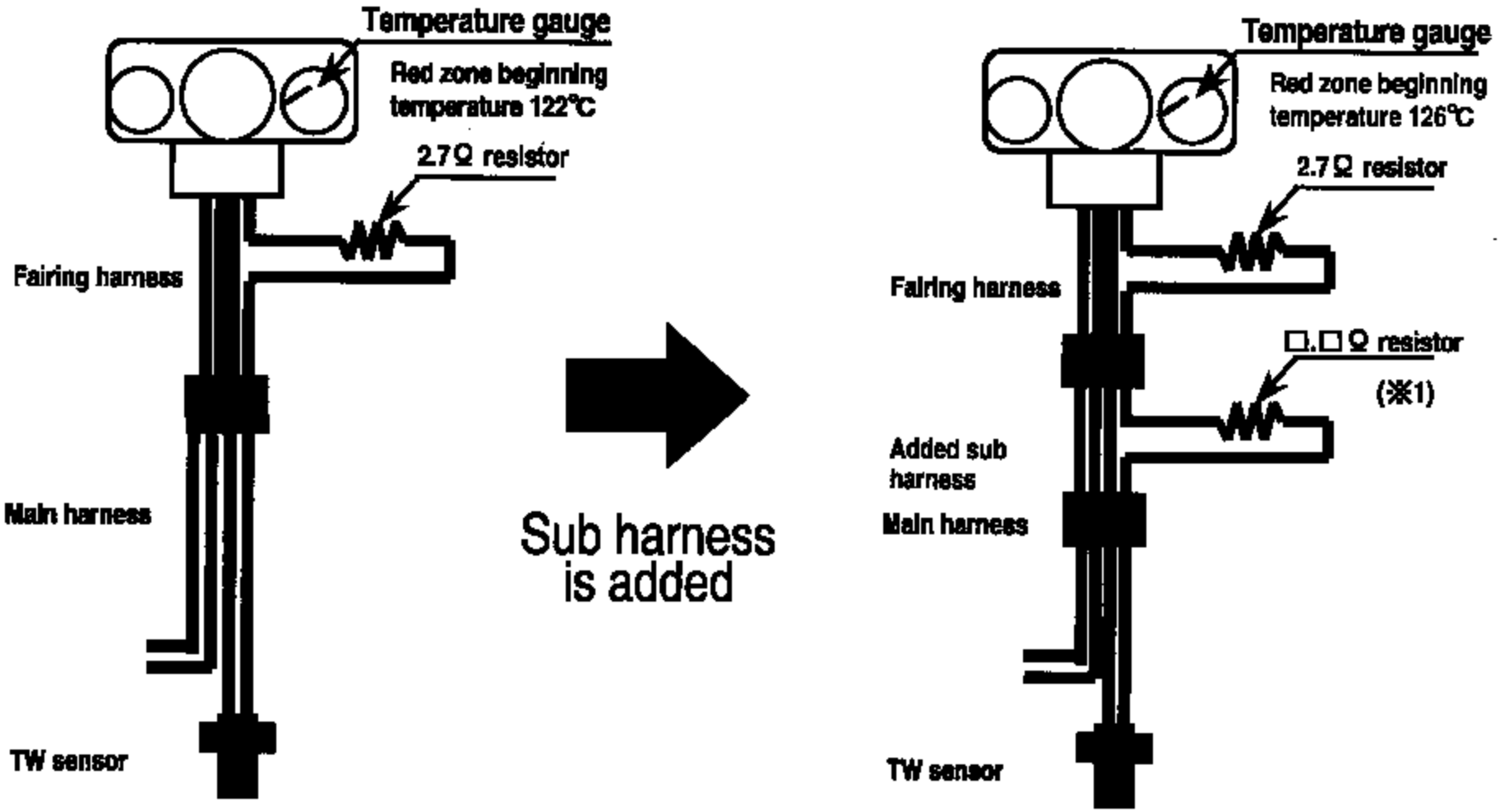
  ※ Adjustment with the supplier is required as to the time period.

  For MCAA, the entire prototype build is stopped and manufacture is done on holidays.
  As to resistor, HGA will research availability in Akihabara.

【A】 For '01YM, from the beginning

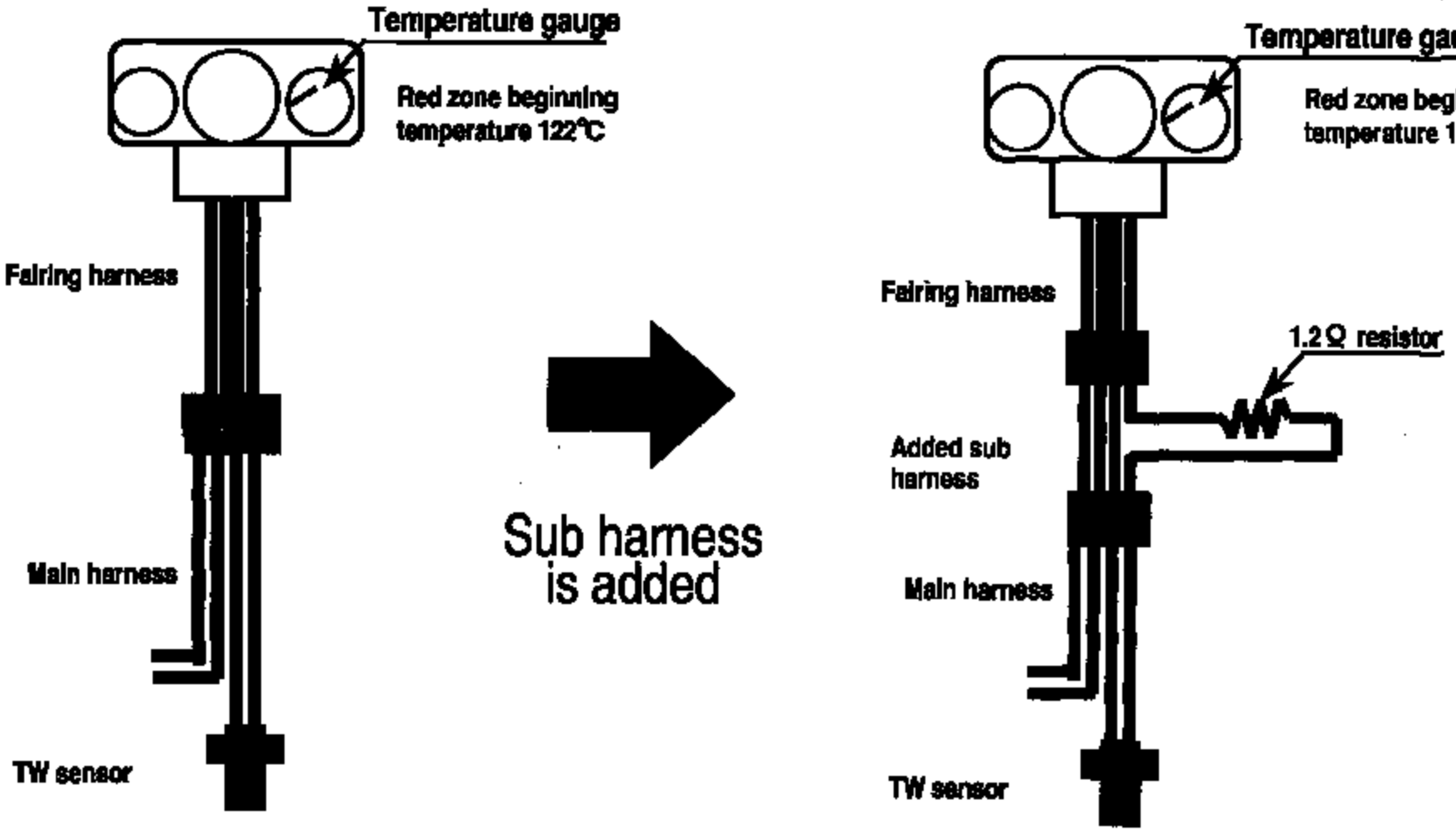


【B】 For '01YM, from the middle



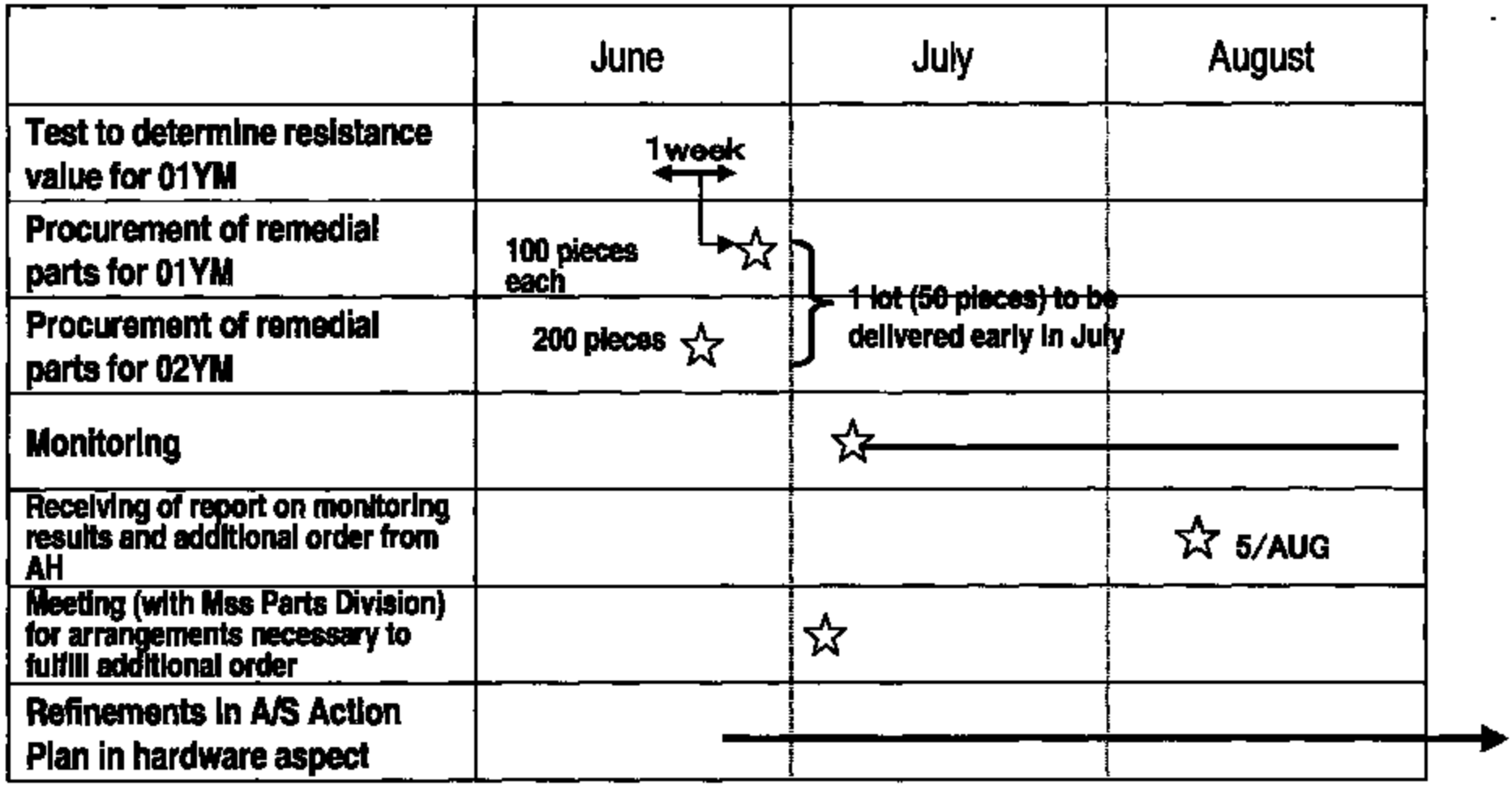
※1 : □.□=○.○−2.7[Ω]

【C】 For '02YM


Temperature gauge
Red zone beginning temperature 122℃
Fairing harness
Main harness
TW sensor
Sub harness is added
Temperature gauge
Red zone beginning temperature 126℃
Fairing harness
1.2Ω resistor
Added sub harness
Main harness
TW sensor

8. Future Activity Schedule

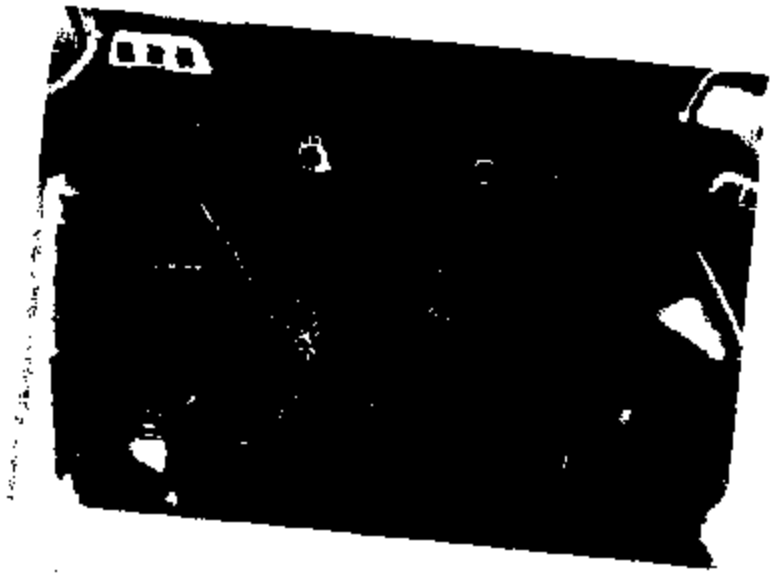
GL1800 Temperature Gauge



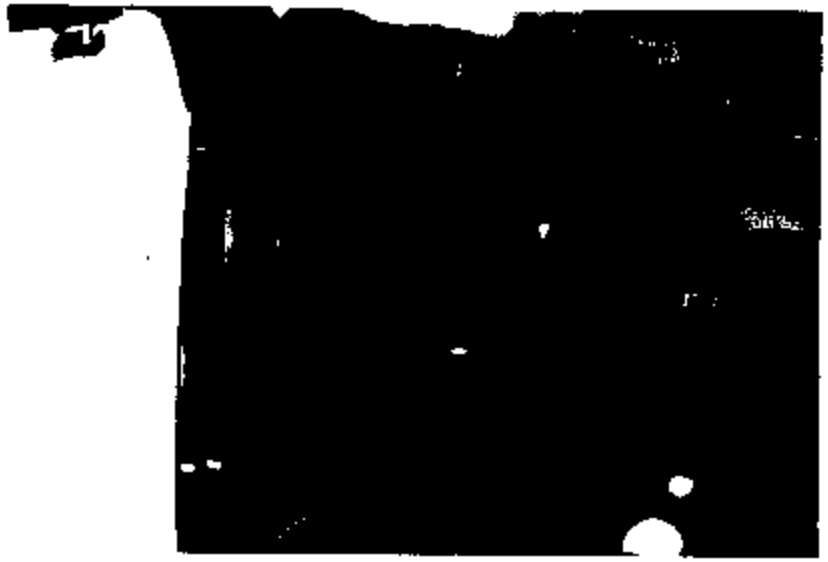
Procurement of parts for monitoring	HGA
Cost of 400 parts for monitoring	Joint Analysis Office
Cost of replacement with parts for monitoring	AH Service

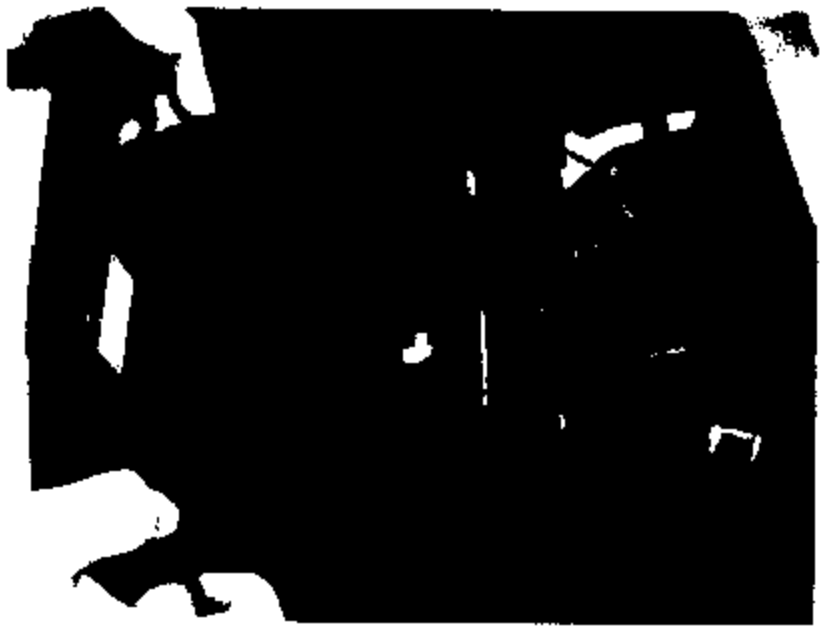
【Reference】

Procedures for Replacing Sub Harness for Adjusting Readings on Temperature Gauge of MCA



① Remove the LH pocket





Open the LH pocket.

With a small-tip screwdriver, push in the center of the speed nut (at four locations).

※ Remove the nuts and put them in the pocket so that they won't be lost.

Remove the pocket.

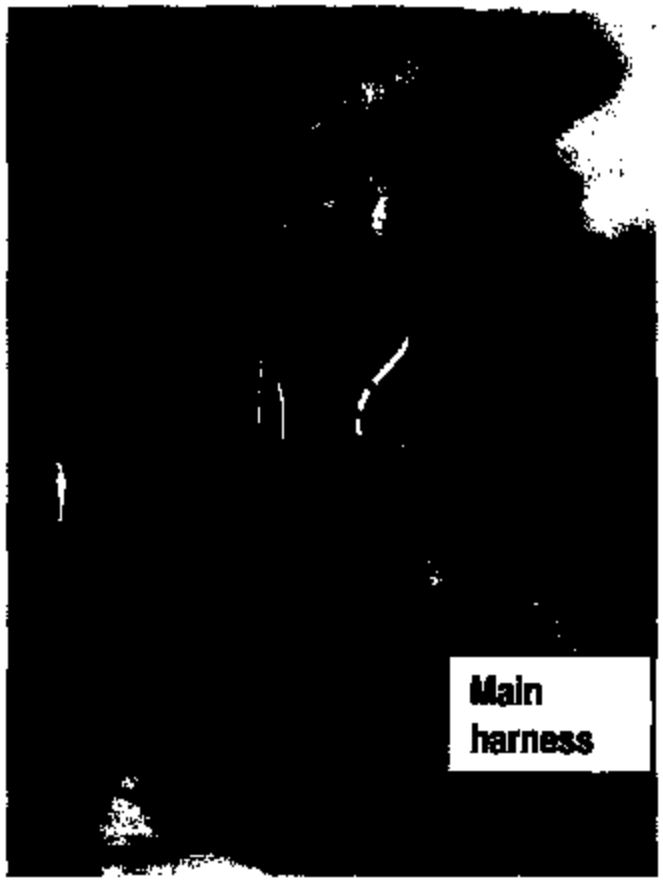
② Remove the connector holder

Loosen the two white screw holders of the connector holder.

※ When loosening the screw holder on the far side, turn it by pushing with the index finger.

Pull out the connector holder.

③ Disconnect the connector



Disconnect the blue connector from the connector holder.

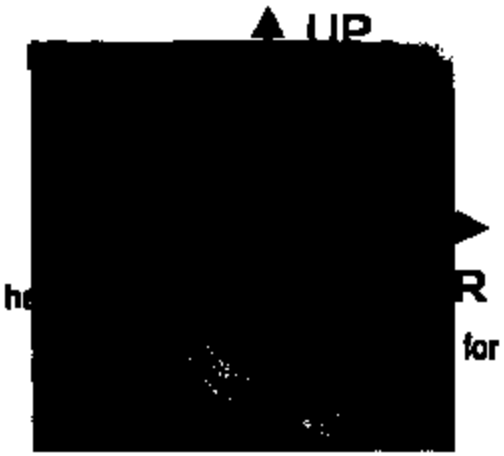
(As shown in the left photo, push the blue connector from behind it with your index fingers while holding the connector holder with its main harness side toward you.)

Disconnect the main harness side connector by pushing its lock (shown by an arrow).

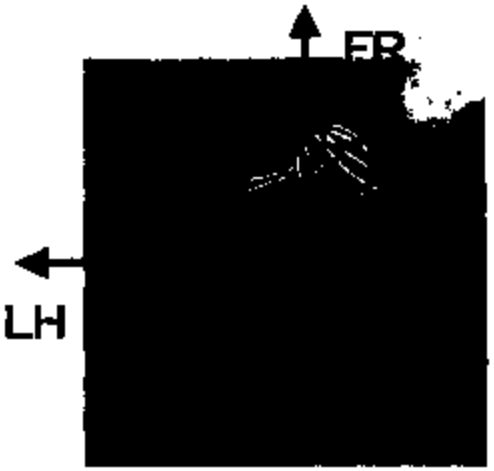
④ Install the sub harness

Connect the sub harness for adjusting temperature gauge readings between the front sub harness and the blue main harness connector.

As shown in the left and following photos, set the connectors in the connector holder.



VIEW Z

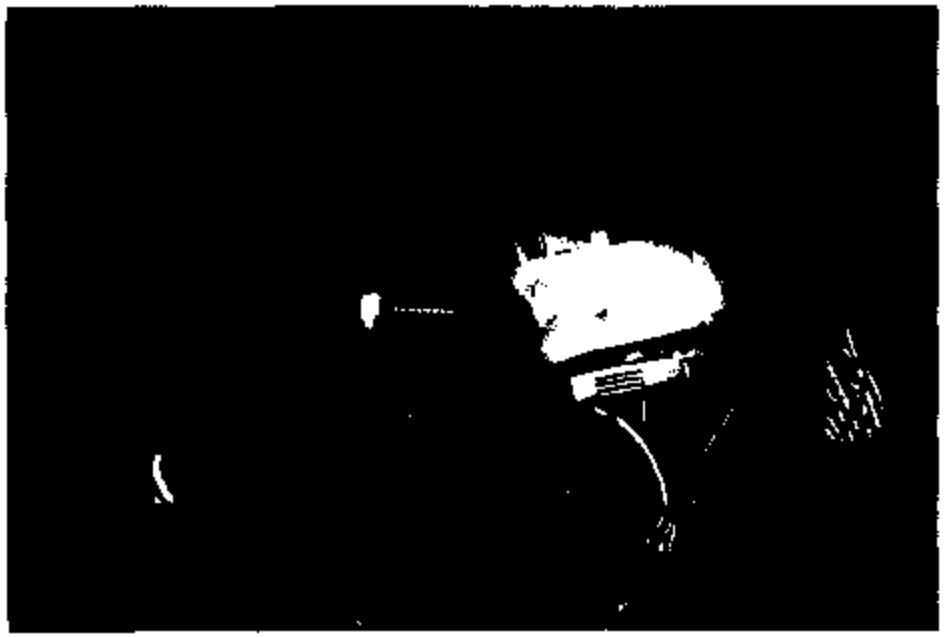


VIEW Y

⑤ Reinstall the connector holder

Remove the harness clip from the main harness (which is just this side of the connector holder) by unwinding the tape round it.

※ You don't necessarily have to secure the connector holder with the locating clip on the A/C stay.



Return the connector holder in the cowl and set in its original position.

※ Thread in the connector holder clamping screw to the extent that half the thread length is exposed.

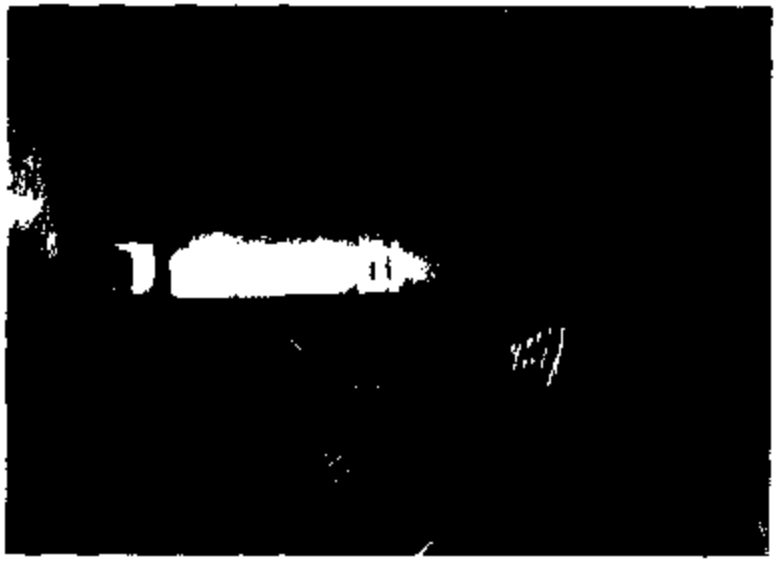
↓

Put the connector holder back into the cowl.

↓

Tighten the connector holder clamping screw securely.

⑥ Restore to the original condition



Reinstall the pocket.

After reinstalling the connector holder, restore the wiring to its original condition.

To install the speed nut, push up the center, set the nut into place and push in the center.

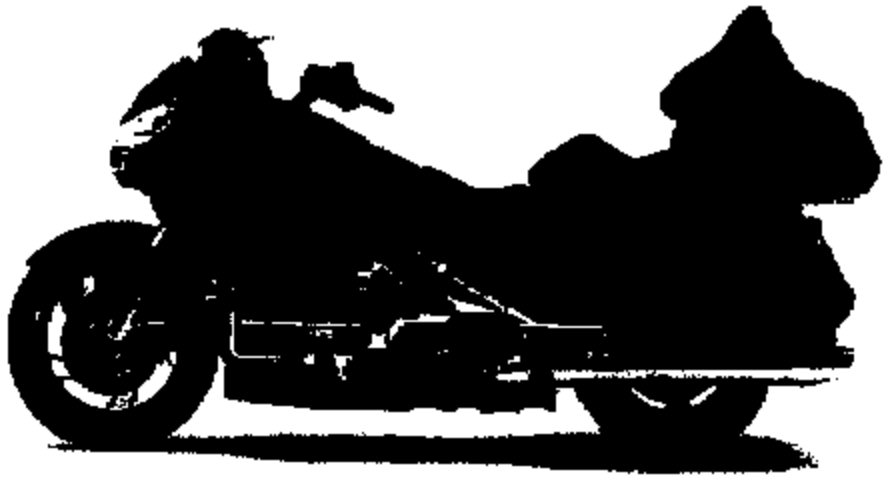
Start the engine and make sure the temperature gauge works properly, then the work is over.

GLX1800(MCA)

水温高い(91KR) Q2報告

24／JUN 2002

1. 市場情報分析
2. 各モデル、仕様別一覧
3. A/S案対応案
4. A／S案テスト結果
5. 現地SEDMeeting結果
6. 市場対応
7. 対応手法
8. 今後の展開計画



1－1. 市場情報分析

GL1800水温計

	01YM	02YM
客相の苦情	42件	21件

	吹いた件数
01M	3件

渋滞	56件

水温計の指示が"高温を示す""R／Zに入る"事で不安に感じているお客様が大半である。

情報内容が明確な件数

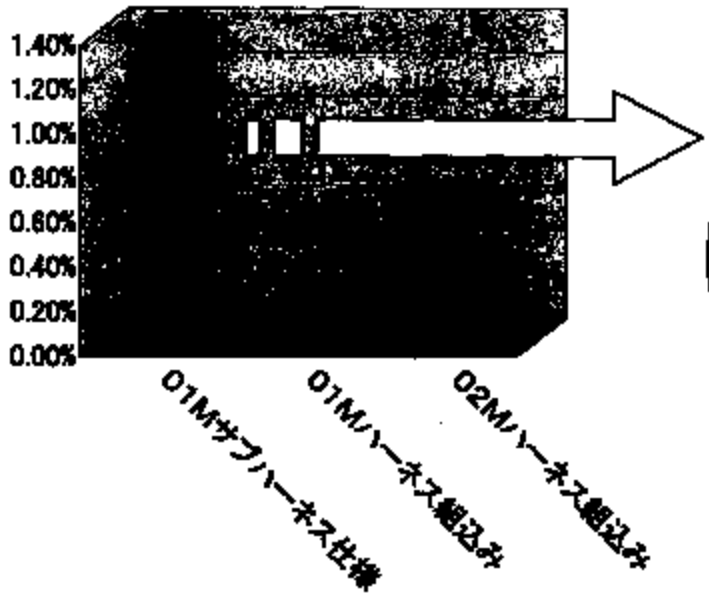
	01YM	02YM
テックライン	45件	17件

必要な情報が的確に得難い為

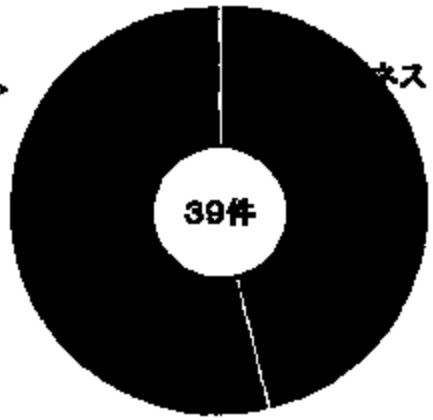
今後の訴えに対しての調査として

問診票を作成しAHへTossする

仕様別コンプレーン発生率



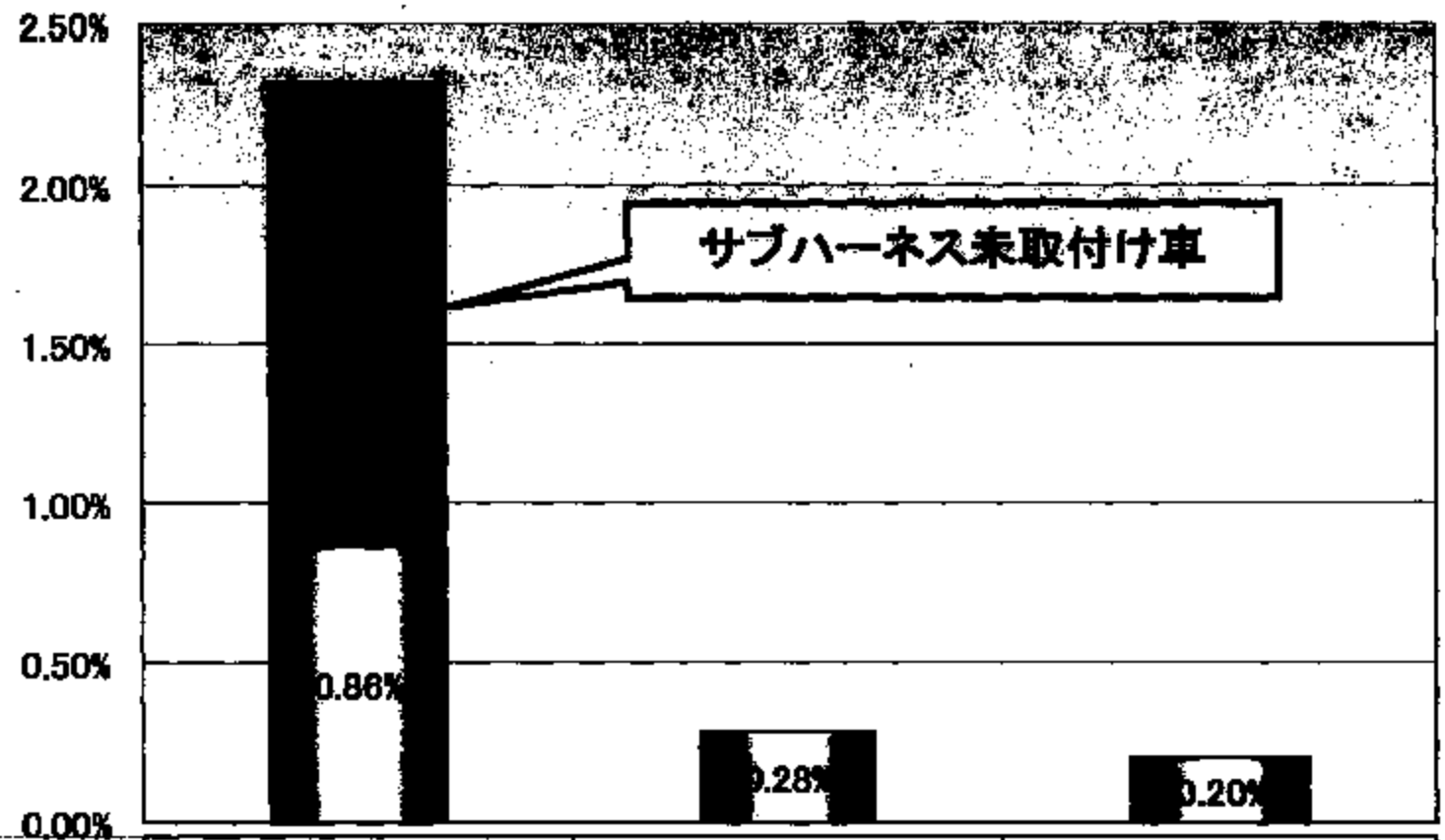
訴え後サブハーネス発送



01YM初号機よりサブハーネスで抵抗追加仕様を適用し、ウエアハウス、ディーラーで改修実施しているがディーラーでのPDIが確実に行われたか疑問が残る。

1－2. 市場情報分析　　GL1800水温計

発生率

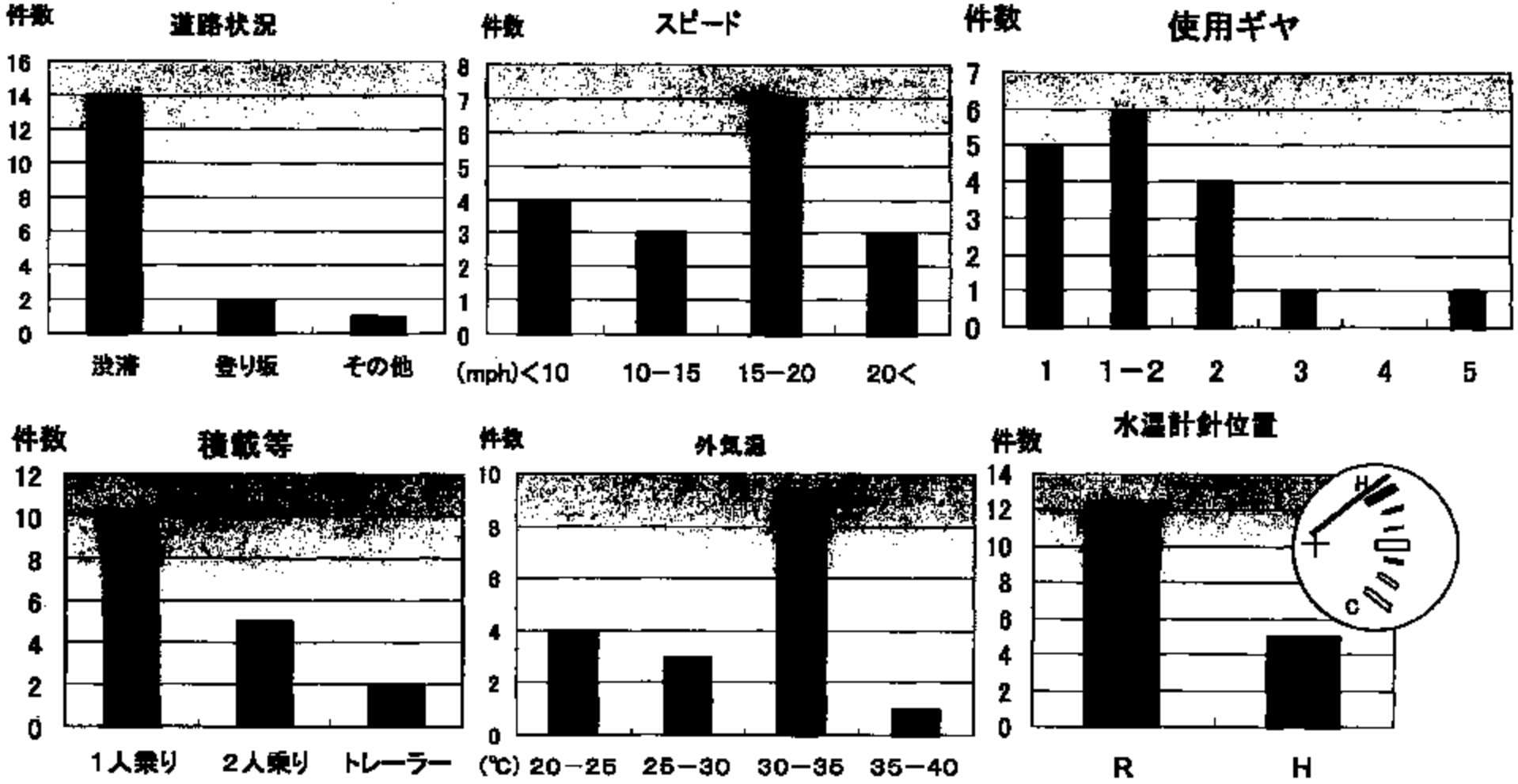


		01YM サブハーネス仕様	01YM ハーネス組込仕様	02YM TWセンサー対策仕様
販売台数		2800	6032	8548
件数	取付け済	24	17	17
	未取付け	41	—	—
発生率	取付け済	0.86%	0.28%	0.20%
	未取付け	1.46%	—	—

1－3. 市場情報分析　　GL1800水温計

発生状況分析結果、現在把握している再現モードとほぼ一致している。

但し、使用ギヤについては2速の使用頻度も高い事が解った。



2. 各モデル、仕様別一覧

GL1800水温計

	モデル	温度センサー	仕向	仕様 変更内容	仕様 メータ設定	適用	販売台数	打ち上げ件数 R/Zゾーン	打ち上げ件数 水槽走
								17件	
4	02仕様 MCAF	水温	K	暫定対応 1.2Ω抵抗付き サブハーネス追加	126℃設定	2001.7月生産分		0件	0件
5				ファイアリングハーネスに 1.2Ω抵抗を内臓	126℃設定	2001.10月以降生産分			
6	03仕様 MCAH	水温	K/A ED	メータ	126℃設定				
7	04仕様	水温	K/A ED	メータ	126℃設定				
8	05仕様	水温	K/A ED	大幅L/O変更					

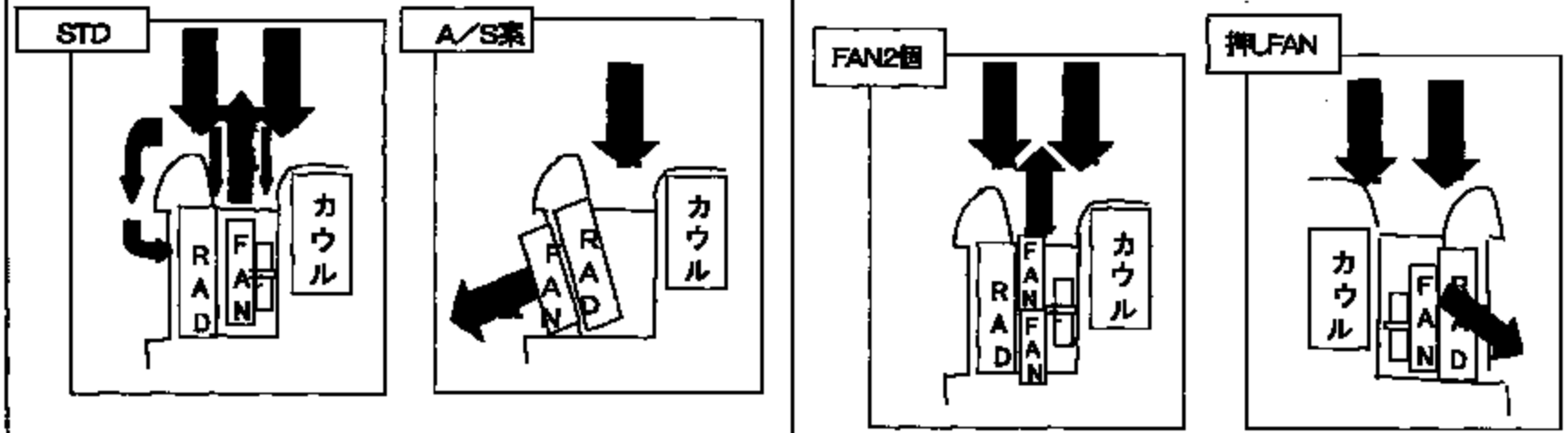
3－1. A／S対応案　　GL1800水温計

		冷却性能				ファン騒音	外観影響	熱居住性	補機類耐熱	その他
		アイドル	低速走行		高速走行					
			延命効果	水沸き						
1	量産仕様	○	×	×	○	○ 63dB	○	○	○	
2	ファンCUT速度変更	○	×	×	○	○	○	○	○	
3	↑＋ファン逆転	×	×	×	○	×	○	×	○	
4	シュラウド無し	○	○	×	×	○	○	×	×	
5	じゃま板	○	○	×	×	○	×	○	○	
	じゃま板 ＋FAN能力UP	○	○	×	○	○	○	○	○	
7	引きファン×1　押し ファン×1	×	○	×	○	×	○	×	○	
			②	○						
9	押しファン×2	×	○	×	○	× 69dB	○	×	○	
			①	○						
8	05モデルL/O (ファン外付け)	○	○	○ 117℃ サチレート	○	○ 61dB	×	○	○	

■US持ちこみAS案

A/S対策案の概要

	A／S対策案－① ： 冷却ファン外配置	A／S対策案－② ： L側FAN2個／R側押しFAN
対策概要	ラジエターの外側からファンで風を引っ張り、 走行風の悪影響を防ぐ	片側FAN2個 片側のみ押しファンにする



3－3. A／S対応案 コスト　　GL1800水温計

条件

・現行部品はUS現調であるが、A／S部品は日本作成および出し前提とする。
・部品コスト算出条件：台数は100台を目安とし、メーカー概算＋HGA試作前提コストにて計算する。
・日程については、試作品納期日程とし、量産し日程とする。（10台／day）
・工賃については、パーツリスト工数表を参考に US工賃（60$／hr）で算出する。

A/S対応案①	担当	作り	コスト	備考	物だし日程	工賃
・FANシュラウド(R/L)	1S	新規試作	¥24,000	追加工では、精度/数出し 困難	・L/O, 作図手配 含めて 30日	・RAD ASSY交換 ・ホース交換 ・LOUMER交換+R/L =4. 0hr＊50／hr 200$
・FANモーター(R/L)	8S	MCA改	¥48,000	MCA量産品を USから取り寄せ 新規ステー部分試作対応で取りつけ改修		
・FANモーターステー(R/L)	1S					
・RAD(シュラウド取り付けステー)	1S					
・金網(R/L)	1S	新規試作	¥3,000	市販の金網をカット		
・ルーバー(R/L)	1S	量産品カット	¥10,000	カット／ボス 追加		
・R側 RAD出口ホースCUT	1S	量産品カット	¥0	現物カット		
・車速センサー無し(有りでOK)	8S		¥0	なしにするには＋$152(Fユニット)		
・居住性対応ゴム板設置	1S	新規	¥3,000	ゴム平板 カット		
・水温計指度126℃(据付)	8S		¥950	0.75h		
TOTAL			¥88,950			
A/S対応案②						
・FANモーター(R/L)	8S	MCA改	¥100,000	USメーカーにて ピッチ違い新作し JPNにて ステー新作/モーター/FIN組換え	・L/O, 作図手配 含めて 45日	・RAD ASSY交換 ・R/L+ENGラバー交換 =6. 0hr＊50／hr 300$
・FANモーターステー(片側)	1S					
・FAN羽根(片側M88)+RAD	1S					
・RADフィンピッチ(2.75→3.5)	1S					
・1. 8キャップ	1S	他機種流用	¥3,000	NT7G(CR)流用		
・ゴム類をO3YMの耐熱仕様に変更	1SFRA／ENG		¥123,03	量産流用であるが、工賃大		
・水温計指度126℃(据付)	8S		¥950	0.75h		
TOTAL			¥104,073			

4－1. AS案テスト結果

GL1800水温計

・USテスト結果

			外気	STD		03仕様	AS－①		AS－②	
				R/Zに入る時間	水漏き 有無	R/Zに入る時間	R/Zに入る時間	水漏き 有無	R/Zに入る時間	水漏き 有無
車両標準状態	平坦路		34℃	6. 5分	×	11. 5分	36分	○	－	－
			43℃	6. 5分	×	8. 5分	15分	○	17分	×
		向い風	47℃	5分	×	6分	1レンジ前	○	28分	×
		追い風	48℃	3分	×	3. 5分	6. 5分	×	5. 5分	×
	登坂路	～1(3%～5%) 追い風	40℃	5分	×	8分	18分	×	11分	×
		～2(5%～8%) 向い風	36℃	9分	×	12分	26分	○	－	－
トレーラー牽引	平坦路	(2名+95Kg)	41℃	－	－	－	11. 5分	×	－	－

4－2. AS案テスト結果

GL1800水温計

・結果まとめ

＊現地テスト結果を含む延命効果大の①案をＡＳとして推奨する

1）外気３４℃条件下での延命効果は大。
2）酷暑条件下（３５℃以上）での延命効果もＳＴＤに比べ２倍以上有る
3）登坂／追い風についても、ＳＴＤに比べ２倍以上有る

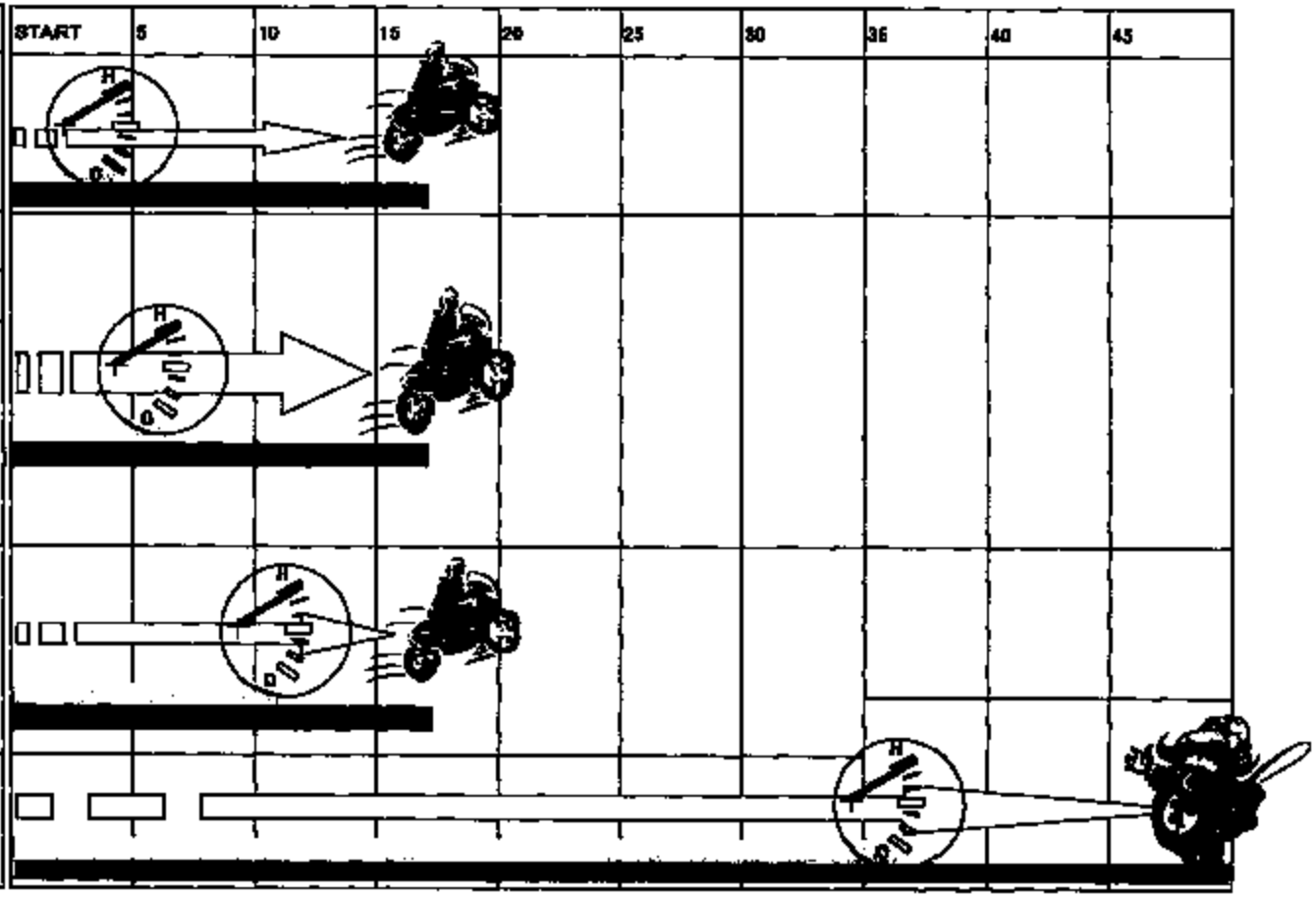
4）ＡＳ案の妥当性
ＨＲＡのＵＳ調査結果（ロス周辺）では、
Ⅰ、渋滞時間は長くても３０分（日々の自然渋滞）
Ⅱ、パレードは約３０分程度（Americade）
Ⅲ、外気は３０℃～３５℃MAX
Ⅳ、トレーラー牽引状態でも延命効果有り
（ＳＴＤトレーラー牽引と比較していないがＳＴＤ牽引無しよりタフネスは有る）

……以上の事から、今回のＡＳ①はＲ／Ｚに入る時間が３０分以上であり
延命効果大と判断する。

4－2. AS案テスト結果　GL1800水温計

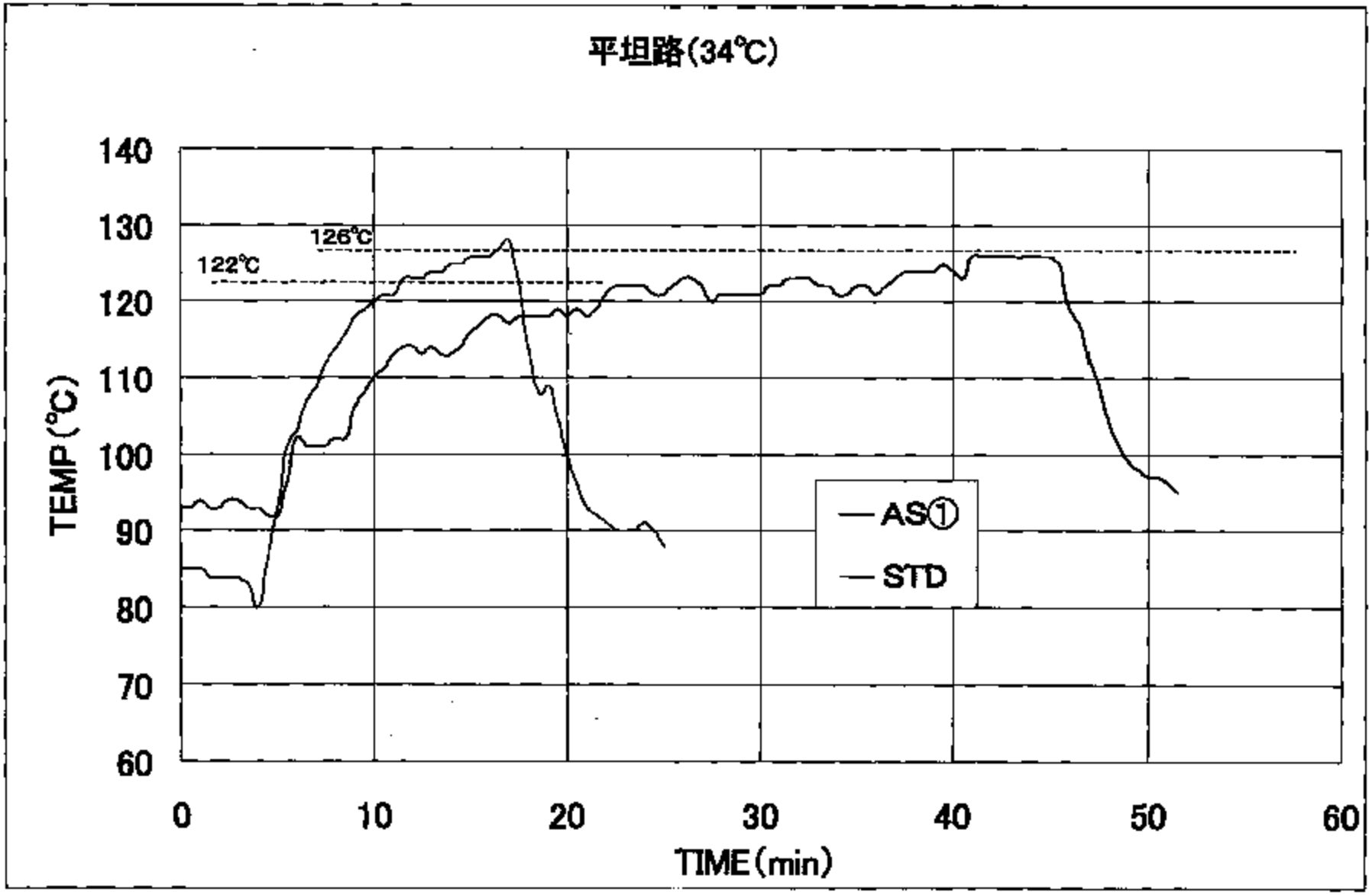
・R／Z入り口及び水沸きに至る時間

年式	対応内容	R／Z入口	R／Zまでの時間	水沸き
01	水温計指示未対応	112℃	4分	17分
	ハーネス後つけ	122℃	6.5分	17分
	ハーネス組付け	↑	↑	↑
02	ENGエア噛み対応品	↑	↑	↑
03	水温計指示R／Z入口温度設定変更	126℃	11.5分	↑
AS－①		↑	36分	126℃サチュレート



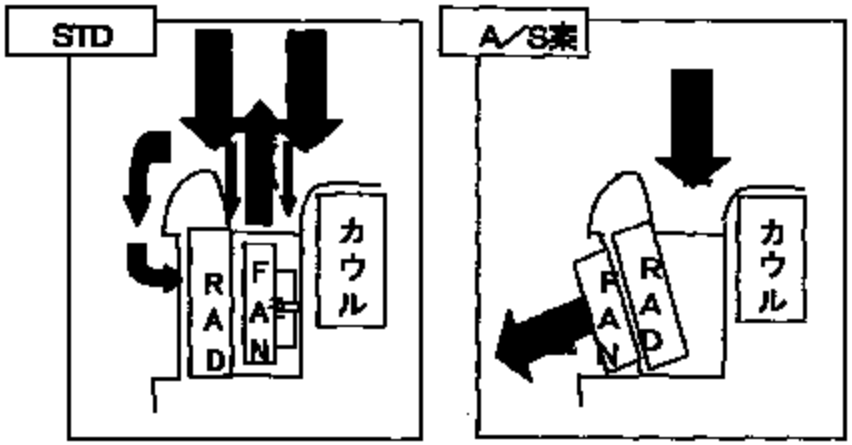
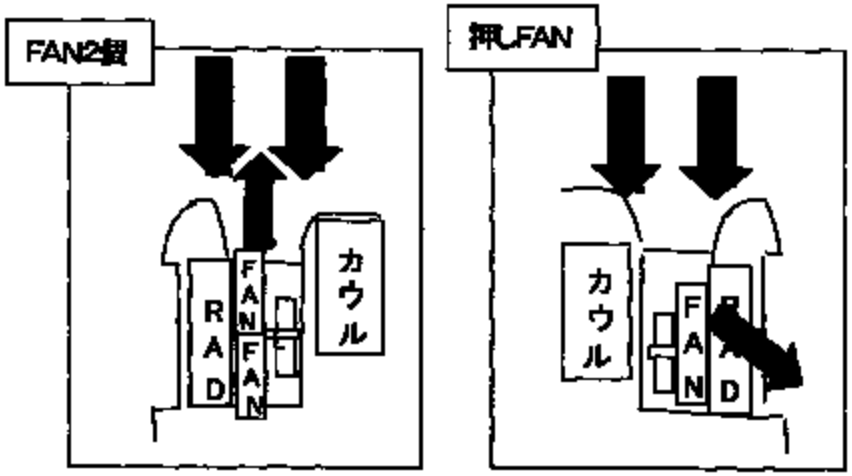
4－3. AS案テスト結果　　GL1800水温計

・STD vs AS①案 （外気34℃）



4－4. AS案テスト結果　　GL1800水温計

・ AS①② 試乗会インプレ

	A／S対策案－① ： 冷却ファン外配置	A／S対策案－② ： L側FAN2個／R側押しFAN
対策概要	ラジエターの外側からファンで風を引っ張り、 走行風の悪影響を防ぐ 	片側FAN2個 片側のみ押しファンにする 
AH試乗会打上げ	・外観 ・指の安全 ・搭乗住性の低下(ライダー／パッセンジャー)	・FAN騒音

5. 現地SEDMeeting結果　GL1800水温計

結論

HGA提示仕様(#1案)でのAS対応に付いてはAH-SVCとして賛同致しかねます。
ただし、案の方向性(押出し送風から吸込み送風へ変更)は正しい方向と思われ、下記AH心配も御考慮の上、熟成をお願いします。

提示仕様へのAHコメント

1. USでのテスト結果に依れば、まだレッドゾーンへ針が突入する可能性は有る。
2. ライダーとパッセンジャーへの熱害に付いては現行MCAに比べ悪化していると考えられ、
   せっかくのMCAでの長所がスポイルされてしまう。
   最低でも旧GL1500同等の快適性を確保願います。
3. 市場措置案のコストがまだ高い。
   (AH-SVCとしてはこの問題は一件対応では無くて顧客に案内した形での措置を希望しています)

* 上記2. と関連しますが樹脂物の温度が相当上がっており、デスバレーテスト実施車のR側ルーバーは熱によると思われる変形が発生していた。

AH-SVCとしては、提案のあった現コンプレーン顧客(01,02YM)への緊急措置(レッドゾーン突入点＝126℃)対応を当座の措置として早急に推進していただく様お願い致します。
SVC希望として、'02顧客対応200個+'01YM対応各100個(抵抗のサブハーネス対応用と工場装着用)を手配願いたいと考えます。既販のコンプレーン顧客に一件対応でお配りし、その結果に付いてはモニターを行い、結果をHGAへ連絡します。

コンプレーンユザーに対し、03モデル同等の仕様を準備し、モニターを実施する。併せてソウト対応を図り(セカンド使用等)市場状況をウォッチングする。

モニター用部品手配数

1. 01モデルサブハーネス仕様	100個
2. 01モデルハーネス仕様	100個
3. 02モデル	200個

但しA／Sハード対応案は継続展開を行なう(HGA)

7－1. 対応手法

•対応手法

モデル	適用		仕向	水温センサー	完成車ハーネス仕様	R／Z入口温度	対策案	対策手法
	適用時期	適用号機						
2001年 (MCAA)	～19/NOV/'00		A, ED	エア温度	2．7Ω抵抗付 サブハーネス追加	122℃	R／Z入口温度を 126℃に変更する	[redacted]
	20/NOV/'00～		A, ED	↑	フェアリングハーネスに 2．7Ω抵抗を内蔵	↑		
2002年 (MCAF)	25/MAY/'01～		A, ED	[redacted]	――――	↑		
	??～		K		1．2Ω抵抗付 サブハーネス追加	126℃	――――	――――
	??/OCT/'01～		K		フェアリングハーネスに 1．2Ω抵抗を内蔵	126℃		
2003年 (MCAH)	??/APR/'02～		A, ED K		――――	126℃	――――	――――

※1 空気温度を測定している為、複合誤差で
水温計の指示のバラツキは大
水温計表示の正確さは保証出来ない
水吹き温度ギリギリまで上げられない

※2 抵抗値は再度検
水温はセンサー部の温度で設定等々
MCAH開発時の不具合対応が必要

•対応コスト

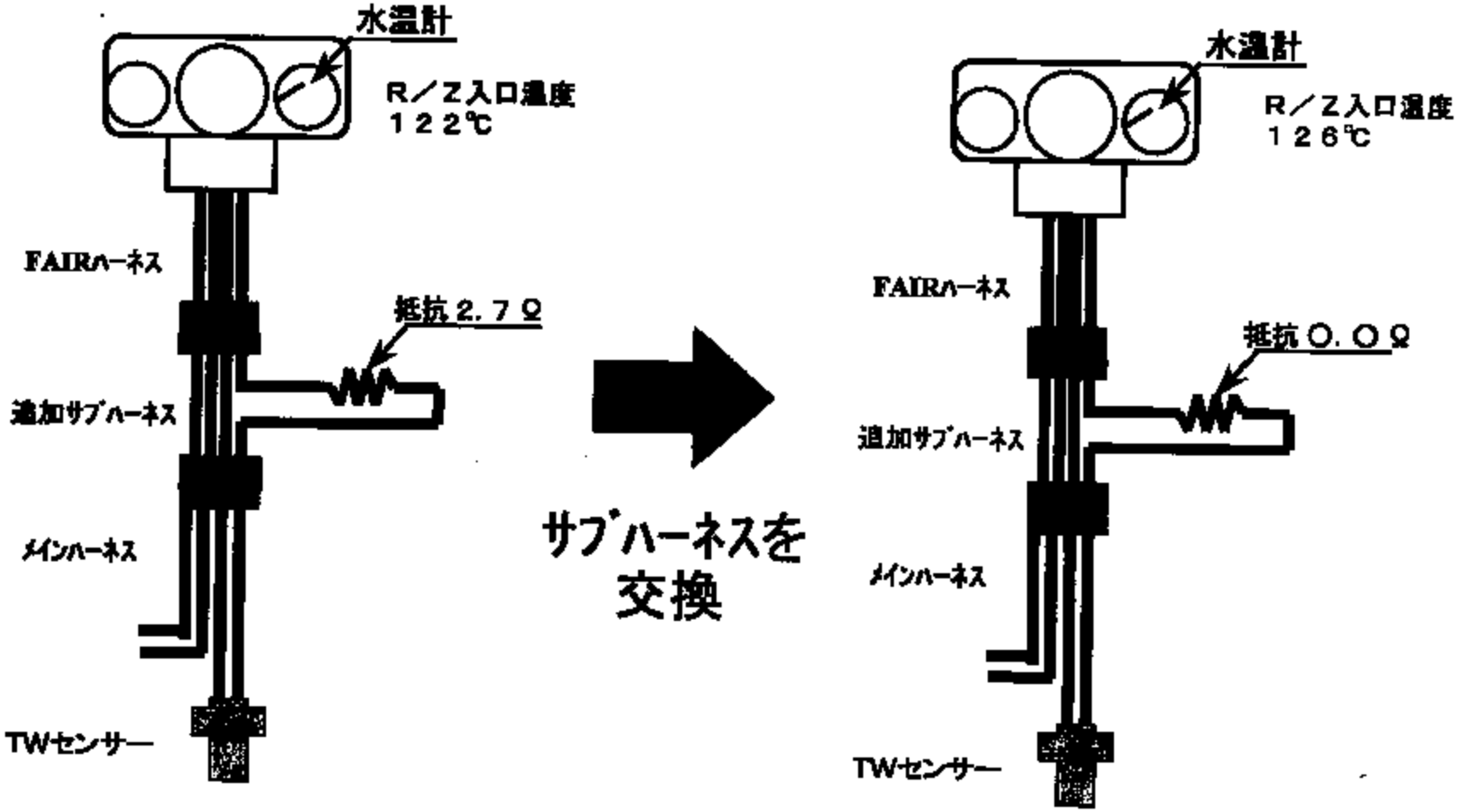
サブハーネスコスト：￥1，000　組替え工数0．75時間

•対応時間

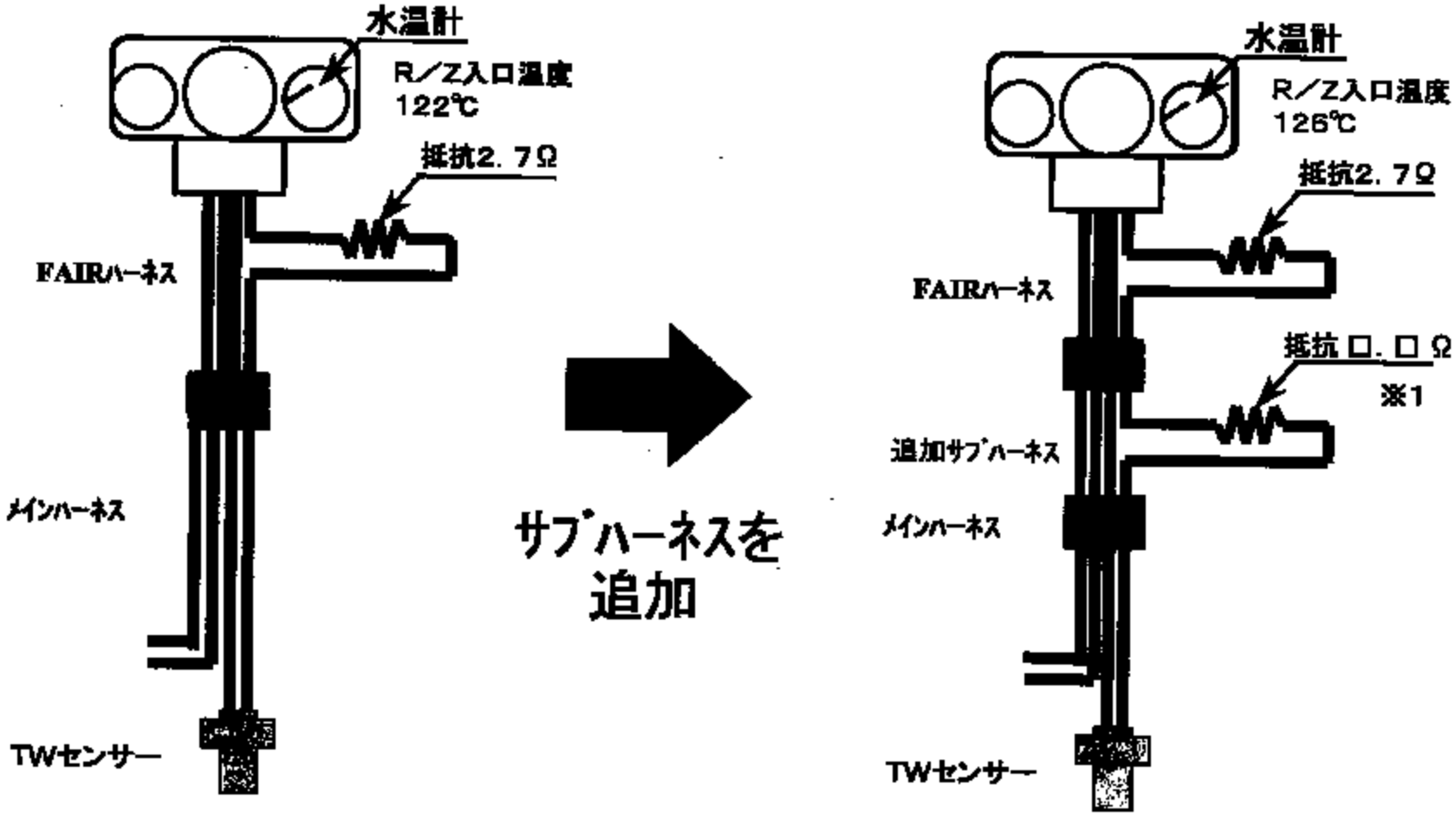
抵抗値仕様決めテスト：1week
※MCAAは空気を測定している為実機にて現合設定＆確認が必要

物製作：　最短　1．5week
※但しメーカー工数調整必要
MCAA時は、全試作をSTOP＆休日稼動＆抵抗はHGAが秋葉原で調

【A】'01初、

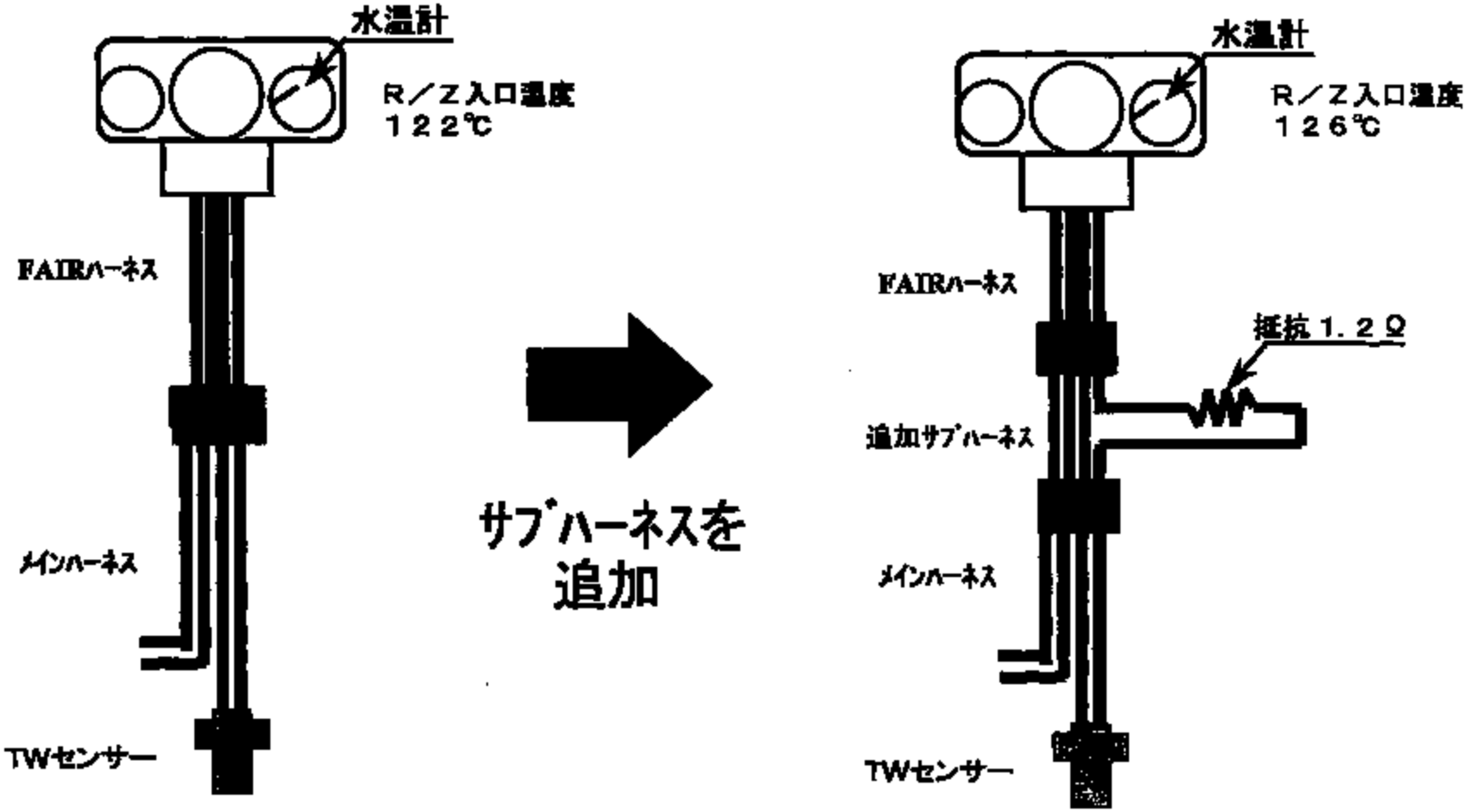

水温計
R／Z入口温度
122℃
FAIRハーネス
抵抗2.7Ω
追加サブハーネス
メインハーネス
TWセンサー
サブハーネスを
交換
水温計
R／Z入口温度
126℃
FAIRハーネス
抵抗0.0Ω
追加サブハーネス
メインハーネス
TWセンサー

【B】‘01途中～、


水温計
R／Z入口温度
122℃
抵抗2. 7Ω
FAIRハーネス
メインハーネス
TWセンサー
サブハーネスを
追加
水温計
R／Z入口温度
126℃
抵抗2. 7Ω
FAIRハーネス
抵抗 □. □ Ω
※1
追加サブハーネス
メインハーネス
TWセンサー

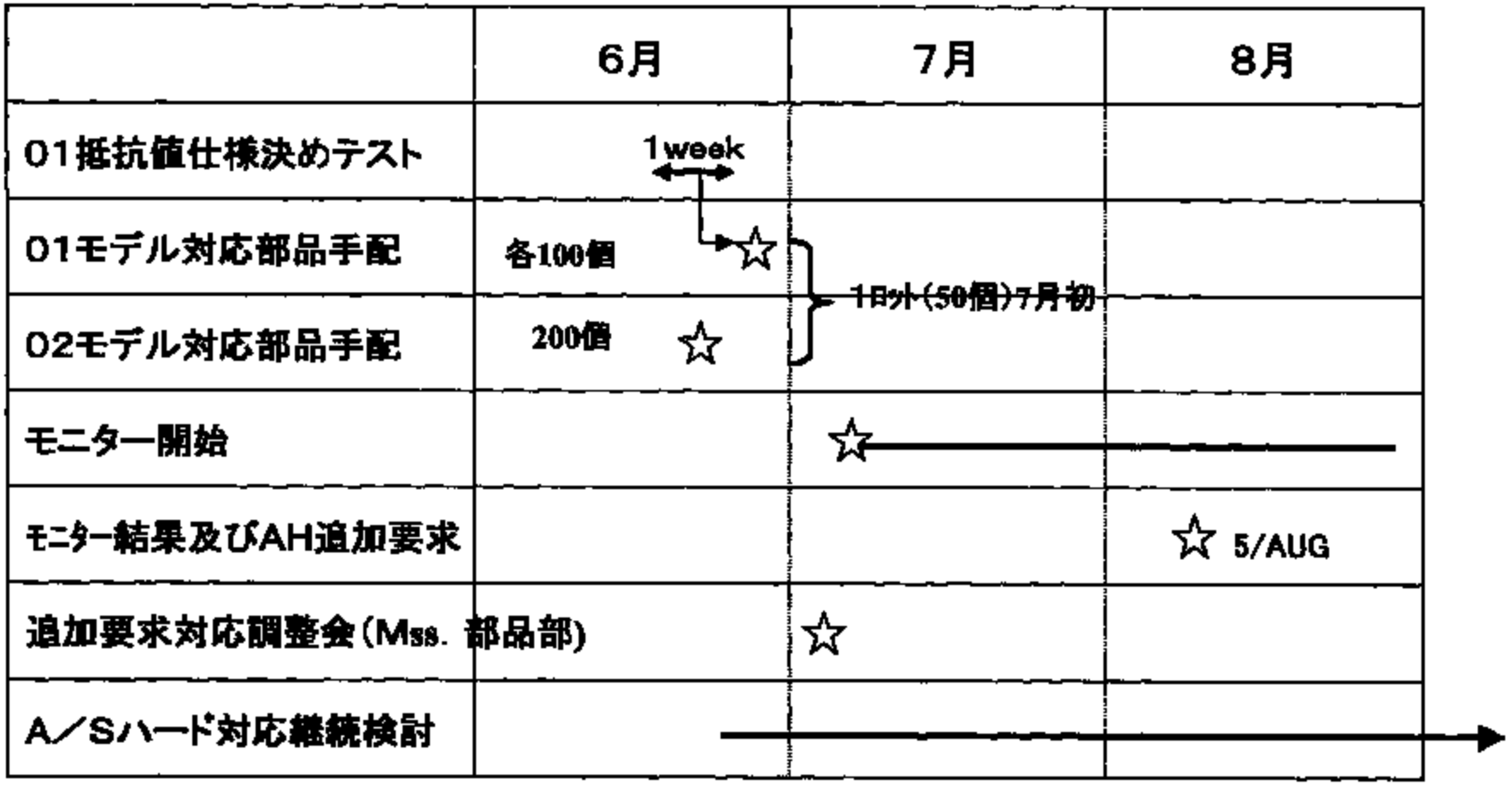
※1 □. □=○. ○−2. 7[Ω]

【C】'02


水温計
R／Z入口温度
122℃
FAIRハーネス
メインハーネス
TWセンサー
サブハーネスを
追加
水温計
R／Z入口温度
126℃
FAIRハーネス
抵抗1.2Ω
追加サブハーネス
メインハーネス
TWセンサー

8. 今後の展開

GL1800水温計



モニター用部品手配　　HGA
モニター用部品代400個　　合同解析室
モニター用部品組換費用　　AHサービス

【ご参考】

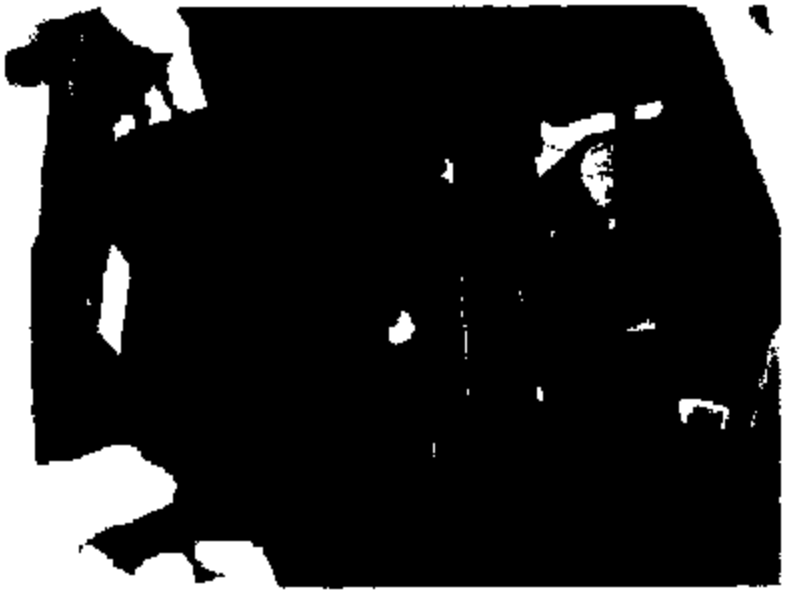
MCA水温計指度調整用
サブハーネス組替え手順

①LH ポケットを外す

LHポケットを開け

小さいﾄﾞﾗｲﾊﾞｰでスピードナット
中心を押し込む（4個所）

※ナットは無くさない様にポケット
内に外して入れておく

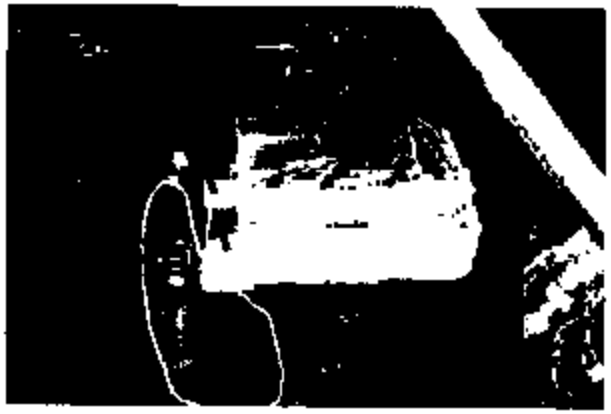


ポケットを取り外す

②コネクターホルダーを外す

コネクターホルダー固定部の
白いビスホルダー前後2本を弛める

※奥のビスホルダーは人差し指で
押し廻す



コネクターホルダーを引っ張り出す

③コネクターを外す

BULEのコネクターをコネクターホルダーから外す

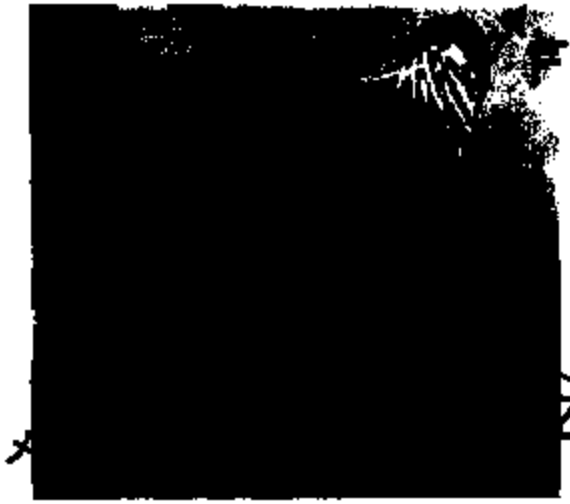
（左写真のように、メインハーネス側を手前にして
ホルダーを押さえながらBLUEのコネクターを
人差し指で手前に押し出す）

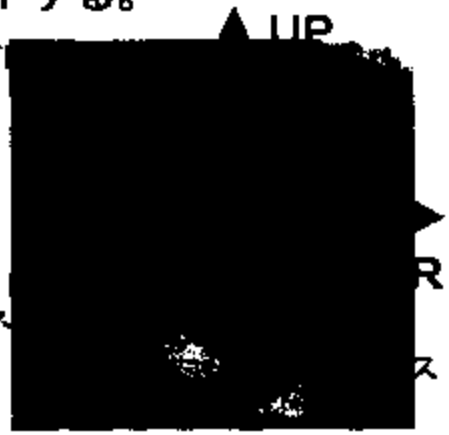
メインハーネス側
コネクターのロック
（左図矢印）を押しながら
メインハーネス側コネクター
を外す

④サブハーネスの取付け

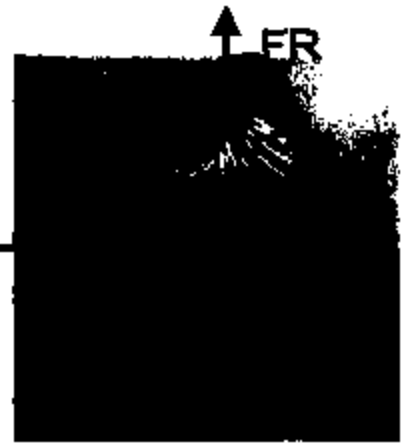
FRサブハーネス～メインハーネスBULEコネクター間に
水温計指度調整用サブハーネスを接続する。

左及び下図のようにコネクターをコネクターホルダーに
セットする。





VIEW Z

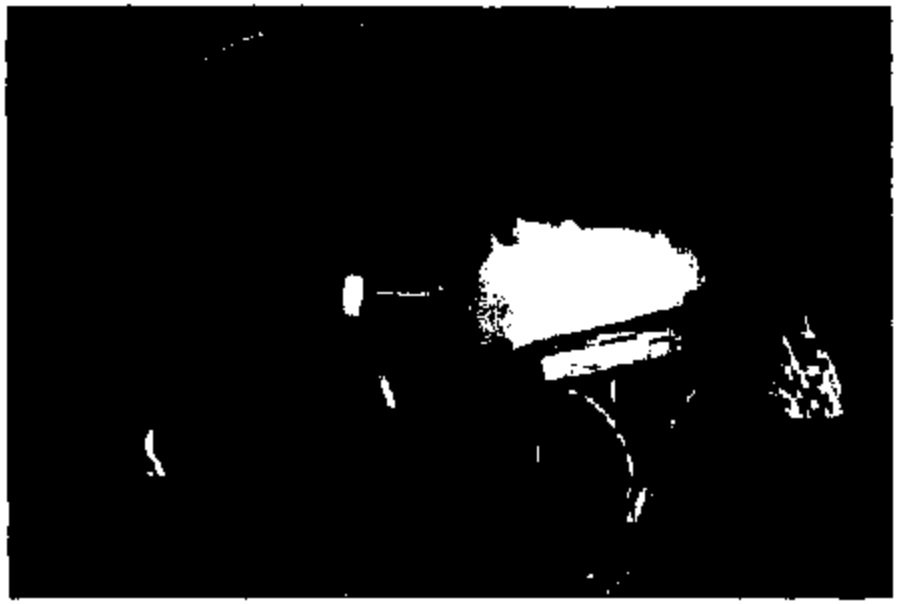


VIEW Y

⑤コネクターホルダーの取付け

コネクターホルダー手前のメインハーネスについている
ハーネスクリップをテーピングを外し、取り外す。

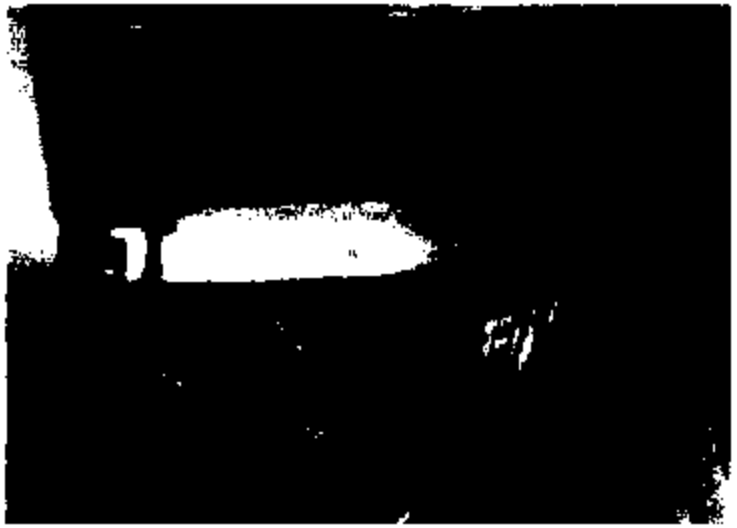
※A／Cステーに元々あった
位置決めクリップ による
固定は無くて可



コネクターホルダーをカウル内に戻し、
元の位置にセットする。

※コネクターホルダー固定ビスの頭を
半分位出しておく
↓
コネクターホルダーをはめ込む。
↓
ホルダー固定ビスを締める

⑥元に戻す



コネクターホルダーをセット後、元通り
ワイヤリングする。

スピードナットは真ん中を持ち上げ
セ

ポケットをセット。

組付け後、ENG始動し水温計が
動作する事を確認してOKなら
完了！！

Event
Name of dept/ person in charge
Completion date

Receipt
H Motorcycle Information Analysis Sc. A. Head
2002/06/08

Information investigation
H Motorcycle Information Analysis Sc. M. Hondo
2002/06/08

Investigation & analysis
H Motorcycle Technical Analysis Sc. K. Honda
2002/06/08

C/M request
H Motorcycle Technical Analysis Sc. K. Honda

Interim response

C/M response

Drawing release

C/M implementation

Completion
H Motorcycle Technical Analysis Sc. K. Honda
2002/06/08

Receipt date
/
98112

Counter-measure Request

TO		Dept.	✓		
		Dept.	✓		

Rank: ☐ Safety

Date	Approved by	Checked by	Prepared by

Type / YM, Make, Model	Title	Reference No.
8047	red zone	MC8008080515180
83 / GL1800A		
Symptom		

Two customers complained that the temperature gauge climbed to the red zone when riding. Dealer checked coolant level in the radiator of a customer's vehicle but there was no lack of coolant.

Response

Response to be submitted to no later than

Results of investigation and analysis

• Title CRS is closed then new CRS (MC8008080) will be opened again. It was judged Amount 6 changed on changed number of CRS.

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Dept.
Countermeasure
Action to be taken on in-use vehicles, stocks of vehicles
Confirmation of effectiveness of C/M
Feedback to existing standards

Countermeasure-applied vehicle numbers

Date	Type / Model code	MY	Destination	Engine	Serial number

Market Quality Information [QIS]

Issuing department: H Motorcycle Information Analysis Sc.

Place of occurrence	
Frame No.	HMF8047A8A000170
Engine No.	1201288
Transmission No.	–
Transmission type	
Customer intended	USA / other
Date of registration	2002/07/31
Date of occurrence	2002/08/07

New part number			
Main part number	87180-MGA		
Symptom code	000	Malfunction	
Cause category			
Responsibility: Department			
Responsibility: Supplier		Code	
Countermeasure category			
Countermeasure code			
Possibility of further occurrence			
Parts for countermeasure			
Review Items	Drawing	Operation Standard	

		Finalized & Issued					
		Finalized & Issued					
		Finalized & Issued					
		Finalized & Issued					
		Finalized & Issued					
0 Issues	2002/08/08 Today	Completed & Issued	Masaaki Matsuura Name				Makoto Honda Name

市場品質情報 [QIS]

発行部門
H二輪合解情報

発生場所	
フレームNo	1HFSC47453A200179
エンジンNo	-2201288
ミッションNo	-
ミッション区分	
走行距離,時間	1209 Mile
受除年月日	2002/07/23
発生年月日	2002/08/01

新部品番号	
主部品番号	37100-MCA
症状コード	012 機能低下・動き悪い・効か
原因区分	仕様
宣伝部 部門	二研
宣伝部 取引先名	(3-1)
対策区分	せず
対策内容コード	4105 対策せず
発生予測	あり(数発)
対策パーツ	無
見直し項目	図面 作業標準

発行	年月日	記事	承認	確認	確認	作成
0	2002/12/24	改訂発行	投稿証明			神谷 升

イベント
担当部門氏名
完成年月日

受付
H二輪合解情報 篠井 明
2002/08/06

情報調査
H二輪合解情報 神谷 升
2002/08/09

調査解析
H二輪合解技術 神田 敏三
2002/08/09

対策要求
H二輪合解技術 神田 敏三
2002/08/09

中間回答

対策回答
H二輪合解技術 西村 淳
2002/12/19

出図

対策実施
西村 淳

完了
H二輪合解技術 神田 敏三

受付月日
/

29117

対策要求

完先	H二輪合解技術	受付 /

重要度
安全性G

年月日		
承認	確認	作成

型式/YM・通称名	件名	推進No
SC47	水温計レッドゾーンを示す	MC20020806184649
03/GL1800A		
発生状況		

お客様は2人のお客様より、走行中水温計がレッドゾーンに入るとの訴えをうけた。DRLは一台の車両を確認したが、クーラントは減っておらず適量入っていた。
(M3M009/2件)

回答

8 月 30 日までに 経由 H二輪合解技術 完回答願います。

調査・解析結果

発生状況
・外気温 : 32℃
・道路状況 : 渋滞路
・使用ギヤ : 1速～2速
・車速 : 15～20mph
・渋滞走行距離 : 1～2mile
上記状況下で水温計がレッドゾーンに入った。

現品返却無し

解析結果

1. 実走行確認結果
走行条件
・使用ギヤ :1速～2速
・車速 :10mphにて、1.5km走行で水温計がレッドゾーンに入り、ユーザーの訴えが再現した。

2. 発生メカニズム
ラジエターの冷却風はサイドから吸気し、前方へ排風する流れとなっており、走行風と排風が相殺し、十分な冷却風が得られず水温が上昇する。

上記結果より、低速走行領域における、冷却性能不足していることが解った。

原因	低速連続走行 15～20mphに置ける冷却性能不足
対策	冷却性能タフネスUP仕様見直し実施中(2002年12月19日現在)
既販車及び在庫車の処置	対策内容が決定次第処置を決定する。
対策効果確認	
直接へのフィードバック	低速走行冷却不足、ユーザーの使われ易ってを考慮した冷却性能見極めを願います。

対策適用号機

年月日	型式	年式	仕様地	区分	号機

月日	回答部門(所内)	承認	確認	作成
12/19	H二輪合解技術			西村 淳

月日	回答部門(所内)	承認	確認	作成
/				

月日	回答部門(所外)	承認	確認	作成
/				

イベント
担当部門氏名
完成年月日
受付
H二輪合解情報
萬井 明
2002/06/05
情報調査
H二輪合解情報
神谷 升
2002/06/09
調査解析
H二輪合解情報
神谷 升
2002/06/06
対策要求
H二輪合解情報
神谷 升
中間回答
対策回答
出 画
対策実施
完 了
H二輪合解情報
神谷 升
2002/06/06

受付月日
/

98112

対策要求

完先		受付 /

重要度
安全性C

年月日		
承認	確認	作成

型式／YM・通称名	件名	推定No
SC47	レッドゾーン	MC20020606153920
G3/GL1800A		
発生状況		

このディーラーは2人のお客様より走行中水温計がレッドゾーンに入るとの訴え。ディーラーは1台の車両を確認したところクーラントは減っておらず適量はいってました。

回答

月　日までに　経由　発回答願います。

調査・解析結果

5月5日の判定会にて当件のGICNo. 変更通知により

当QISはクローズし、新GICNo.『M3M009』で
再度QISを起算して推進する。

月日	回答部門（所内）	承認	確認	作成
/				

月日	回答部門（所内）	承認	確認	作成
/				

月日	回答部門（所外）	承認	確認	作成
/				

原因

対策

既販車及び在庫車の処置

対策適用号機

年月日	型式	年式	生産地	区分	号機

対策効果確認

意見へのフィードバック

市場品質情報
[QIS]

発行部門
H二輪合解情報

発生場所	
フレームNo	IHFSC47453A200179
エンジンNo	-2201286
ミッションNo	-
ミッション区分	
発行距離、時間	1200 Mile
登録年月日	2002/07/23
発生年月日	2002/06/01

部品番号	
主部品番号	37100-MCA
現状コード	933 メーター間指示
顧問区分	
担当区 部門	
担当区 取引先名	コード
対策区分	
対策内容コード	
発生予測	
対策パーツ	
見直し項目	開始 / 作業順序

		発行受付				
		発行受付				
		発行受付				
		発行受付				
		発行受付				
0	2002/06/05	発行受付	松浦 正明			神谷 升
発行	年月日	記事	承認	確認	確認	作成

イベント
担当部門氏名
完成年月日

受付
H二輪合解情報 岩本 英俊
2002/09/05

情報調査
H二輪合解情報 藤原 一弘
2002/09/19

調査解析
H二輪合解情報 藤原 一弘
2002/09/19

対策要求
H二輪合解情報 藤原 一弘
2002/09/20

中調回答

対策回答
M市場品質BL 山田 知明
2002/10/17

出図

対策実施
M二輪GDCM 山田 知明
2002/08/29

完了
H二輪合解技術 中村 英治

受付月日
/

99112

対策要求

完先	H二輪合解情報	受付 /

重要度
安全性B

年月日		
承認	確認	作成

型式/YM・通称名	件名	推進No
SC47	シリンダーヘッド不具合によるオーバーヒート	MC2002081910931
02/GL1800		
発生状況		

カスタマーが20マイル以内のところにあるディラーに車両を戻してきた。そして、その車両の水温計が、どんな速度でも数分でレッド・ゾーンに入ってしまうと訴えてきた。(M2M116/1件)

回答

10 月 5 日までに 経由 H二輪合解情報 御回答願います。

調査・解析結果

【合同解析室1次調査結果】
<現品確認結果>
・Lh シリンダーヘッドRr、焼気面(#6 Cy.) の水通路 3 箇所検具が通らず
・
・A, B 部は完全閉塞、C 部は通光することよりピンホールは調べている。
・HGA テスト結果より、A, B 部完全閉塞すると冷却を不良となる事が確認されている。
・同一事象が HAM、Mss でも確認されている。

<判断>
・シリンダーヘッド鋳造時の中子折れに起因するウォタージャケット水通路閉塞で、循環水流量不足によるオーバーヒートと判断する。

【Mssの調査結果】
<高速現品確認結果>
・L側ヘッド#6シリンダーの水通路2箇所(A/B)に閉塞が見られた
<鋳造工程見直し結果>
・鋳造工程、品質検査、払い出し検査工程に於いて、中子折れ不良の外観検査が有ったものの、中部については発見しにくい状況であった。
・鋳造時中子から発生するガスを金型外に導くパイプとしてフローティングベントをしようしているが、この時動きが悪いとベントが中子に刺さり中子が折れる事が有った。一このまま鋳造するとALの暴張りができる。
・当事象発生に伴い水通路閉塞有無の確認と修正実施。(全流動品チェック HAMの在庫を含む)
L側ヘッド 1210台 閉塞修正
R側ヘッド 365台 閉塞修正

月日	回答部門(所内)	承認	確認	作成
10/07	M二輪GDCM			新山

月日	回答部門(所内)	承認	確認	作成
19/06	M完成車品質M			真目

月日	回答部門(所外)	承認	確認	作成
/				

原因

【事象発生原因】
・シリンダーヘッド鋳造時のウォタージャケット水通路閉塞で、循環水流量不足により当事象に至ったものと判断する。

【発生原因】
・鋳造の際に、水通路中子に突き当てているフローティングベントの動きが悪く、中子を折った。そこに鋳造した為ALの暴張りが出来て鋳造時水通路A, B部が閉塞した。

【流出原因】
・鋳造工程で中子折れ確認方法が真までは確認していなかった。

対策

【発生対策】
・水通路中子の折れ易い部位と鋳造型の当り面を満す修正を行う。'2002-9-12~
・鋳造工程で型締めによる中子折れ確認を行う。
・フローティングベントの作動確認を型メンテ時、鋳造ショット毎に行う。

【流出対策】
・折れ事象部針金通し検査を行う。'2002-8-29~

既設車及び在庫車の処置

品質委員会にて検証市場措置を決定。

対策適用号機					
年月日	型式	年式	区間番号	区分	号機
2002/08/29	SC47	2002	AH	F	204862
2002/08/29	SC47	2002	FH	F	200125

対策効果確認

・鋳造型の修正で暴張り現象を無くし、中子折れ針金通し確認を全数実施した事で効果有りと判断する。

選択へのフィードバック

・中子が折れ易い部位は鋳造型の当り面の過がしが必要である。

市場品質情報 [QIS]

発行部門
H二輪合解情報

発生場所		
フレーム No	1HFSC47092A110769	
エンジン No	-2114235	
ミッション No	-	
ミッション区分		
走行総数、時間	29	Mile
登録年月日		
発生年月日	2002/06/11	

新部品番号	
生部品番号	12020-MCA
症状コード	022 [illegible]
原因区分	製造社内
担任部門	二輪GDCM
担任部門	物引先名 [illegible]
対策区分	完了
対策内容コード	2112 金型修正
発生予測	あり(放発)
対策パーツ	後
見直し項目	回答 / 各系標準 ○

発行	年月日	記号	承認	確認	確認	作成
△		改訂発行				
△		改訂発行				
△		改訂発行				
△		改訂発行				
△		改訂発行				
△0		完了発行				藤原一弘

Event
Name of dept./ person in charge
Completion date

Receipt
H Motorcycle Information Analysis SL, A. Hasui
2005/05/09

Information investigation
H Motorcycle Information Analysis SL, H. Honda
2005/05/10

Investigation & analysis
H Motorcycle Technical Analysis SL, K. Kouki
2005/05/20

D/M request
H Motorcycle Technical Analysis SL, K. Kouki

Interim response

D/M response
H Motorcycle Technical Analysis SL, J. Nishimura

Driving release

C/M implementation
H Motorcycle Technical Analysis SL, J. Nishimura

Completion
H Motorcycle Technical Analysis SL, K. Kouki

Photographs

06112

Counter-measure Request

TC

Mark: Recall / Notify

Rank: C Safety

Date	Approved by	Checked by	Prepared by

Type / Yrd. Make, Model	Title	Reference No.
SO47	Temperature gauge indicates red zone	MC2005050184349
03 / GL150A		
Symptom		

Two customers complained that the temperature gauge climbed to the red zone when riding. Dealer checked coolant level in the radiator of a customer's vehicle but there was no lack of coolant.

Response

Response to be submitted to _____ no later than _____

Results of investigation and analysis

Occurrence situation
- Ambient temperature : 32°C
- Road condition : Congested
- Gear used : Low to 2nd gear
- Vehicle speed : 15 to 25mph
- Distance moved in congested traffic : 1 to 2 miles

The temperature gauge climbed to the red zone in the above situation.

Results of analysis

1. Duplication test
   Riding conditions
   - Gear used : Low gear
   - Vehicle speed : 15mph

   When the vehicle was ridden 1.5km in the above riding conditions, the vehicle's temperature gauge climbed to the red zone, i.e. the symptom alleged by the customer was duplicated.

2. Occurrence mechanism
   The radiator cooling air is drawn in from the side and discharged in the forward direction of the vehicle. When the vehicle is moving slowly, however, discharged air interferes with incoming air, preventing the radiator from obtaining enough cooling air. Coolant temperature is thereby increased and it leads to the alleged symptom.

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Cause

The subject vehicle adopts the side radiator whose cooling system is designed to draw in cooling air from the side and discharge hot air in the forward direction of the vehicle when the vehicle is ridden at low speeds (20km/h or below).
However, the incoming air adversely affects the vehicle's cooling performance when the vehicle is ridden continuously at low speeds in 1st or 2nd gear. This causes the coolant temperature to rise and the temperature gauge to read high.

Countermeasure

From 05Y01, the red zone beginning temperature set for the temperature gauge is changed from 122°C to 120°C so that the temperature gauge will be tough enough to stay below the red zone during low-speed running.

Action to cover vehicles found in customer's hands / Application of SVC

Date of manufacture supplied vehicle's serial number/s

Date	Type (Model code)	MY	Destination	Transmission	Serial number

Confirmation of effectiveness of SVC

The countermeasure is effective in ensuring that the temperature gauge gives correct reading when the vehicle is ridden at low speeds.

Feedback to existing materials

There are matters yet to be verified involving customers' usage and cooling performance in stop-and-go mode or parade mode.

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Market Quality Information [QIS]

Issuing department
H Motorcycle Information Analysis SL

Plant of manufacture	
Frame No.	1HFSO47M85A000179
Engine No.	KE0128E
Transmission No.	-
Transmission type	
Distance traveled	1200 (miles
Date of registration	2005/02/28
Date of occurrence	2005/05/01

Area part number	
Main part number	87100-MGA
Symptom code	030 Malfunction
Cause category	Specification
Department	
Supplier	Code
Countermeasure category	
Countermeasure's code	
Possibility of future occurrence	
Parts for countermeasure	
Review items	Drawing / Specification checked

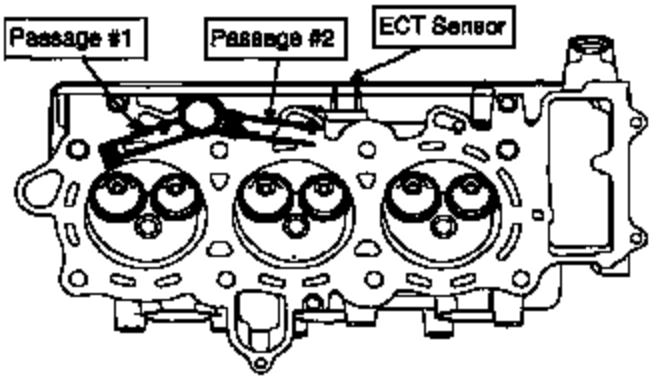
Revision	Date	Note	Approved by	Checked by	Checked by	Prepared by
1		Revised & issued				
2		Revised & issued				
3		Revised & issued				
4		Revised & issued				
5		Revised & issued				
6		Completed & issued				Nobuo Hasiya

QES TEST REPORT

08/27/02 ~ 08/29/02	1HFSC47
MCA	Larry Mullins Layne Coleman Andy Ryder
12220-MCA-7500	

During mass production of the MCA, a CBU (1HFSC47049A203489) was in repair for a coolant leak check. The repair associate performed the proper repair but during confirmation of the repair noticed the fans did not cycle on and off according to the specification. Analysis of the CBU was performed and root cause of the problem was determined to be a coolant passage block in the L Cylinder Head in 2 locations due to casting of the part. This test report documents the tests that were performed on a completed unit to verify proper fan operation with different scenarios of passages blocked in the L Cylinder Head.

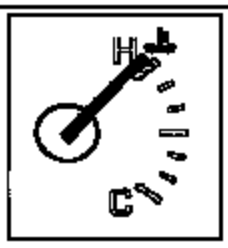
Test #1:



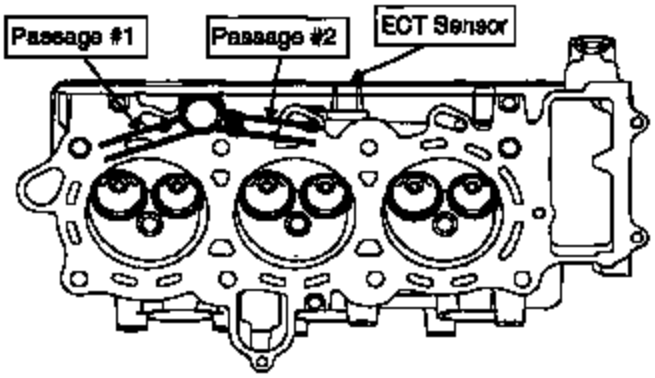
L Cylinder Head Conditions:

Passage #1: Closed

Passage #2: Closed

Engine RPM	Vehicle Speed (km/h)	Gear	Fan Operation	Temp Meter Indication
Idle	0	N	N/G (Fans Always On)	
2000	0	N	N/G (Fans Always On)	

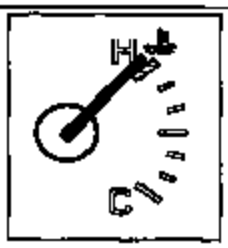
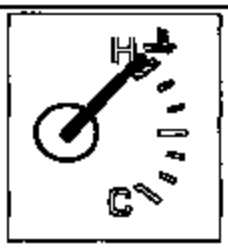
Test #2:



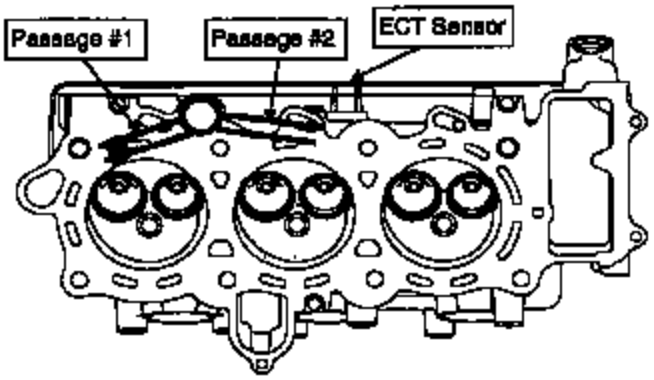
L Cylinder Head Conditions:

Passage #1: Open (As Cast Condition)

Passage #2: Closed

Engine RPM	Vehicle Speed (km/h)	Gear	Fan Operation	Temp Meter Indication
Idle	0	N	N/G (Fans Always On)	
2000	0	N	N/G (Fans Always On)	
1000 ~ 1500	20 ~ 30	2	N/G (Fans Cycle due to Vehicle Speed and not Coolant Temperature) *Outside Air Temp = 82 °F	
1500 ~ 2000	80 ~ 100	5	OK (Fans Cycle due to Vehicle Speed) *Outside Air Temp = 86 °F	

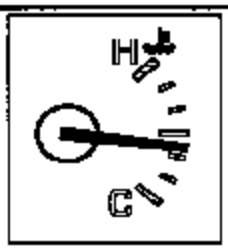
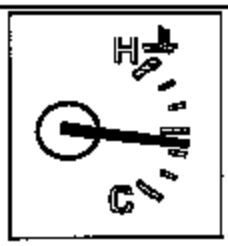
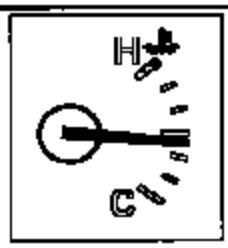
Test #3:



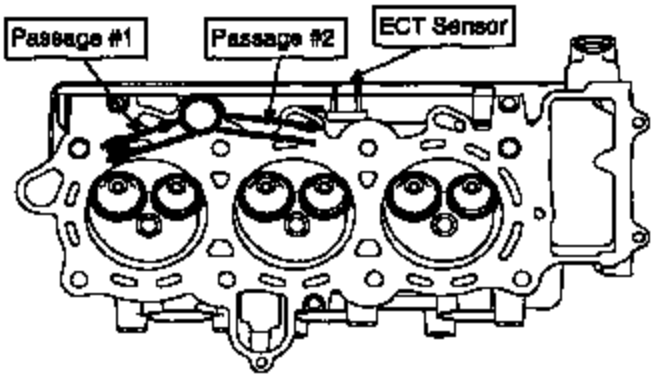
L Cylinder Head Conditions:

Passage #1: Closed

Passage #2: Open (As Cast Condition)

Engine RPM	Vehicle Speed (km/h)	Gear	Fan Operation	Temp Meter Indication
Idle	0	N	OK (Fans Cycle On and Off)	
2000	0	N	OK (Fans Cycle On and Off)	
1000 ~ 1500	20 ~ 30	2	OK (Fans Cycle On and Off according to Coolant Temperature and Vehicle Speed) *Outside Air Temp = 70°F	
1500 ~ 2000	60 ~ 100	5	OK (Fans Cycle On and Off according to Coolant Temperature and Vehicle Speed) *Outside Air Temp = 70°F	

Test #3:



L Cylinder Head Conditions:

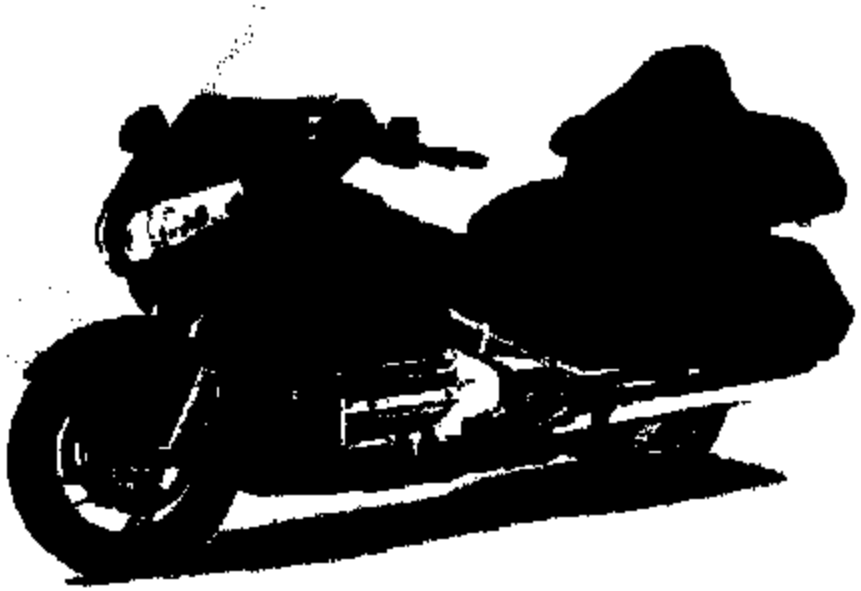
Passage #1: Closed

Passage #2: Open (Inserted 2 mm Hole)

Engine RPM	Vehicle Speed (km/h)	Gear	Fan Operation	Temp Meter Indication
Idle	0	N	OK (Fans Cycle On and Off)	
2000	0	N	OK (Fans Cycle On and Off)	

Coolant Passage Block in Cylinder Head of GLX

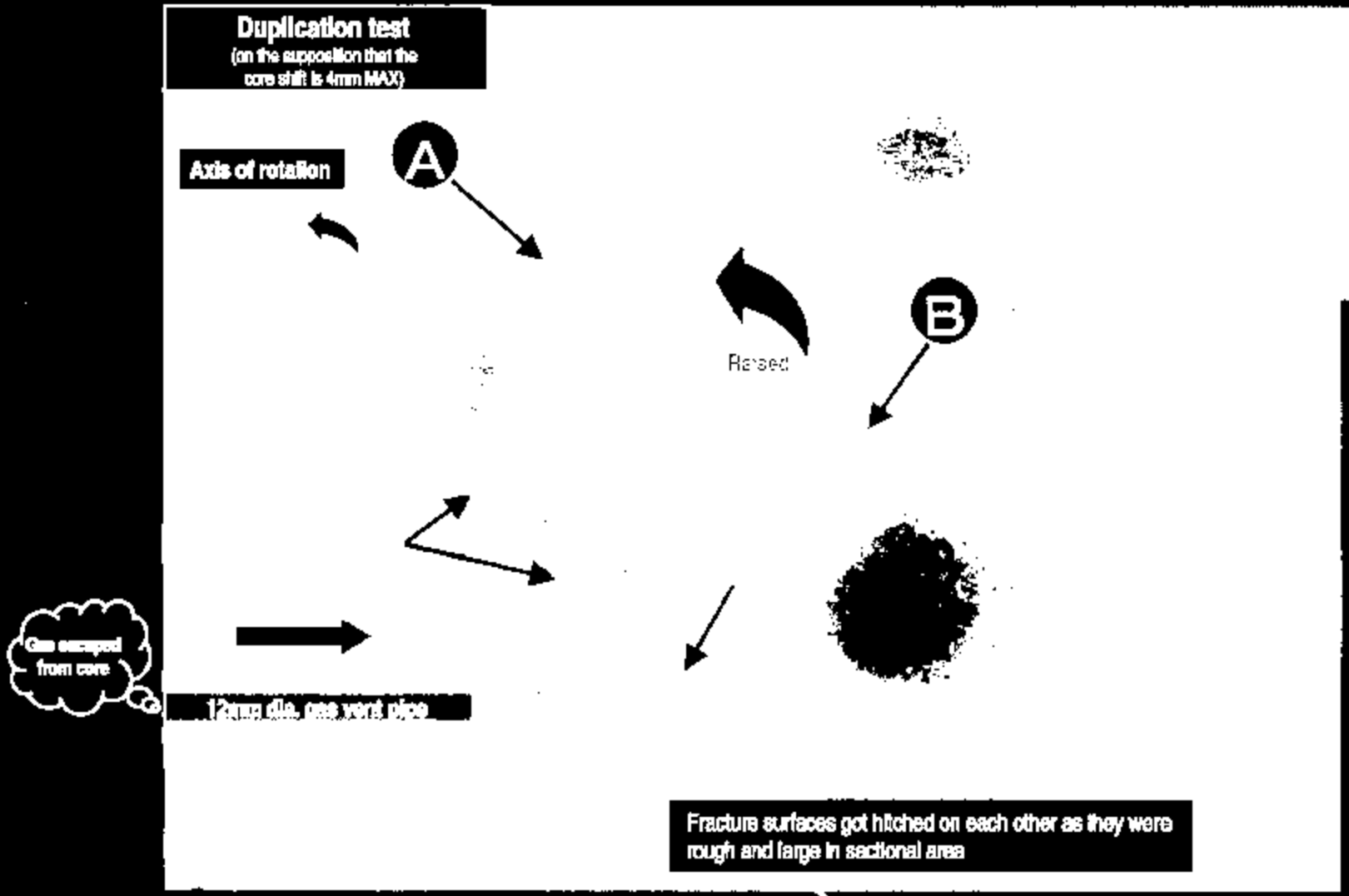
1. Locations where Coolant Passage Block Occur
2. Estimated Number/Percentage of Affected Units in the Market (by Blocked Location and by Symptom)
3. Effectiveness of Countermeasure
4. Test Results (Comparison between Coolant Passage-blocked Vehicle and Standard Vehicle)
   - Low-speed range
   - High-speed range
5. Countermeasure Development Schedule (Parts Replacement, etc.)



Coolant Passage Block in Cylinder Head of GLX

Reasons why coolant passage block does not occur at the (C) location (L: 0/5318, R: 0/5544)

1. The core broke at all the (A), (B) and (C) locations, and swiveled about an axis passing through the core prints and the (C) location where the fracture surfaces got hitched on each other (because of a large sectional area), and as a consequence the core was raised on a slant without leaving any gap at the (C) location.
2. The gas vent pipe had the effect of preventing the (C) location from opening.
   (Insertion of aluminum does not occur unless the gap is 0.5mm or wider)
   (Clearance between gas vent pipe and core is 0 to 0.2mm)



Coolant Passage Block in Cylinder Head of GLX

Estimated number/percentage of affected units in the market (by blocked location and by symptom)

- Not blocked
- Blocked but temperature gauge does not go into the red zone
- Temperature gauge climbs to the red zone (There is a premonition)
- Proving test has been conducted

※Ride in LOW gear not included

＊Number of units assembled and shipped in AUG : 43,701

＊Data as of SEP 26 are shown

R cylinder head

L cylinder head (Sensor installed side)

Defect rate Number of units	Not blocked	A	B	AB	C	AC	BC	ABC
Not blocked		4.2% 1836		0. 1% 44	0% 0	0% 0	0% 0	0% 0
A	1. 6% 700	0. 07% 31	0. 03% 13	0. 002% 1	0% 0	0% 0	0% 0	0% 0
B		0. 6% 263	0. 3% 132	0. 02% 9	0% 0	[illegible]	0%	0%
AB	2. 7% 1180	0. 1% 437	0. 05% 22	0. 003% 2	0% 0	[illegible]	[illegible]	[illegible]
C	0% 0	0% 0	0% 0	0%	0% 0	[illegible]	[illegible]	[illegible]
AC	[illegible]	[illegible]	[illegible]	0% 0	0% 0	[illegible]	[illegible]	[illegible]
BC	[illegible]	[illegible]	[illegible]	0% 0	0% 0	[illegible] 0	[illegible] 0	[illegible] 0
ABC	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0

At VMax only

At VMax only

At VMax only

A vehicle alleged to have coolant passage block in cylinder head at the A, B and C locations was returned from AH market, but it was verified by cutting the cylinder head that the actually blocked locations were A and B.

The L cylinder head is provided with a coolant temperature sensor. If the coolant passage is blocked at the A location and an air pocket is thereby formed, the sensor detects higher temperature than actual, thus increasing the likelihood of the temperature gauge going into the red zone.

Coolant Passage Block in Cylinder Head of GLX

Results of test at low-speed range

【Observation】

- **There wasn't much difference in both coolant temperature and plug seat temperature between the coolant passage-blocked vehicle (L: A&B blocked, R: A blocked) and the standard vehicle (base vehicle of Product Engineering).**
- **So far as the results of the conducted tests are concerned, there is no adverse effect at low-speed range.**

Test items/conditions	Requirements	Standard vehicle (Base vehicle of Product Engineering) (No coolant passage blocked)	Coolant passage-blocked vehicle (Worst case as of the end of AUG) (L: A&B blocked, R: A blocked)	Customer's vehicle (Vehicle that has overheated) (No coolant passage blocked)
Idling • Coolant temperature (at radiator inlet, after 18 min)	Temp. gauge setting: 126℃ No coolant expulsion			
Continuous running at 20km/h in LOW gear • Coolant temperature (at radiator inlet, after 10 min) • Oil temperature (at radiator inlet, after 10 min)	Temp. gauge setting: 126℃ No coolant expulsion Standard: 150℃	Coolant temperature is 8 to 10℃ lower than that of standard vehicle at 1500rpm and 3000rpm in LOW	Coolant expulsion did not occur until reaching 3.0km 125℃	
Running at 30km/h to 40km/h in 2ND gear • Coolant temperature (at radiator inlet, after 32 min) • Oil temperature (at radiator inlet, after 32 min)	Temp. gauge setting: 126℃ No coolant expulsion Standard: 150℃			
Idling → Continuous running at 20km in LOW gear	(Target)			
#1 plug seat temperature after 26 min	200℃			
#2 plug seat temperature after 26 min	200℃			
#3 plug seat temperature after 26 min	200℃			
#4 plug seat temperature after 26 min	200℃			
#5 plug seat temperature after 26 min	200℃			
#6 plug seat temperature after 26 min	200℃			

Results of test at high-speed range

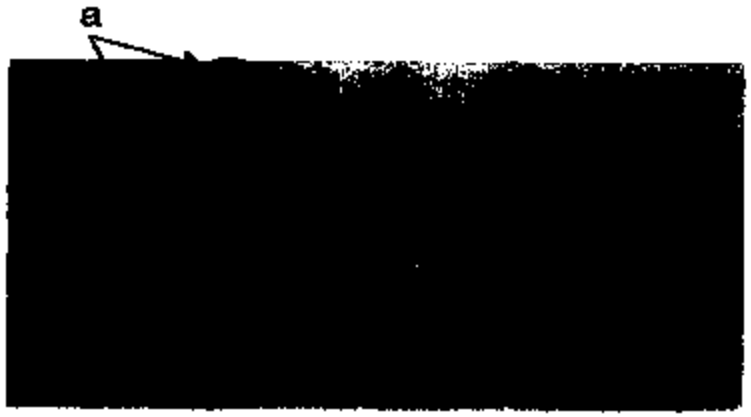
【Observation】

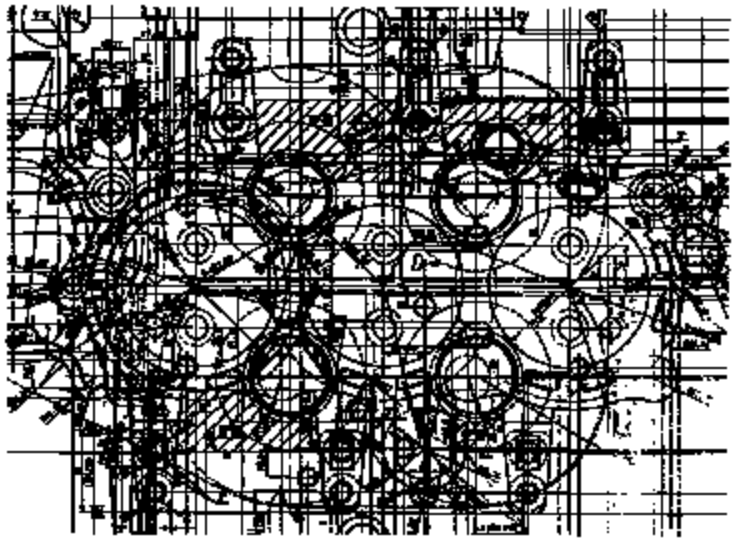
- With regard to the coolant temperature at VMax, both the coolant passage-blocked vehicle (L: A&B blocked, R: A blocked) and the standard vehicle failed to meet the requirements.
- With regard to the plug seat temperature, both the coolant passage-blocked vehicle and the standard vehicle met the requirements.
- So far as the results of the conducted tests are concerned, there isn't much difference at high-speed range between the coolant passage-blocked vehicle and the standard vehicle.

Test items/conditions	Requirements	Standard vehicle (No coolant passage blocked)	Coolant passage-blocked vehicle (Worst case as of the end of AUG) (L: A&B blocked, R: A blocked)
VMax(210Km/h) ・Coolant temperature (at radiator inlet, after 13 min)	112℃	Measured value 108℃, Atmospheric temperature correction value +12℃	Measured value 112℃, Atmospheric temperature correction value +12℃
VMax(210Km/h)	(Target)		
#1 plug seat temperature after 26 min	200℃		
#2 plug seat temperature after 26 min	200℃		
#3 plug seat temperature after 26 min	200℃		
#4 plug seat temperature after 26 min	200℃		
#5 plug seat temperature after 26 min	200℃		
#6 plug seat temperature after 26 min	200℃		

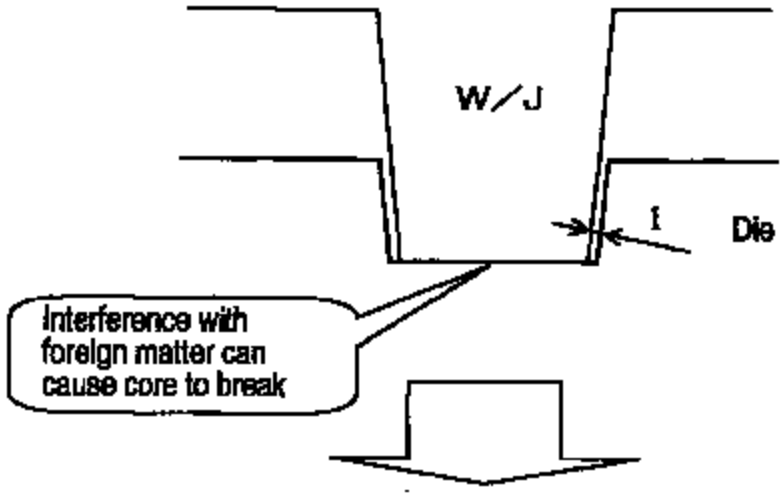
Coolant Passage Block in Cylinder Head of GLX

- It was so arranged that the core would be, if broken, separated from the core print.
- It was so arranged that the two portions (indicated by "a") at where breakage had occurred would not interfere with foreign matter such as burr.

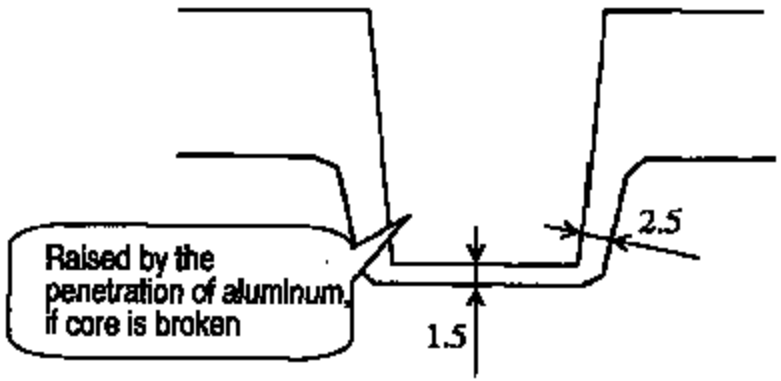




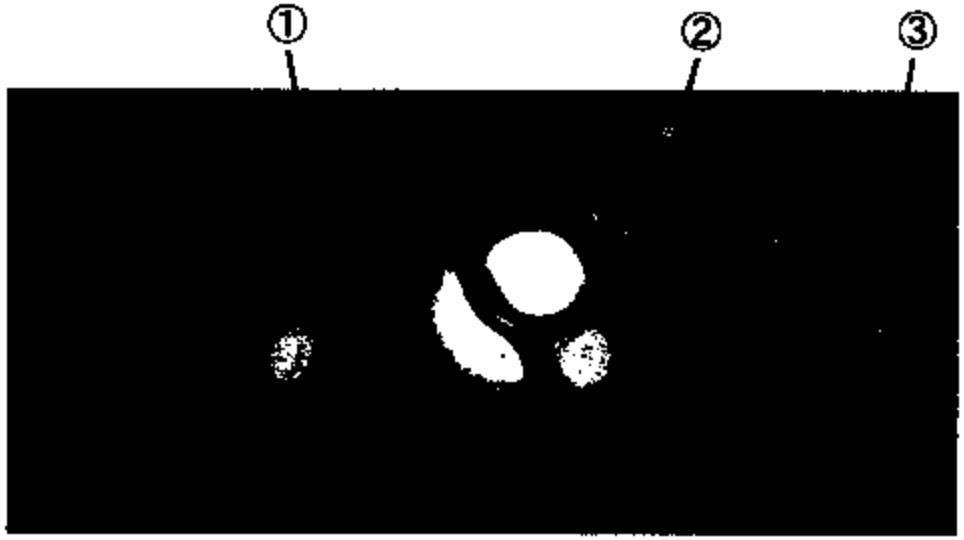
Before countermeasure



After countermeasure



【Relationship between floating vent projection and broken core】



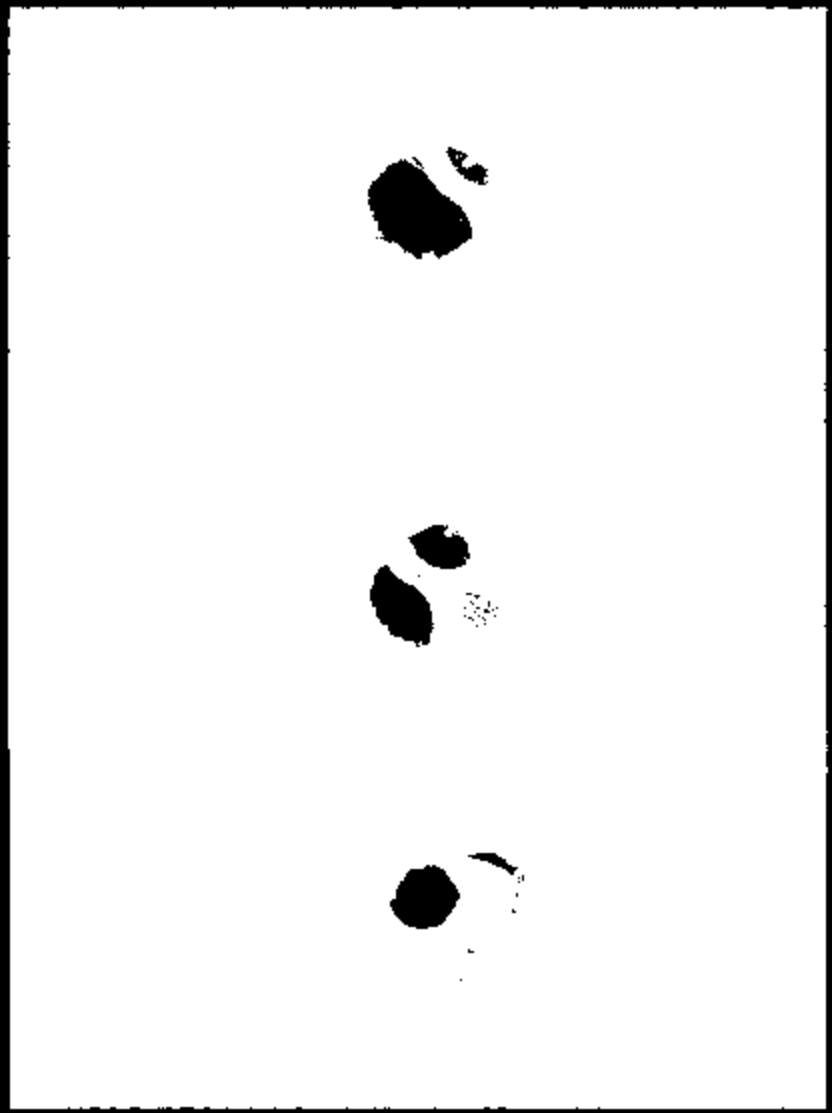
If any of the ①, ② and ③ floating vents is not smooth in movement, the core breaks at A, B and C locations.

Location	①	②	③
Floating vent projection that can result in broken core	1.2mm MIN	1.1mm MIN	0.9mm MIN

●GDC－M Coolant Passage Block in Cylinder Head of GLX

【Relationship between floating vent projection and broken core】
After countermeasure (Core print was provided with a relief of 1.5 to 2.5mm)

Location	①	②	③
Floating vent projection that can result in broken core	1.9mm MIN	1.9mm MIN	3.8mm MIN



Coolant Passage Block in Cylinder Head of GLX

	SEP								OCT														
	23	24	25	26	27			30	1	2	3	4			7	8	9	10	11			14	15
Joint Analysis Office	★	Report to Iketani, Managing Director						★	The 3rd meeting						★	The 4th meeting							
1. Measures to eliminate root cause/stop problem																							
- Building of system of 100% inspection for blocking (MMP)	AUG 28										Completion PC No.49												
Floating vent	Replaced all floating vents with new ones on AUG 28																						
- Replacement																							
	Revised on SEP 12																						
- Operation Standard								On-site control															
Core	Checked for broken core at die clamping every 2 hours (AUG 28)																						
- Check for broken core at die clamping									On-site control														
	100% inspection system																						
- Inspection prior to release											Mass production line												
2. Estimation of number/ percentage of affected units in the market																							
3. Replacement of parts (100% inspection)			Modification/Dispatch					L: 4 pieces ... Not blocked 4 pieces															
- Japan								R: 7 pieces ... A blocked 1 piece, Not blocked 6 pieces															
				Investigation																			
- Overseas																							

(pieces)

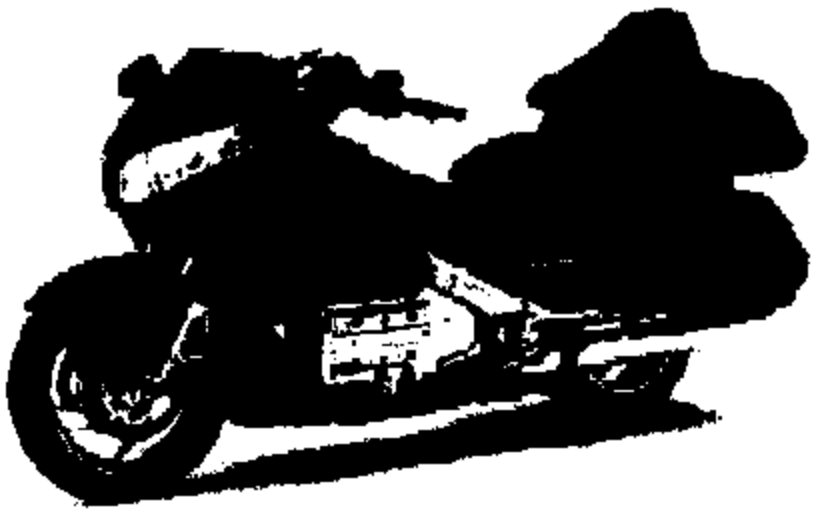
	US	Europe	TTL
L	4	1	5
R	5	1	6

1. 折れ事象の絞込み
2. 市場発生予測(事象分類)
3. 対策効果
4. テスト結果(事象品とｽﾀﾝﾀﾞｰﾄﾞの比較)

   ・低速域

   ・高速域

5. 推進日程(パーツ対応他)



●GDC－M　GLX シリンダーヘッド水路閉塞

02 03 27

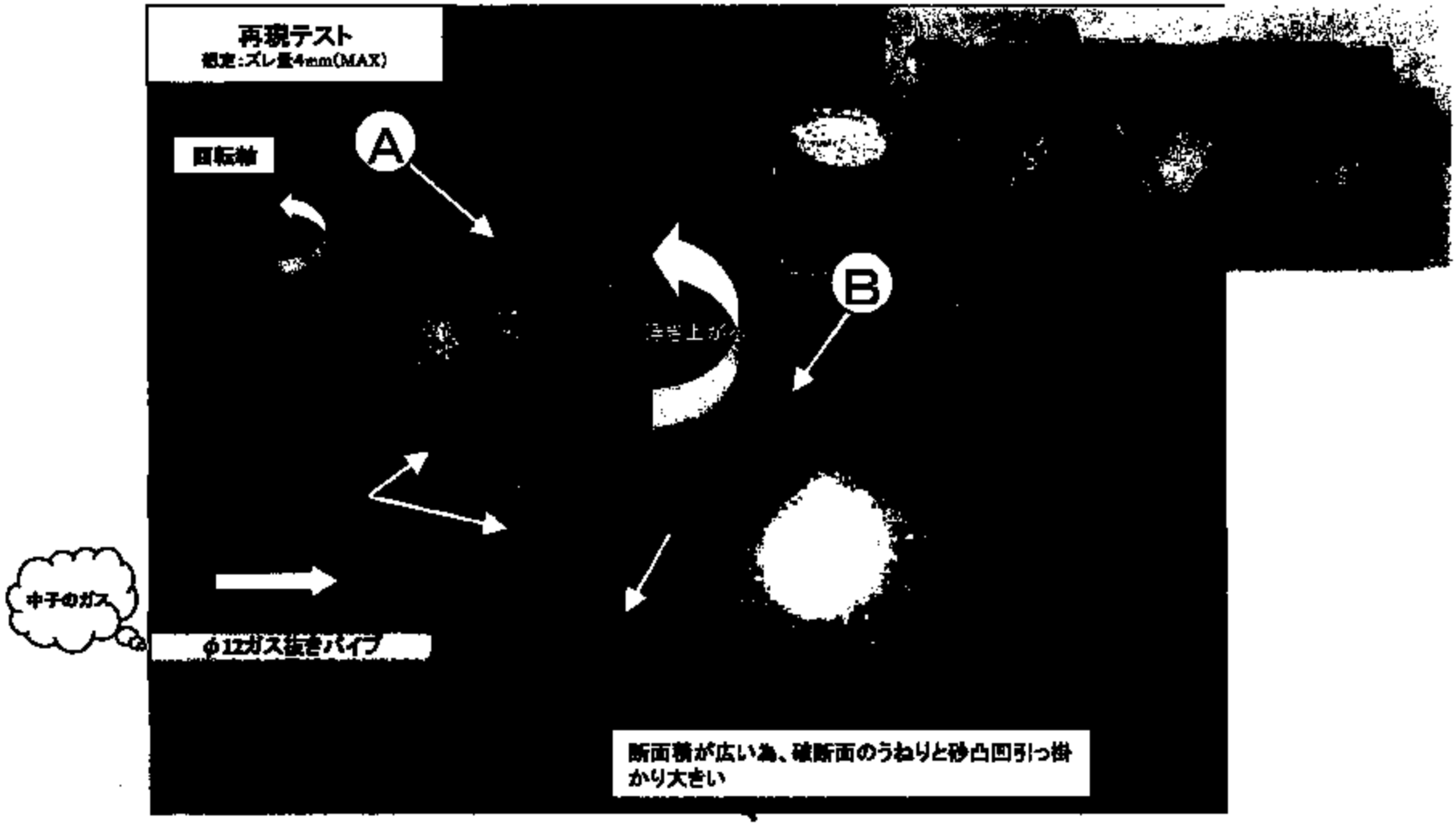
C折れが発生しない理由（L:0／5318　R:0／5544）

1.中子はA・B・C全部折れているが、幅木とC部の引掛り(断面積大)を基点に斜め上方向に浮き上がる

2.ガス抜きパイプは、C部に対し開き防止効果がある

（アルミ差込は、0.5mm以上の隙間がないと発生しない）

（ガス抜きと中子のクリアランス設定は0～0.2mmである）



閉塞箇所別、市場発生予測／事象分類

閉塞無し

閉塞は有るがメーターはR／Zに入らない

メーターR／Z入り口を指す（予見性有り）

確認テスト実施済み

※Low走行は除く

＊8月組立出荷台数 43701台

＊発生率は9月28日現在

VMAXのみ　VMAXのみ　VMAXのみ

R側ヘッド

L側ヘッド センサー側 ＼ 上段 不良率 下段 台数	無し	A	B	AB	C	AC	BC	ABC
無し		4.2% 1836		0.1% 44	0% 0	0% 0	0% 0	0% 0
A	1.6% 700	0.07% 31	0.03% 13	0.002% 1	0% 0	0% 0	0% 0	0% 0
B		0.6% 263	0.3% 132	0.02% 9	0% 0	0%	0%	0%
AB	2.7% 1180	0.1% 457	0.05% 22	0.003% 2	0% 0			
C	0% 0	0% 0	0% 0	0%	0% 0			
AC				0% 0	0% 0			
BC				0% 0	0% 0			
ABC	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0

L側ヘッドは 水温センサーがありA部閉塞 によるエアー溜りでR／Zへ入り易い

低速域テスト結果

【考察】

・水路閉塞品（L:AB閉塞、R:A閉塞）は水温、プラグ座温度共、STD（品技ベース車）に対し温度上昇は認められない
・確認したテスト項目から低速域での悪影響は特に無い。

テスト項目・条件	要件	品技ベース車（水路の閉塞なし）	事象品（8月末現在最悪事象）（L:AB閉塞、R:A閉塞）	ユーザー車（オーバーヒート）（水路の閉塞なし）
アイドル放置	メーター設定：126℃			
・水温（ラジエター入口 18分経過時）	水噴きなき事			
Low20Km/h連続	メーター設定：126℃		3.0km走行水噴きには至らず	
・水温（ラジエター入口 10分経過時）	水噴きなき事		125℃	
・油温（ラジエター入口 10分経過時）	目安：150℃	STD車との比較でも、Low／1500rpmとLow／3000rpmで水温が8～10℃低い		
2nd 30Km/h～40Km/h	メーター設定：126℃			
・水温（ラジエター入口 32分経過時）	水噴きなき事			
・油温（ラジエター入口 32分経過時）	目安：150℃			
アイドル放置→ Low20Km/h連続	（目標）			
プラグ座温度 26分経過時#1	200℃			
プラグ座温度 26分経過時#2	200℃			
プラグ座温度 26分経過時#3	200℃			
プラグ座温度 26分経過時#4	200℃			
プラグ座温度 26分経過時#5	200℃			
プラグ座温度 26分経過時#6	200℃			

高速域テスト結果

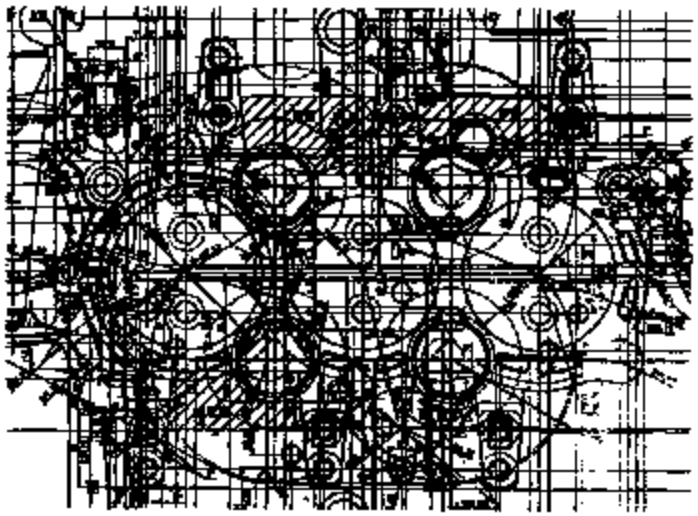
【考察】

・VMaxでの水温は水路閉塞品（L:AB閉塞、R:A閉塞）、スタンダード車共、要件外であった。
・プラグ座温度は水路閉塞品（L:AB閉塞、R:A閉塞）、スタンダード車共、要件内であった。
・確認したテスト項目から高速域でスタンダード車との大きな差はない。

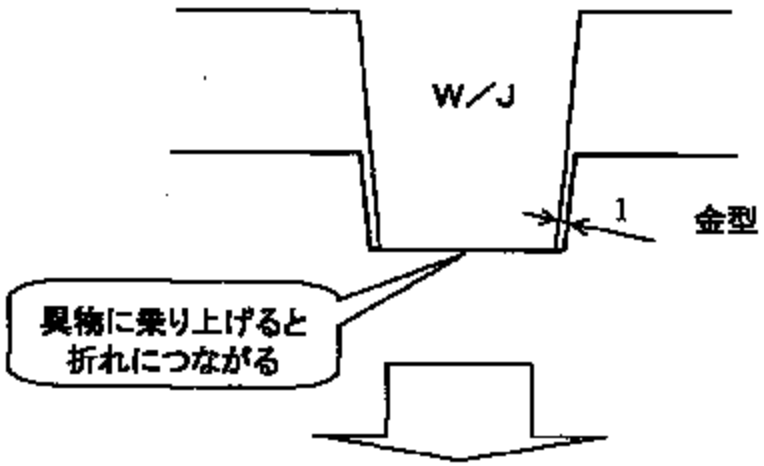
テスト項目・条件	要件	スタンダード車 （水路の閉塞なし）	最悪事象品（8月末現在） （L:AB閉塞、R:A閉塞）
VMax（210Km/h） ・水温（ラジエター入口 13分経過時）	 112℃	実測108℃気温補正値+12℃	実測112℃気温補正値+12℃
VMax（210Km/h） プラグ座温度 26分経過時#1 プラグ座温度 26分経過時#2 プラグ座温度 26分経過時#3 プラグ座温度 26分経過時#4 プラグ座温度 26分経過時#5 プラグ座温度 26分経過時#6	（目標） 200℃ 200℃ 200℃ 200℃ 200℃ 200℃		

GLX シリンダーヘッド水路閉塞

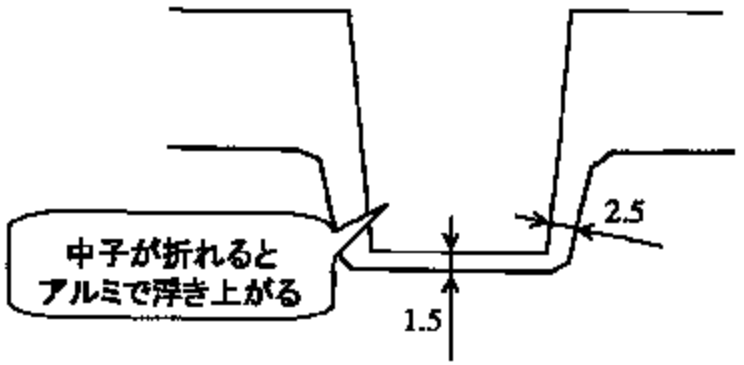
・折れた中子が幅木から離脱する様にする。
・折れ部にある足2箇所(a)がバリ等の異物に乗り上げないようにする。



現状

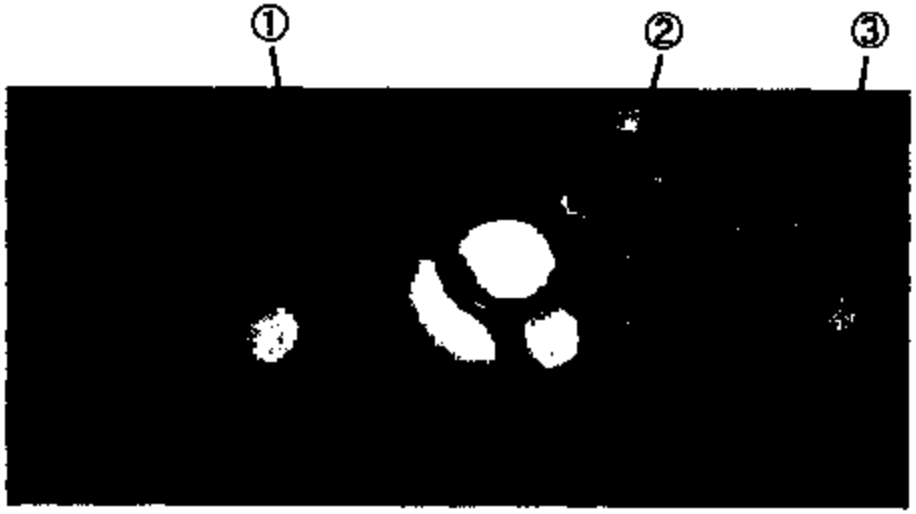


対策



●GDC－M　GLX シリンダーヘッド水路閉塞（対策前）

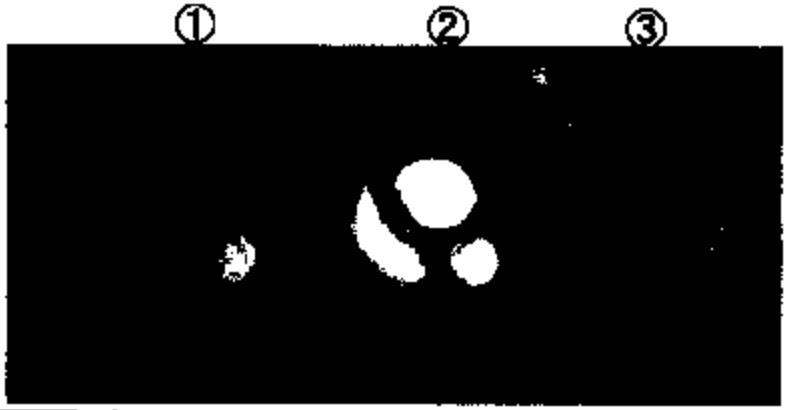
【フローティングベント突出し量と折れの関係】



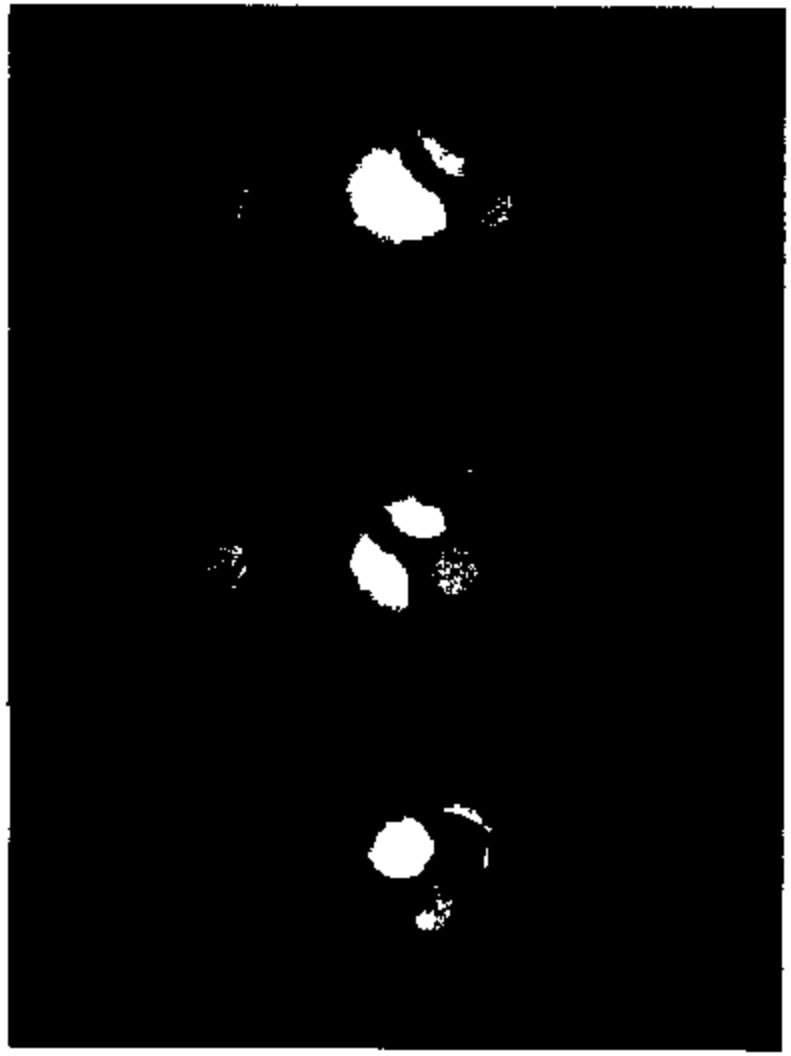
①、②、③ どこのフローティングベントの動きが悪くても A、B、C の折れが発生する

部位	①	②	③
折れ限界	1.2mm以上	1.1mm以上	0.9mm以上

【 フローティングベント突出し量と折れの関係　】
対策後（金型の幅木部1.5～2.5mm逃がし実施）



部位	①	②	③
折れ限界	1.9mm 以上	1.9mm 以上	3.8mm 以上



GLXシリンダーヘッド水路閉塞

	9月 23	24	25	26	27	30	10月 1	2	3	4	7	8	9	10	11	14	15
合同解析室	★ 池ノ谷常務報告					★ 第3回					☆ 第4回						
1. 源流・流出防止対策																	
・閉塞全検体制(MMP)	8月28日								完了PCNo49 ▽								
フローティングベント	8月28日全て新品に交換																
・交換	▼																
	9月12日落し込み																
・作業標準	▼																
中子	28日型締め中子折れ確認を1回／2時間実施																
・型閉め確認	▼						現場管理										
	全検体制																
・払出し検査	▼ ▼								量産ラインに移行								
2. 市場の不良発生予測			▼			GDC・品技											
3.パーツ入れ替え(全検)		発送・改修				L:4個…閉塞なし4個											
・国内		▼			▼	R:7個…A閉塞1個、閉塞なし6個											
		調査															
・海外		▼	▼	差し止め		発知											

(個)

	US	ヨーロッパ	TTL
L	4	1	5
R	5	1	6

Event
Name of dept./ person in charge
Completion date

Flowchart
H Motorcycle Information Analysis St. N Tanaka
2002/05/09

Information investigation
H Motorcycle Information Analysis St. K Fujisawa
2002/05/10

Investigation & analysis
H Motorcycle Information Analysis St. K Fujisawa
2002/05/16

C/M request
H Motorcycle Information Analysis St. K Fujisawa
2002/05/20

Interim response

C/M response
M Market Quality St. Y Tanaka
2002/10/17

Drawing release

C/M implementation
M Motorcycle ODDM T. Yamada
2002/05/25

Completion
HMotorcycle Information Analysis St. K Fujisawa

Product date
/
00112

Countermeasure Request

					Rank	Date		
	H Motorcycle Information Analysis St.	/			B Safety	Approved by	Checked by	Prepared by
PD		/						

Type / Yrs. Mdls. Model	Title	Reference No.
8047	Overheat due to defect in cylinder head	MC2003081911 0831
02 / 04.1880		

System

A customer brought his vehicle to a dealer within 20 miles' distance and alleged that the pointer of his vehicle's temperature gauge would go into the red zone after a few minutes of running on any road. (M2M115 / 1 complaint)

Response

Response to be submitted to H Motorcycle Information Analysis St. no later than 5 OCT 2002.

Results of investigation and remedy

1. Investigation of the returned cylinder heads
2. Investigation of the current process
3. Investigation of the parts on the line and parts in stock
4. Investigation of mechanism and cause of occurrence

1. Result of investigation of the returned cylinder heads
It was found that the #5 cylinder coolant passage in L cylinder head was blocked in 2 location (A/B).

2. Result of investigation of the current process
In the processes of casting, quality inspection and inspection prior to release, appropriate inspection to detect any defect caused by broken core was carried out but it was difficult to detect internal defect by the inspection.

3. Result of investigation of mechanism and cause of occurrence
As a pipe to let gas generated in the core out of the die, a floating vent is used. If this floating vent fills to move smoothly, it gets stuck in the core and causes the core to break. If casting is done with the core broken, aluminum penetrates into the broken portion and blocks the portion.

4. All parts on the line and in stock at HAM were checked for coolant passage block due to the above cause, and they were repaired if blocking was found.
L cylinder head : 1218 pieces found blocked and repaired
R cylinder head : 868 pieces found blocked and repaired

Date	Responding dept.	Approved by	Checked by	Prepared by
/	Motorcycle ODDM			

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Date	Responding dept.	Approved by	Checked by	Prepared by
/				

Cause

Cause of occurrence
The floating vent failed to move smoothly, got stuck in the core and broke the core. Casting was done with the core broken, and aluminum penetrated into the broken portion.
Cause of non-detection
Check for defect caused by broken core was done in the processes of casting and inspection prior to release, but was not thoroughgoing enough.
Floating vent operation check was not thoroughgoing enough.

These factors combined together to cause blocking of coolant passages A and B, which resulted in the alleged symptom.

Countermeasure

In order to prevent occurrence, casting die was modified to provide the die surface coming in contact with the broken coolant passage core with a relief. (2002-9-12)

In order to prevent non-detection, the following checks were initiated
- In-process check for core breakage due to die clamping
- Floating vent operation check at die maintenance and at every shot

Action to use on in-use vehicles/ stock of vehicles

Should complaint arise, we propose to handle it as a normal warranty claim. Treatment of the claim is entrusted to MQAC.

Countermeasure-applied serial numbers

Date	Type (Model code)	MY	Destination	Transmission	Serial number
2002/09/30	8047	2003	AH	F	305963
2002/09/30	8047	2003	FK	F	305158

Confirmation of effectiveness of CM

Penetration of aluminum which resulted from broken core, was eliminated by the modification of die.
Non-detection of broken core was eliminated by the initiation of in-process 100% check for core breakage.

Feedback to existing standards

Horizontal implementation of countermeasures for other models
Revision of Operation Standard

Market Quality Information (QIS)

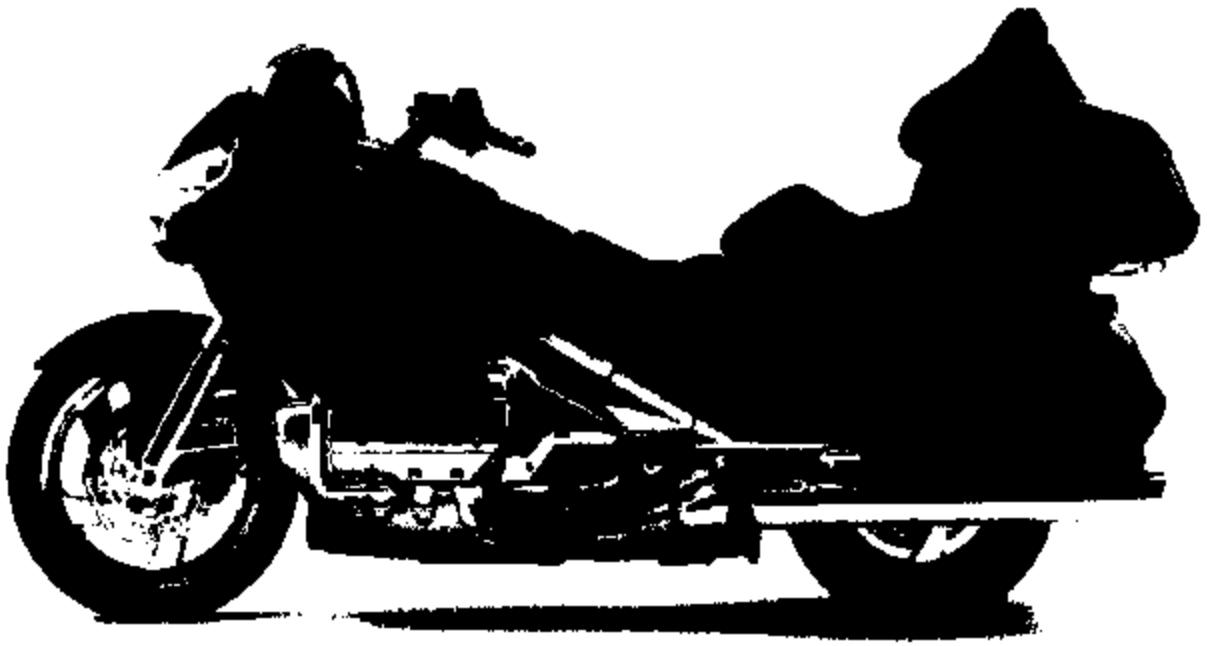
Issuing department
H Motorcycle Information Analysis St.

Place of occurrence	
Frame No.	1HF8C47082A119739
Engine No.	-2114355
Transmission No.	-
Transmission type	
Odometer traveled	80 miles
Date of registration	
Date of occurrence	2002/09/11

Raw part number		
Main part number	13080-MBA	
Symptom code	222	Hot.
Claim category	In house	
Responsible	Department	Motorcycle ODDM
	Supplier	Code
Countermeasure category	Completed	
Countermeasure code	2112	Die modified
Possibility of further occurrence		
Parts for countermeasure		Die
Review Items	Drawing	Production standard
		○

1		Revised & issued				
2		Revised & issued				
3		Revised & issued				
4		Revised & issued				
5		Revised & issued				
6		Completed & issued				Kazuhiko Fujisawa
Issue	Date	Note	Approved by	Checked by	Checked by	Prepared by

GLX1800 (MCA) Coolant Temperature Problem

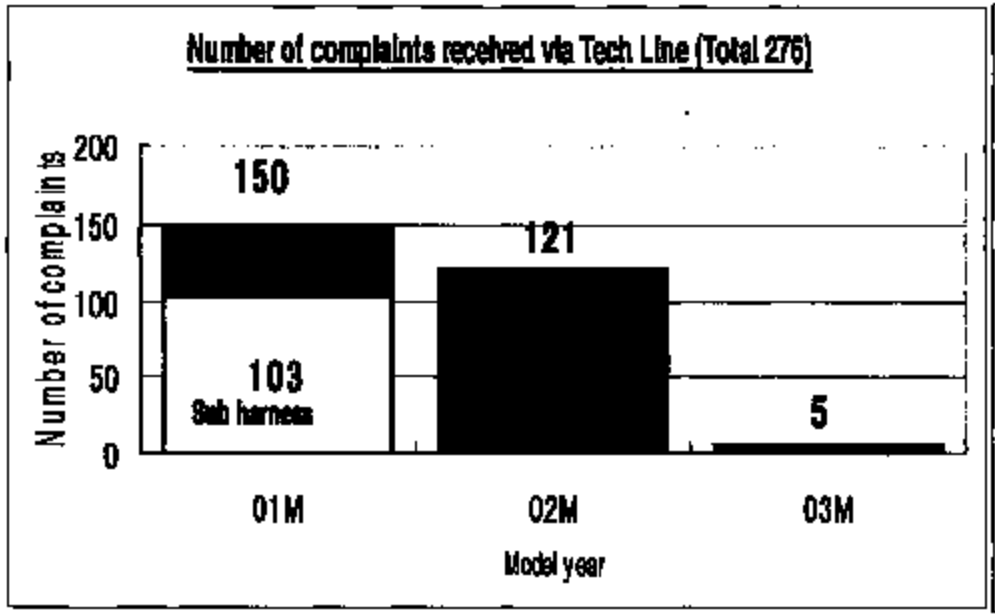


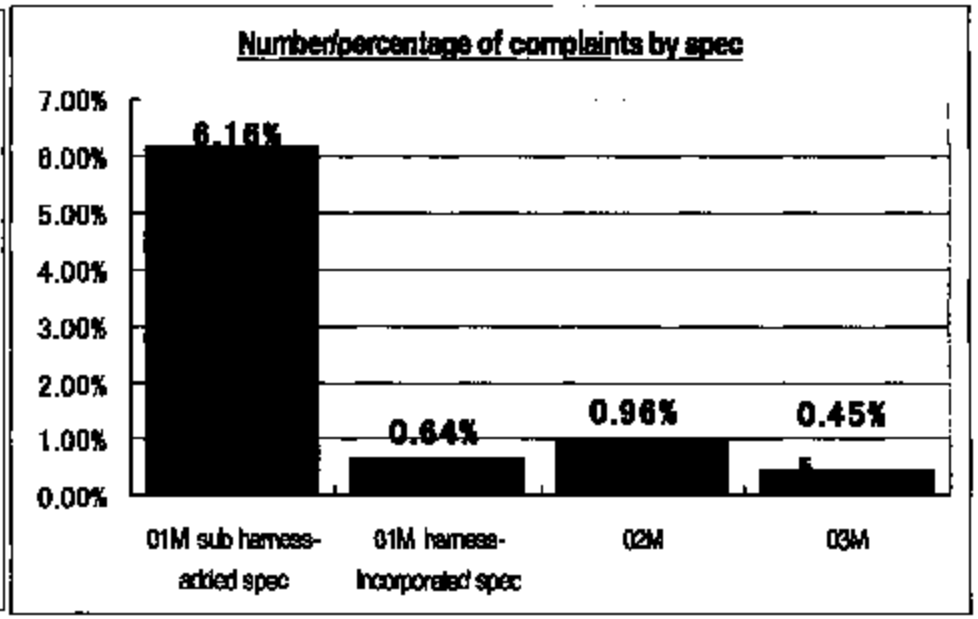
GQM (SEP 30)

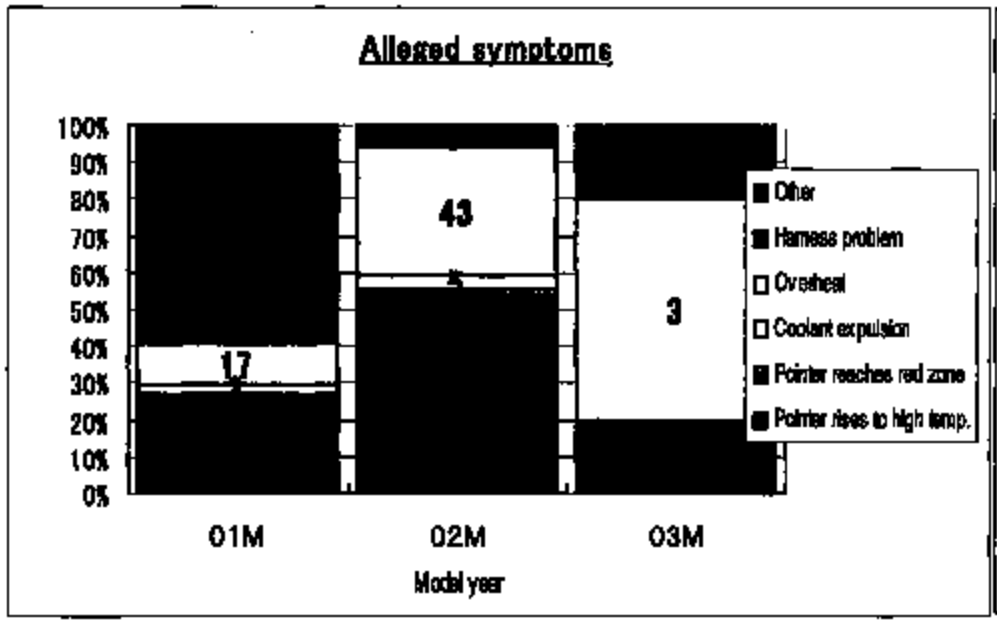
Market Information (Tech Line Information)

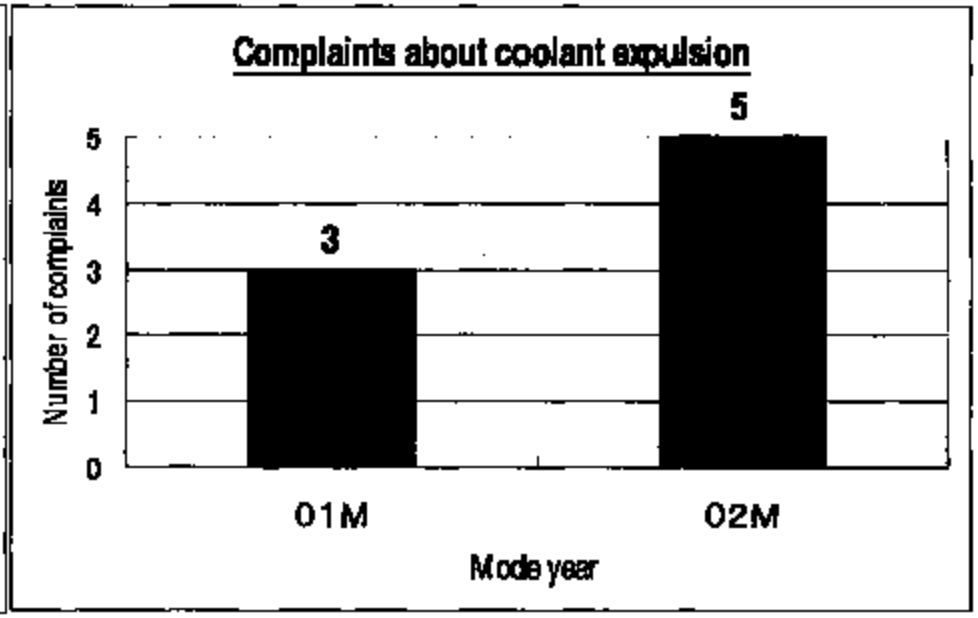
GL1800 Temperature Gauge

Number of vehicles sold in the US : '01M 8917 vehicles, '02M 12689 vehicles, '03M 1094 vehicles





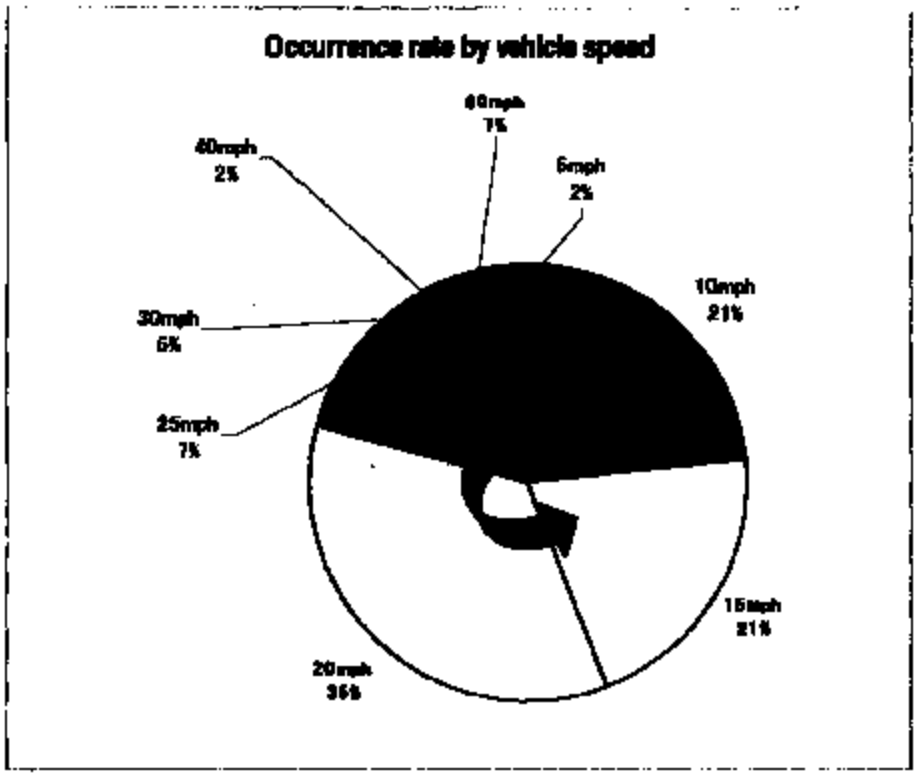


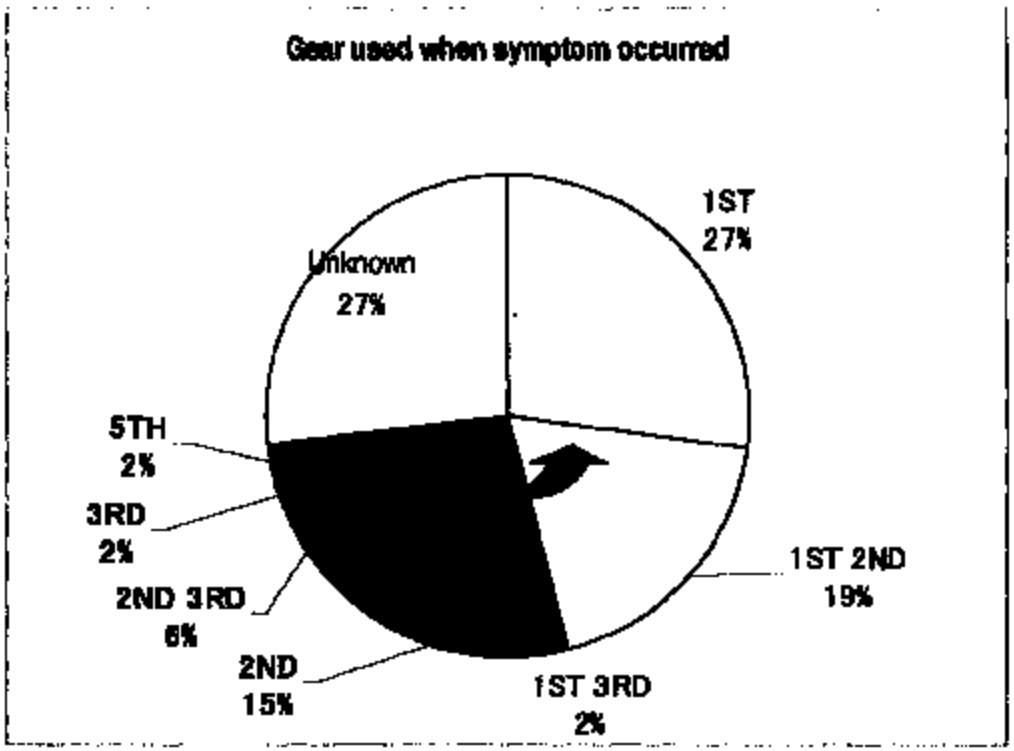


GL1800 Coolant Temperature Problem

《Results of questionnaire to 12 users of 01M and 36 users of 02M》

Complaint about coolant temperature does not necessarily arise out of riding at low speeds.





GL1800 Coolant Temperature Problem

[redacted]

01'YM

Air trapped in cylinder head

Sub harness added

02'YM

Sensor position changed

Detection by sensor:
Trapped air temperature
⇒ Coolant temperature

03'YM

Red zone beginning temperature changed

122⇒126℃

2 complaints (JPN/US)

Blocking of radiator

1 complaint (US)

Blocking of coolant passage in cylinder head

L cylinder head

R cylinder head

Incorrect indication by temperature gauge

Lack of radiator capacity

Cause analysis in progress

Manufacturing defect

Market complaints/claims

[redacted]

[redacted]

GL1800 Coolant Temperature Problem

[redacted]

01'YM

Air trapped in cylinder head

Sub harness added

02'YM

Sensor position changed

Detection by sensor:
Trapped air temperature
⇒ Coolant temperature

03'YM

Red zone beginning temperature changed

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2 complaints (JPN/US)

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Blocking of coolant passage in cylinder head

L cylinder head

R cylinder head

Incorrect indication by temperature gauge

Lack of radiator capacity

Cause analysis in progress

Manufacturing defect

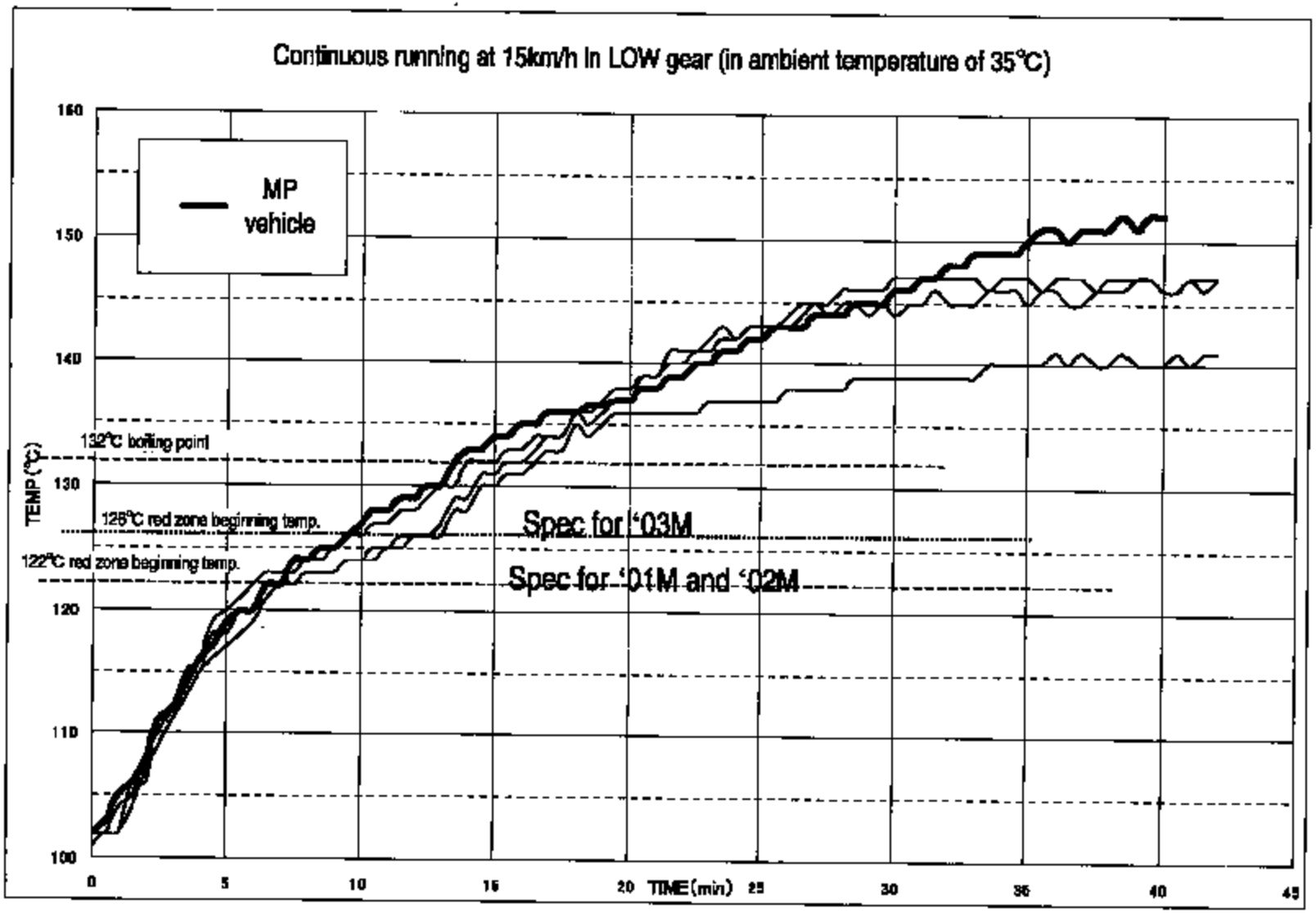
Market complaints/claims

[redacted]

[redacted]

GL1800 Coolant Temperature Problem

GL1800 cooling performance at low-speed range



GL1800 Coolant Temperature Problem

Proposed measures against the problem that the temperature gauge indicates higher temperature than actual coolant temperature

		Cooling performance				Fan noise	Influence on appearance	Comfort (Protection from hot air)	Heat resistance of accessories	Other
		Idling	Low-speed running		High-speed running					
			Effectiveness in prolonging time until reaching red zone	Effectiveness against coolant expulsion						
1	Mass production spec	○	×	×	○	○ 63dB	○	○	○	
2	Fan ON-OFF triggering speed change	○	×	×	○	○	○	○	○	
3	↑ + Reversed fan revolving	×	×	×	○	×	○	×	○	
4	No shroud	○	○	×	×	○	○	×	×	
5	Baffle plate	○	○	×	×	○	×	○	○	
6	Baffle plate + Increased fan capacity	○	○	×	○	○	○	○	○	
7	Draw-in draft fan × 1 Force-out fan × 1	×	○	×	○	×	○	×	○	
8	2 fans on L side Force-out fan on L side	○	②	○	○	×	○	○	○	
9	Force-out fan × 2	×	○	×	○	× 69dB	○	×	○	
10	External cooling fan No appreciable change in performance when started from a distance	○	①	○	○	○	△	○	○	
8	New layout for 05M (External fan)	○	○	○ Saturated at 117℃	○	○ 61dB	×	○	○	

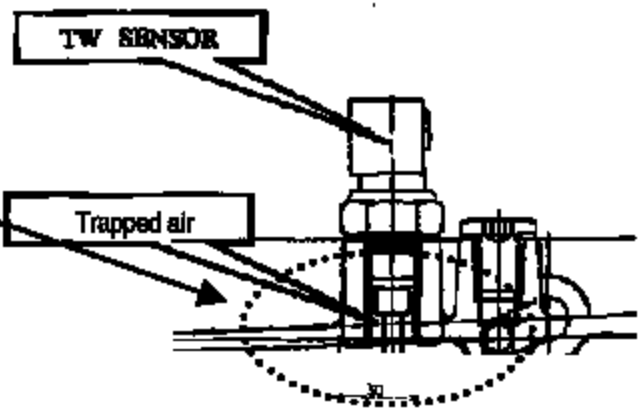
☐ A/S action plans introduced to US

GL1800 Coolant Temperature Problem

01 'YM — Red zone beginning temperature was set at 122°C

- Air was trapped in the temperature detecting area of the coolant temperature sensor, and this caused the temperature gauge to indicate higher temperature than actual.

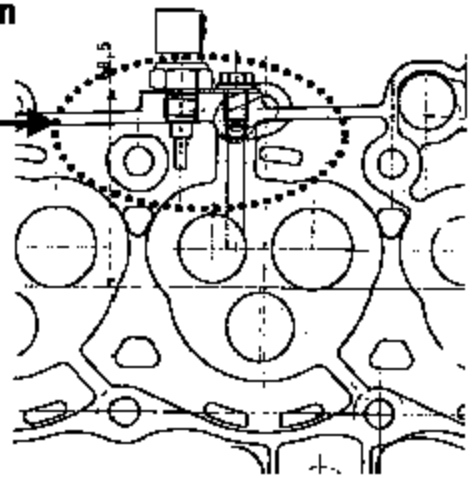
- As a countermeasure, the existing sub harness was replaced with a sub harness with a 2.7Ω resistor for vehicles that were off the line, and a fairing harness with a built-in 2.7Ω resistor was applied to vehicles on the line.



02 'YM — Red zone beginning temperature was set at 122°C

For Japanese version, red zone beginning temperature was set at 126°C in consideration of traffic congestion.

- Coolant temperature sensor area of the cylinder head was modified to prevent air from being trapped.



03 'YM — Red zone beginning temperature was set at 126°C

In the US market, frequent complaints were made on the issue of coolant temperature of '01YM and '02YM.

As a countermeasure, sub harness for correcting red zone beginning temperature to 126°C was prepared and tried on complained customers' vehicles for monitoring.

Result : The sub harness proved 50% effective but AH refused to accept it as appropriate field action to use on affected vehicles.

04 'YM — Same as '03YM

GL1800 Coolant Temperature Problem

[redacted]

01'YM

Air trapped in cylinder head

Sub harness added

02'YM

Sensor position changed

Detection by sensor:
Trapped air temperature
⇒ Coolant temperature

03'YM

Red zone beginning temperature changed

122⇒126℃

2 complaints (JPN/US)

Blocking of radiator

1 complaint (US)

Blocking of coolant passage in cylinder head

L cylinder head

R cylinder head

Incorrect indication by temperature gauge

Lack of radiator capacity

Cause analysis in progress

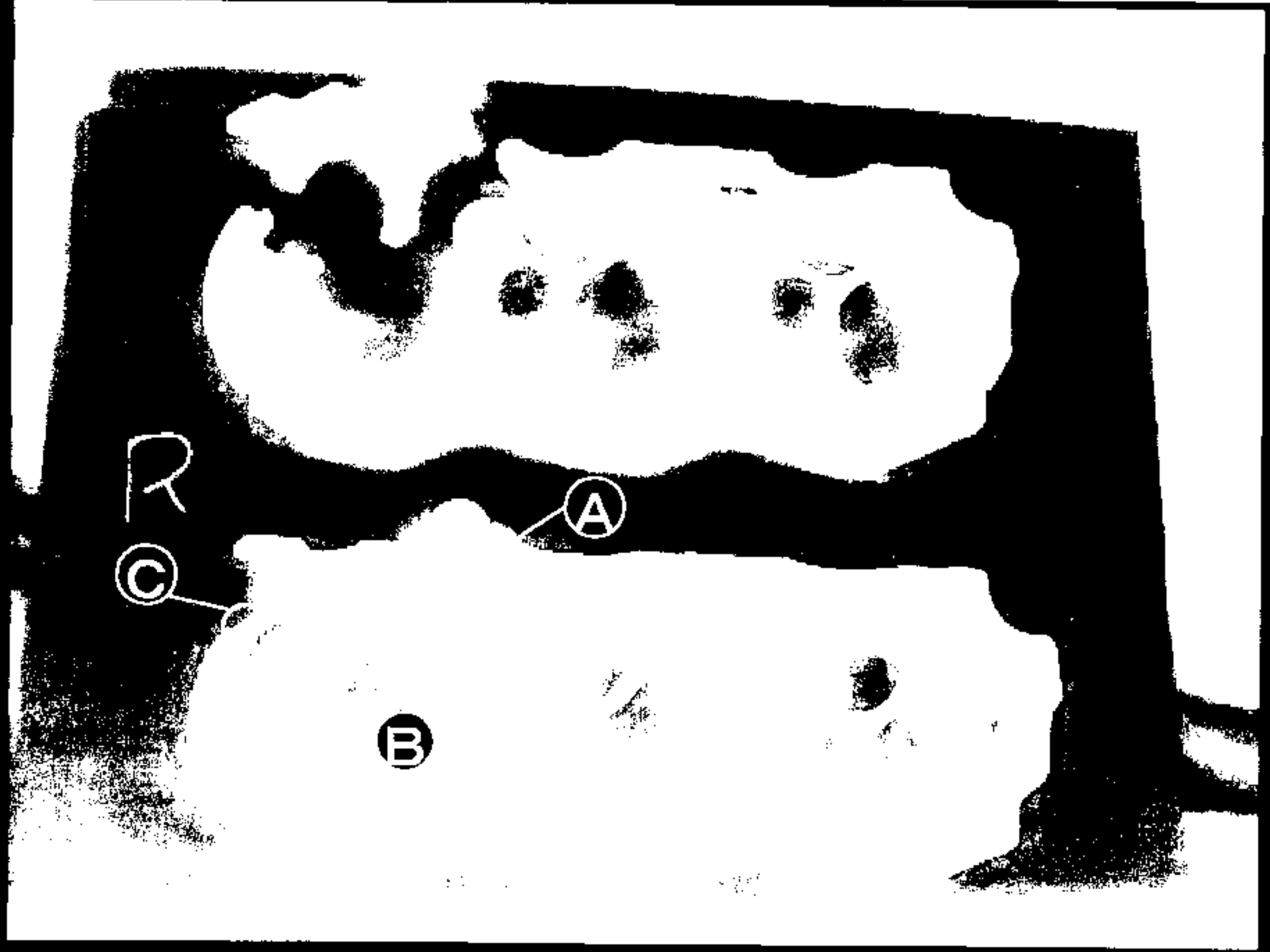
Manufacturing defect

Market complaints/claims

[redacted]

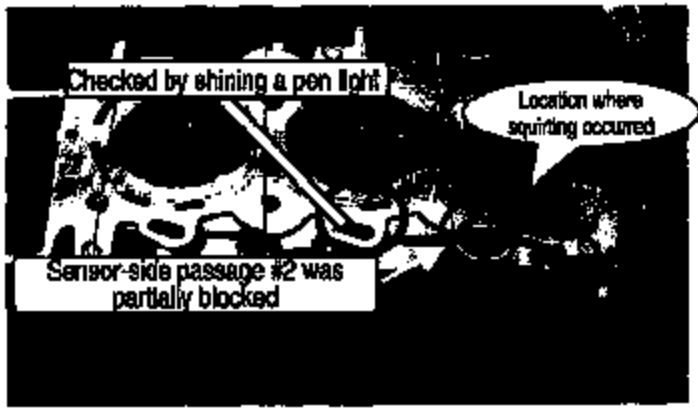
[redacted]

GDC — Coolant Passage Block in Cylinder Head of GLX 02.09.23



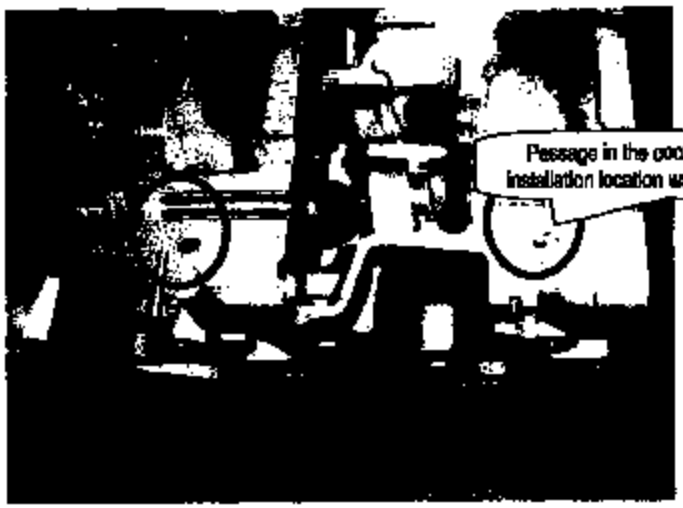
First discovery at MMP

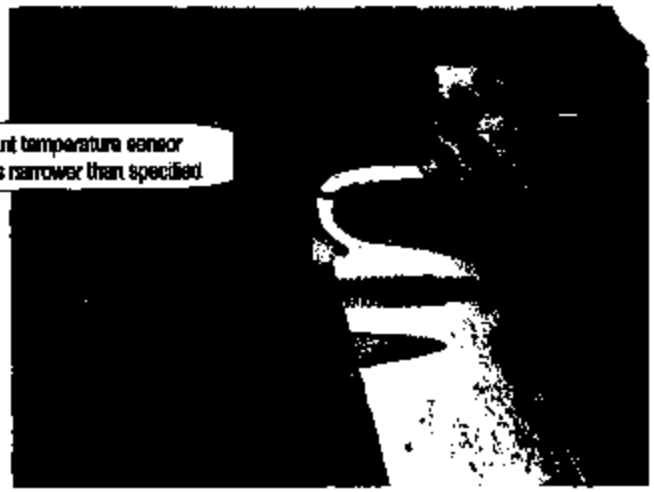
MCA Coolant passage #1 was checked for blocking



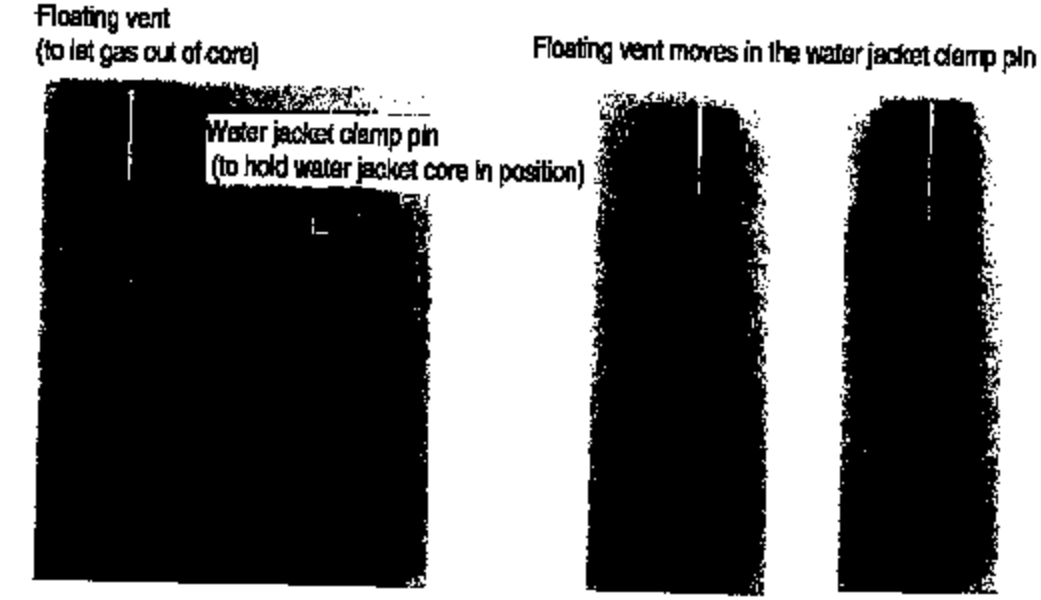
Passage B blocked

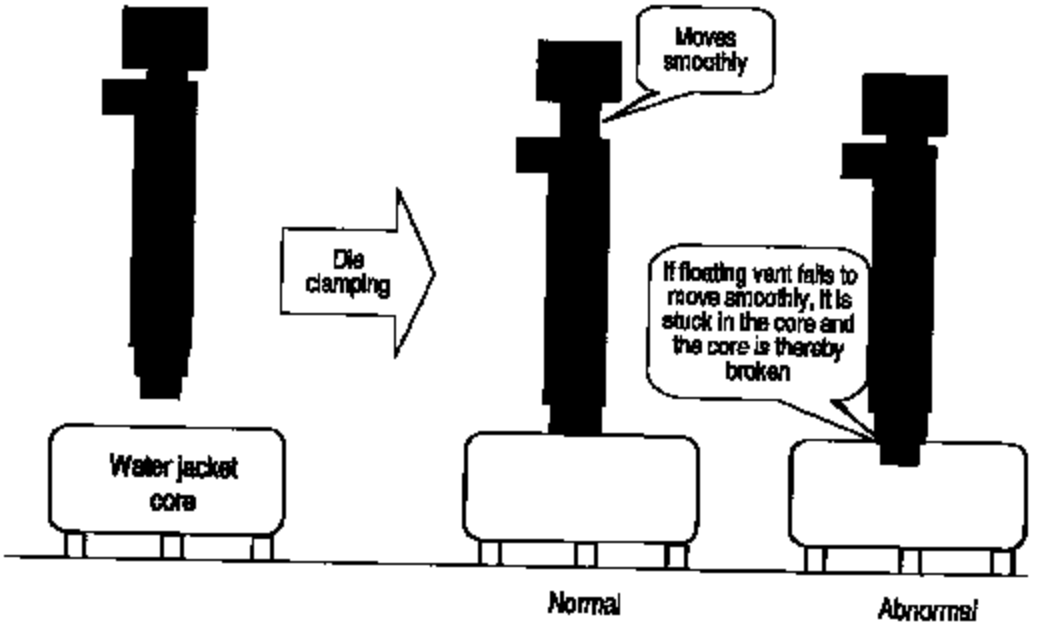
Passage A (partially) blocked





Mechanism of water jacket core breakage due to problem with floating vent





Coolant Passage Block in Cylinder Head of GLX

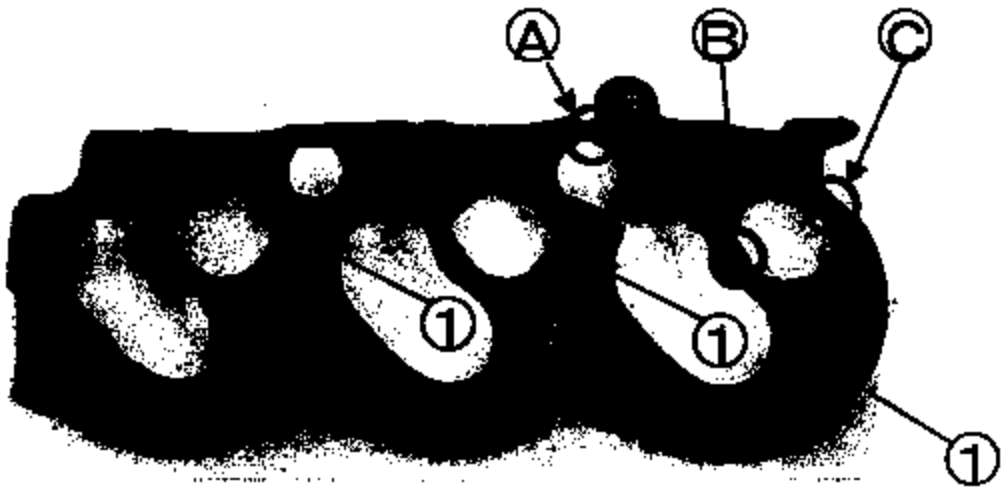
● Results of screening of parts on the line/in stock

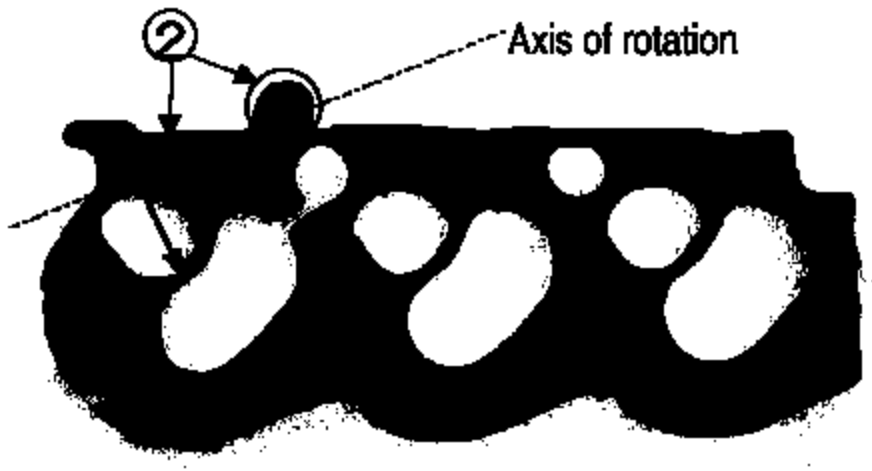
(Coolant passage-blocked rate)
GDC, Machining, Nippon Express, MMP

	Passages A&B blocked	Passage A blocked	Passage B blocked	Passage C blocked	TTL
L	120／5093 2.4%	78／5093 1.5%	734／5094 14.4%	0／5094 0.0%	932／5095 18.3%
R	7／5319 0.1%	227／5319 4.3%	90／5319 1.7%	0／5319 0.0%	324／5319 6.1%

Causes of occurrence

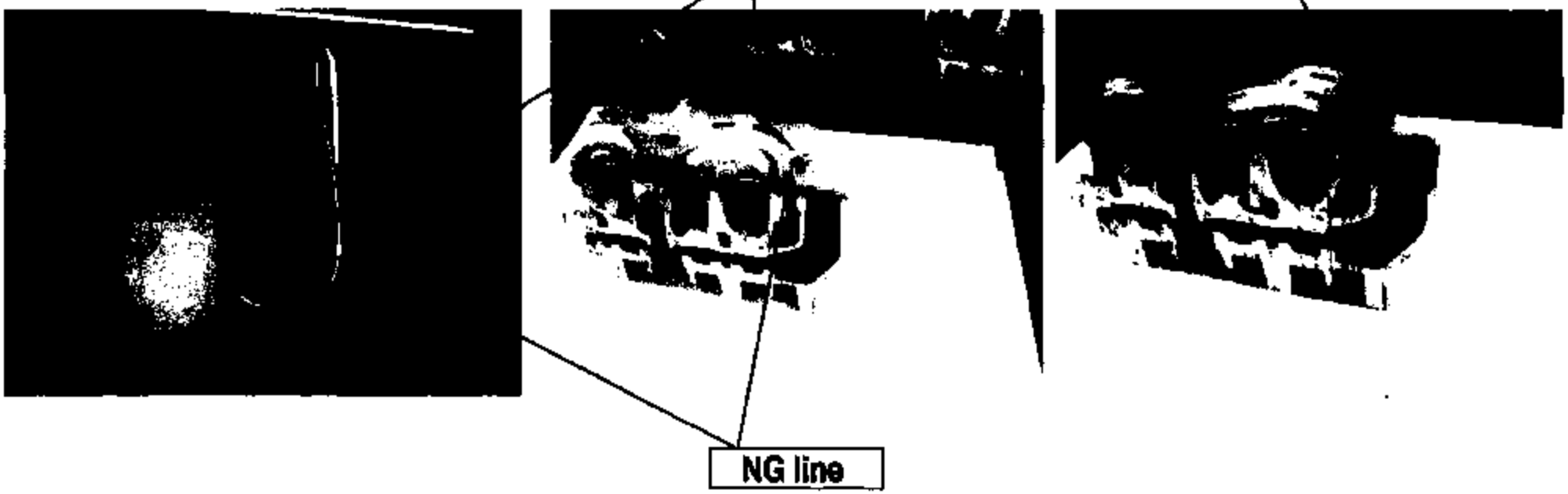
	Core-broken location	Process in which core broke	Cause of breakage	Influence on product	Remark
I	A only	Molding process	Core shrinkage after molding	No blocking Passage A blocked	
II	A, B and C	Casting process	Sealing portion① is held too strong	No blocking Passage A blocked Passage B blocked Passages A&B blocked	(Reason for block in passage B) The broken core is swiveled about an axis passing through the core prints② and the B portion which is farthest from the axis of rotation is raised.
			Core is set with burr remaining on water jacket core print② (locating portion) of lower die		





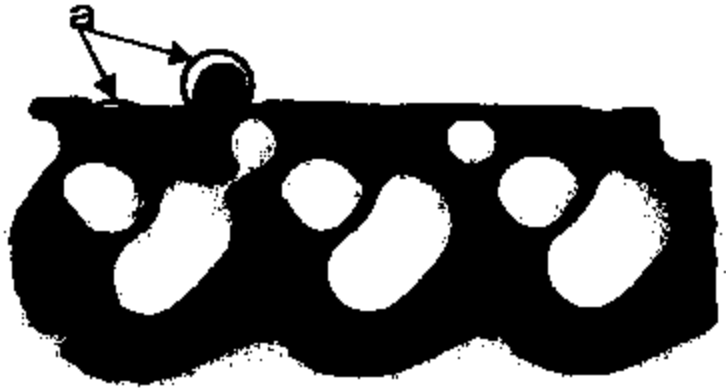
Coolant Passage Block in Cylinder Head of GLX

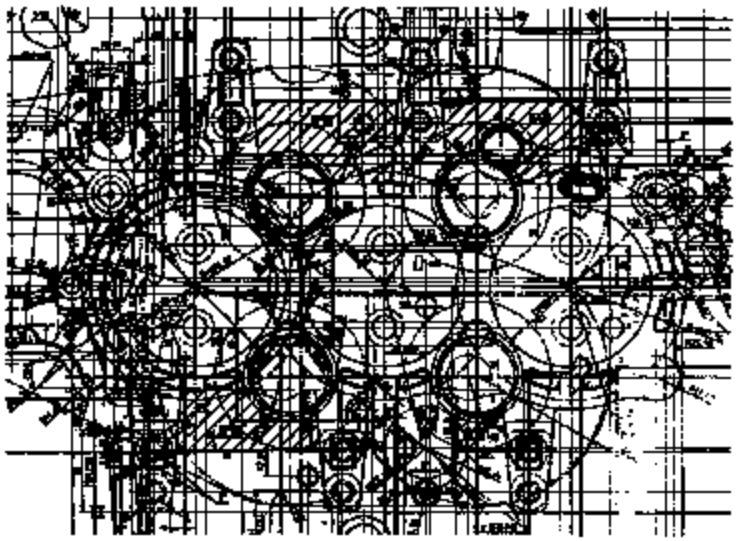
Check by inserting a 3mm diameter wire bent into the shape of coolant passage.



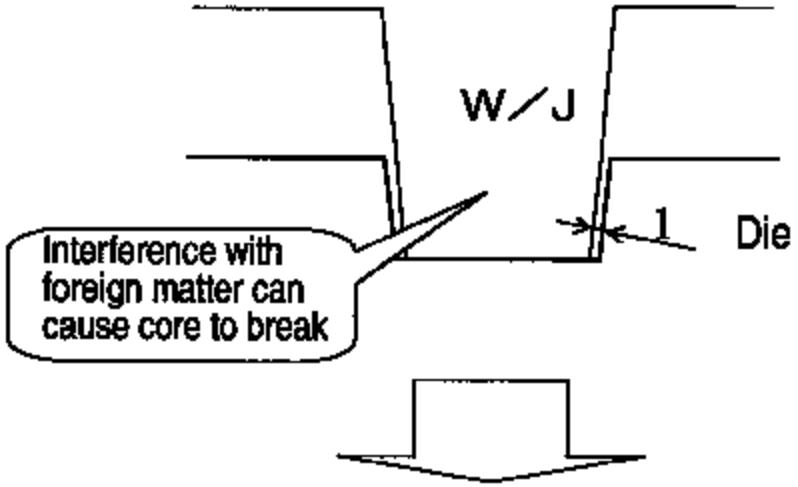
Description of Die Modification

- It was so arranged that the core would be, if broken, separated from the core print.
- It was so arranged that the two portions (indicated by "a") at where breakage had occurred would not interfere with foreign matter such as burr.

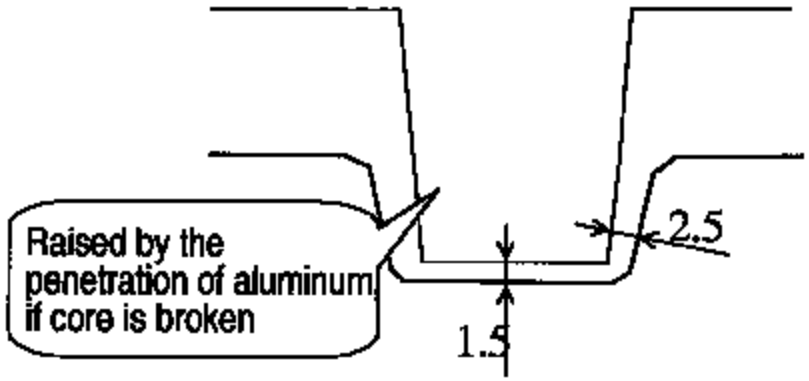




Before countermeasure



After countermeasure



GL1800 Coolant Temperature Problem

[redacted]

01'YM

Air trapped in cylinder head

Sub harness added

02'YM

Sensor position changed

Detection by sensor:
Trapped air temperature
⇒ Coolant temperature

03'YM

Red zone beginning temperature changed

122⇒126℃

2 complaints (JPN/US)

Blocking of radiator

1 complaint (US)

Blocking of coolant passage in cylinder head

L cylinder head

R cylinder head

Incorrect indication by temperature gauge

Lack of radiator capacity

Cause analysis in progress

Manufacturing defect

Market complaints/claims

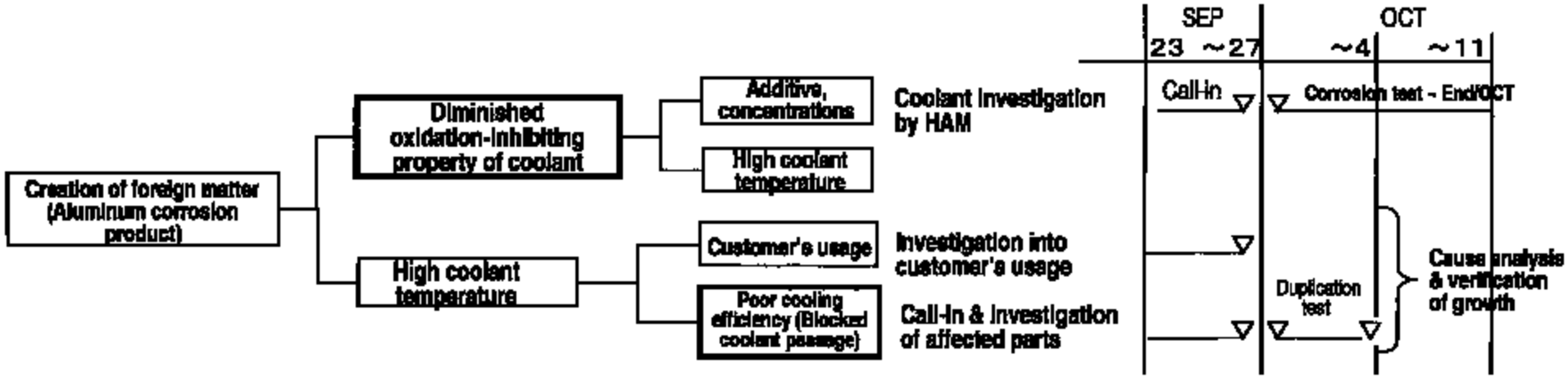
[redacted]

[redacted]

Brief description of complaints about overheat that was found caused by foreign matter in radiator (2 complaints)

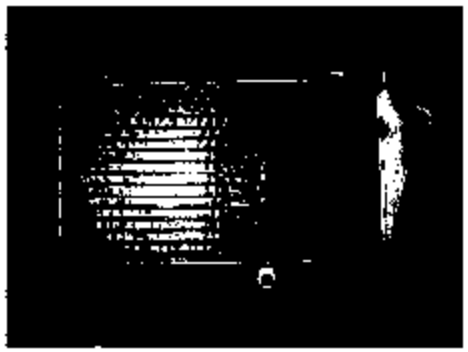
	First complaint (Japan)	Second complaint (USA)
Date of occurrence	July 23, 2002	September 9, 2002
Date of registration	February 22, 2002 ('02YM)	September 9, 2001 ('02YM)
Total distance traveled	2566km	8000 miles (12800km)
Frame No.	SC47-1000157	1HFSC47092A101134
Alleged symptom	When riding, vehicle has given overheated indication by the temperature gauge climbing above the red zone.	Temperature gauge went into the red zone after 20 minutes of riding at highway speeds.
Check result	The L radiator was clogged with foreign matter.	When measured with infrared thermometer, the temperature of L radiator was 38°C and that of R radiator was 92°C. When the radiator was removed, it was found clogged with foreign matter.
Past maintenance record	No coolant maintenance has been done	No maintenance has been done

Possible cause of foreign matter :
Coolant deterioration at high temperature → Creation of aluminum corrosion product



Conditions of Returned Parts

Second complaint (USA)



Second complaint (USA)

First complaint (Japan)

First complaint (Japan)

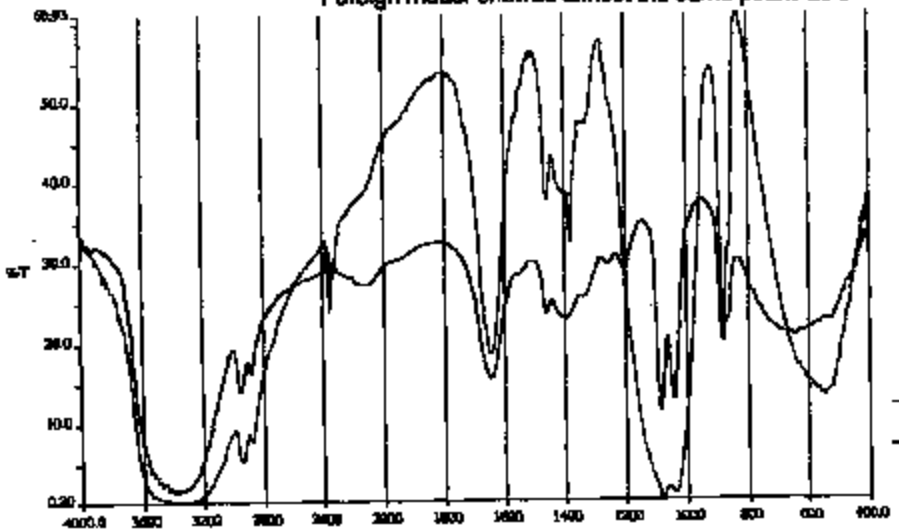
Result of Investigation into Foreign Matter Found in Radiator

9-22-02
HGA Fujitaka

[redacted]

FT-IR analysis result

Foreign matter showed almost the same peaks as those of coolant.



EDS analysis result

C	33.97 %
O	34.17
Na	2.67
Al	11.92
Si	1.73
P	9.34
S	0.72
K	4.30
Mo	1.17

Both the constituents of coolant and oxide of aluminum were detected.

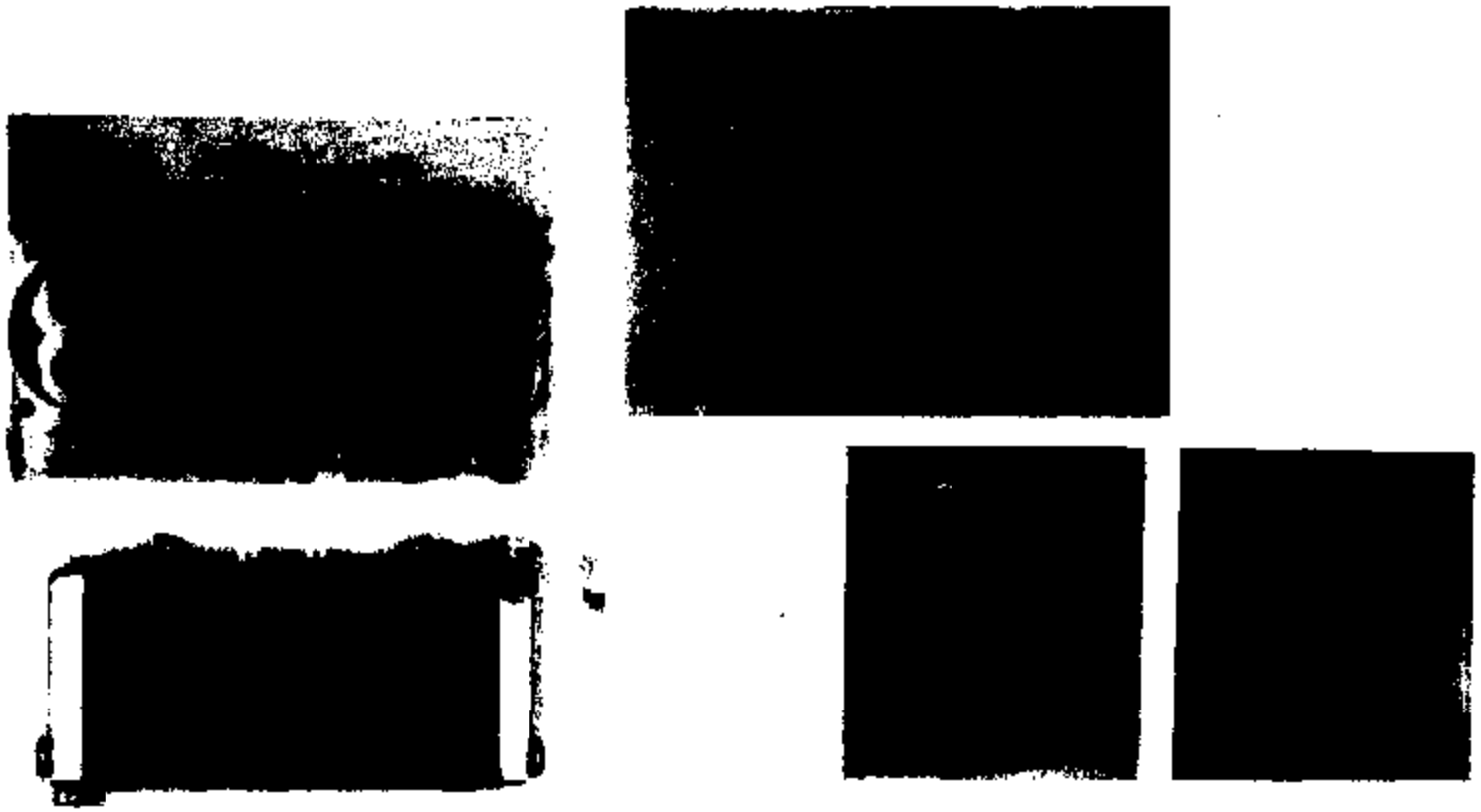
Past Trouble

Coolant : FORD FLUID PARA RADIADORES (Brazil)

Although the coolant did not meet Honda SPEC, it was the best of five types of test coolants which were commercially available in Brazil.

MV9 (CRB600) EH high-speed durability test for 60 hours

- Coolant passage-incorporating aluminum parts (cylinder head, oil cooler and radiator) were heavily corroded and a large amount of corrosion product was created.



Results of Tests on Coolants Commercially Available in the US

- Coolants commercially available in the US compared poorly with factory fill (Valvoline 340-2) in property of preventing aluminum from corrosion.
- The user commented that he had not added any of these commercially available coolants. Adding any of these coolants can aggravate corrosion.

	SIERRA	PRESTONE	PEAK	ALL−CLIMATE	Factory fill (Valvoline 340-2)
Result of corrosion test of electric heating aluminum surface	○	×	○	○	○
Honda SPEC Corrosion amount ≦ 0.20 (mg/cm²)	0.15	0.21	0.05	0.18	0.07

Future Plan

* Investigation into growth of "clogging" trouble

- Checking of coolant passage-incorporating parts other than radiator
- Checking of frequently overheated (but not yet "clogged") vehicle
- Duplication test with coolant passage in R cylinder head blocked

* Reconfirmation of MMP coolant properties

Properties were confirmed to be OK in 1991, however,

① Change from BASF to Valvoline was made, and

② The price delivered was cut down through cost competition.

In view of these circumstances, we ought to reconfirm actual properties of the currently used coolant.

Roundup of Coolant Temperature Problem with GLX1800 (MCA)

1. Specification Changes Made in MCAA (from '01 to '03)

2. Proposal of A/S Action Plans to AH

3. Future Course of Action and Remedial Specifications to Apply to '05 and Subsequent Model-year Vehicles

4. Blocking of Water Jacket

2002/9/21 2K YAMASHITA

Specification Changes Related to Temperature Gauge

	Model	Name	Destination	Coolant temperature sensor	Corrective resistor	Red zone beginning temperature	Cooling fan layout
1	2001	MCAA	A, EC	Temperature of trapped air	2.7Ω resistor added (Sub harness)	Aimed at 122°C	Internal draw-in fan
2					2.7Ω resistor added (Fairing harness)	Aimed at 122°C	↑
3	2002	MCAF	A, EC			Set at 122°C	↑
4			K		1.2Ω resistor added (Sub harness)		↑
5					1.2Ω resistor added (Fairing harness)		↑
6	2003	MCAH	A, EC, K		Temperature gauge inside		↑

Summary as of August 2002

Temperature gauge indicates higher temperature than actual

01YM: Temperature of trapped air was measured

02YM: Improved to measure actual coolant temperature
03YM: Red zone beginning temperature was changed from 122ºC to 126ºC

Countermeasures to use on the next and subsequent model-year vehicles

- For 02YM and 03YM, it was a practical impossibility to take drastic measures without changing exterior.
- Considering the possible parade-like use (i.e. prolonged vehicle operation in slow moving traffic), the following actions will be introduced as a set:

  ① Temperature gauge red zone beginning temperature change from 122ºC to 126ºC

  ② Action from software viewpoint (e.g. recommendation of use of 2ND gear)
- Drastic measures will be taken for 05YM.

Specification Changes Related to Temperature Gauge and Remedial Action to Use on Future Models (Proposal)

The following constitute the report given to AH on the occasion of lineup coordination.

* Considering that 2005 model can undergo exterior change, drastic measures to effect change in cooling fan layout should be taken on that occasion.

Model	Flow	Development purpose	Destination	Coolant temperature sensor	Temperature gauge type	Corrective resistor	Red zone beginning temperature	Cooling fan layout
2001	PD	FMC	A, EC	Temperature of trapped air	Intermediate stabilizing type	2.7Ω resistor added (Sub harness with 2.7Ω resistor) (Fairing harness with built-in 2.7Ω resistor)	122°C	Internal fan
2002	M	Color stripe VA Local content increase Addition of derived models Market problem solving	A, EC		↑	——	↑	↑
			K		↑			↑
2003	C	Color stripe VA Local content increase Market problem solving	All		↑	——		↑
2004	CorM	Color stripe VA Local content increase Market problem solving	All		↑	——		↑
2005	MorPD	Addition of the 30th anniversary commemorative version	All	↑	Linear or intermediate stabilizing type	——	122°C	External fan

Tabular Summary of A/S Action Plans – Proposal to AH GL1800 Temperature Gauge

			Cooling performance					Fan noise	Influence on appearance	Comfort (Protection from hot air)	Heat resistance of accessories	Cost
			Idling	Low-speed running			High-speed running					
				Effectiveness against climbing to red zone	Effectiveness in prolonging time until reaching red zone	Effectiveness against coolant expulsion						
1	Mass production	Mass production spec	○	×	×	×	○	○	○	○	○	—
2		Cap pressure 1.8kg/cm² Red zone beginning temperature 139°C	○	×	○	×	○	○	○	○	○	3000 1000
3	A/S Action Plan -①	External cooling fan	○	×	○	○	○	○	△	×	○	89950
4		Cap pressure 1.8kg/cm² Red zone beginning temperature 139°C	○	◎	○	◎	○	○	△	×	○	
5	A/S Action Plan -②	2 fans on L side Force-out fan on R side	○	×	○	×	○	×	○	○	○	104073
6		Cap pressure 1.8kg/cm² Red zone beginning temperature 139°C	○	○	○	○	○	×	○	○	○	

Comments from AH are summarized as follows:

1. It is not acceptable that the pointer climbs to or above the red zone.
2. Comfort (protection from hot air) of rider and passenger should be equal to that of the current MCA or comfort at least equal to that of GL1500 should be secured.
3 The proposed market action will entail higher cost than we think is reasonable.
   The cost should be cut down. (We hope that a problem of this kind will be addressed not by complaint response on a case-by-case basis but by customer notification)
4. Exterior change should be avoided.
   If we initiate any exterior change (as complaint response on a case-by-case basis), the information will spread widely by Internet or word of mouth and this can attract a rush of customers. Viewed in this light, any action entailing exterior change is hardly advisable. We suppose buyback, which would cost less, is preferable to exterior change.

* It would be practicable to make exterior change in '05YM. In the meantime we should take A/S action meeting the above conditions, which you are requested to plan and propose to us.

Comment from HGA

We have work underway in an all-out effort to refine our plan to meet all the requirements of AH. A meeting was held on SEP 19 for discussing ideas, and we are in a hurry to verify effectiveness of these ideas.

Cooling System Specifications for '05 and Subsequent Model-year Vehicles (JBP)

We judge the following specifications (details of ③) suit our purpose.

		JBP	MCAA ('01~'04)	As against base
Heat radiation of radiator		32. 2kw	26. 4kw	1.22 times larger
FAN	Flow	External draw-in fan	Internal draw-in fan	2.7 times larger
	Diameter	ϕ210	ϕ157	
Motor revolving speed		3700rpm	3350rpm	

	Radiator size	Heat radiation	FAN	Motor	Moving slowly like in parade	Towing a trailer	Comfort (protection from hot air)	Charging & discharging	Fan noise	Remark
MP	270*158*24 P2.75	26.4kw(MCAA)	ϕ157*2	MCA	△	△	○	○	○	Internal draw-in fan
①	270*158*24 P2.75	↑	ϕ157*2	MCF	△	(△)	△	(△)	○	External draw-in fan
②	270*193*24 P2.75	1.22 times larger	ϕ177*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
③	270*193*24 P2.75	1.22 times larger	ϕ210*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
④	280 * 180*32 P2.5	1.48 times larger	ϕ177*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
⑤	270*158*24 P2.75	26.4kw(MCAA)	ϕ128*4	MEE	○	(△)	△	(△)	○	↑
⑥	270*158*24 P2.75	↑	ϕ157*2	MCF	(○)	(○)	(△)	(△)	(○)	2 cylinders stopped, external draw-in fan

Blocking of Water Jacket

Coolant Passage Block in Cylinder Head of GLX

Riding conditions in which the pointer of temperature gauge goes higher (or climbs to red zone)

	L			R			Low-speed running		Steady running				Soak (engine stop) after running	Idling after running
	A	B	C	A	B	C	Parade: Continuous riding at 15–20km/h in LOW gear	Stop-and-go: (Riding in ordinary stop-and-go traffic)	50k/h	100k/h	150k/h	Vmax		
Normal cylinder head	○			○			×	○	○	○	○	○	○	○
Water jacket blocked	■	○ ×	○ ×	○ ×		○ ×	×	×	×	×	×	×	×	×
	If the passage A in the L cylinder head is blocked, air pocket forms in the coolant temperature sensor area and the temperature gauge goes into the red zone whether or not any other passages are blocked and regardless of riding mode. (In the summer season)													
	○	○	○	×	×	○	×	○	○	○	○	○	○	○
	○	○	○	■	■	■	×	×	×	×	○	○	×	×
	So far as the coolant passage block in R cylinder head is concerned, the temperature gauge goes into the red zone only when all the passages A, B and C are blocked, but in this case it occurs even in ordinary riding mode. (In the summer season)													
Radiator clogged with foreign matter							(×)	(×)	(×)	(×)	(×)	(×)	(×)	(×)

Coolant Passage Block in Cylinder Head of GLX

● Coolant expulsion when riding slowly like in a parade

As the symptom was overheat at low speeds, it was judged to come under problems that could affect marketability.

● Coolant expulsion resulted from block in coolant passage caused by broken water jacket core

● Radiator clogging with foreign matter resulted in coolant expulsion

The worst symptom would be

Coolant expulsion occurs before the temperature gauge climbs to the red zone

↓

Coolant splashes on tire

↓

Safety of rider (and passenger) may be jeopardized

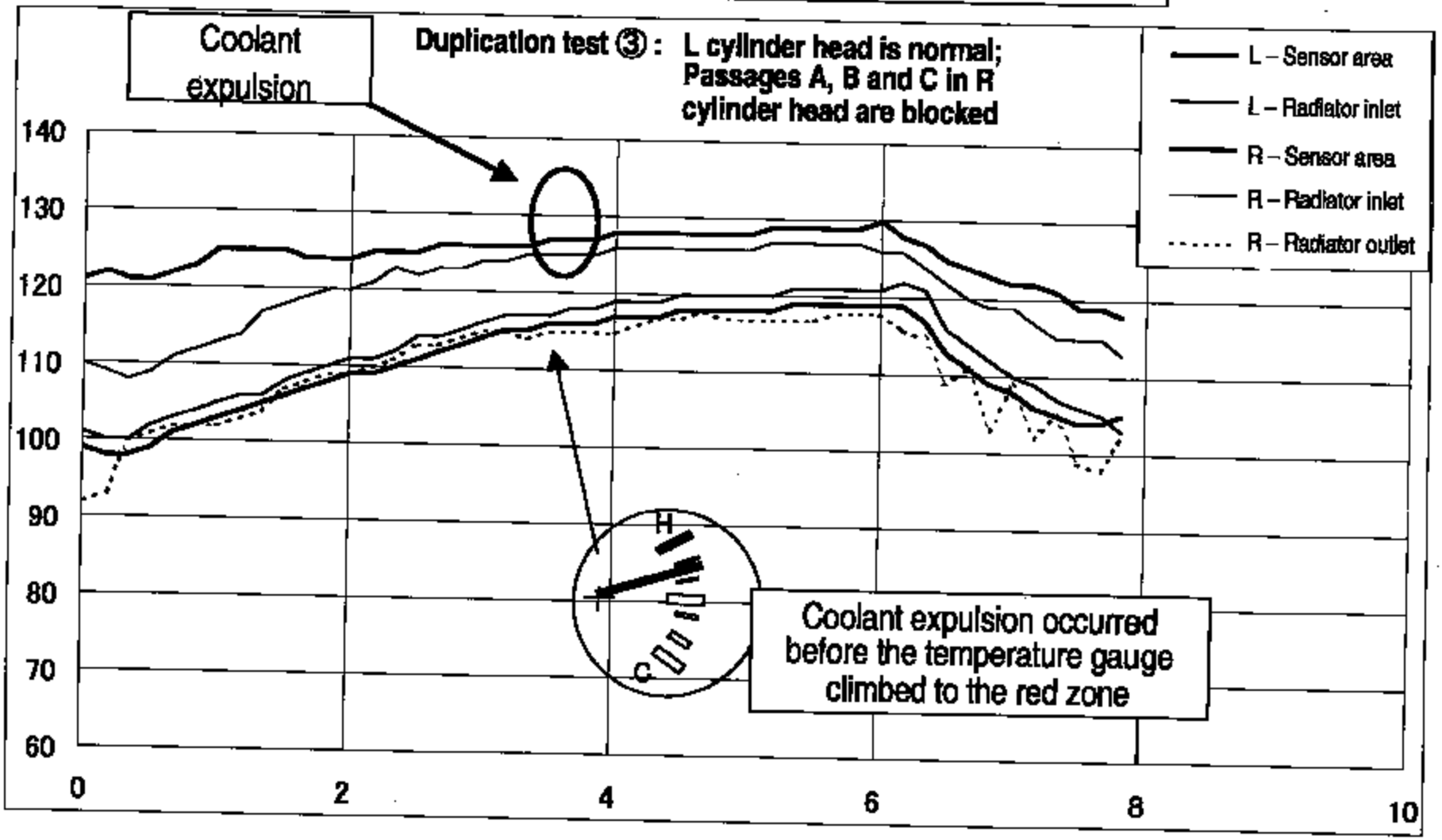
① Symptom that can occur when the L cylinder head (coolant temperature sensor side) is normal and passages A, B and C in R cylinder head are blocked

② Symptom that can occur when the radiator is clogged with foreign matter

Coolant Passage Block in Cylinder Head of GLX

Under the following conditions, coolant expulsion can occur before the temperature gauge climbs to the red zone:

- There is no blocking in L cylinder head but passages A, B and C in R cylinder head are blocked, and
- Vehicle is ridden continuously at 15km/h in LOW gear.



Coolant Passage Block in Cylinder Head of GLX

Trail of coolant expelled from overflow reservoir when GL1800 overheated and the rear tire position

Riding conditions	Move slowly like in parade		Ride in an overheated condition created forcedly (by cutting off cooling air)			
	Run at 20km/h		Run at 80km/h		Run at 120km/h	
	Straight	Slalom	Straight	Slalom	Straight	Slalom
Judgment	○	○	○	×	×	×
Observation	Coolant was expelled 30mm outward of the tire side.	Tire tread did not get on the trail of expelled coolant even during left turn.	Coolant was expelled 30mm outward of the tire side as in the case of riding at 20km/h.	Tire got on the trail of expelled coolant during left turn.	Coolant was dispersed into mist by the head wind. Coolant got on the tire tread and side wall, though small in amount.	

A series of tests was conducted on an asphalt-paved road, and the rider did not feel the tires slipping on the road throughout the testing.

Coolant Passage Block in Cylinder Head of GLX

● **There exists an urgent need to confirm the matters (within the red circle) yet to be confirmed to make a judgment as to whether a safety-related defect exists.**

	L			R			Coolant expulsion before temperature gauge climbs to red zone	Splashing of expelled coolant on rear tire	Ultimate symptom (Engine breakdown)	Safety-related defect
	A	B	C	A	B	C				
Normal cylinder head							No	No	OK	OK
Water jacket blocked	■	○ ×	○ ×	○ ×	○ ×	○ ×	No	No	Unconfirmed	
	○	○	○	×	×	○	No	No	Unconfirmed	
	○	○	○	■	■	■	■	No	Unconfirmed	
Radiator getting clogged with foreign matter	○	○	○	×	×	○	No	No	Unconfirmed	
	User who is not made aware of this pattern may continue riding and allow foreign matter to completely clog the radiator.									

GL1800 Coolant Temperature Problem

Future Activity

		SEP						OCT															
		23	24	~	27	~	30	1	2	3	4	5	6	7	8	9	10	11	12	~	29	30	31
							☆Report to GOM																
1	**Insufficient radiator capacity**																						
	1. Permanent solution by specification change		Action to use on '05YM																				
	2. Complaint response on a case-by-case basis		▽								▽												
	Proposal of ideas																						
2	**Water jacket blocking**																						
	HGA test																						
	1. L cylinder head OK, R cylinder head NG	▽			▽																		
	2. Meeting to determine need of engine durability test	▽				▽	Chassis dynamometer test				▽												
	Mas																						
	1. Measures to stop problem																						
	- 100% inspection for blocking (MMP) from 8/29																						
	- Castings OK assurance from 8/28																						
	2. Parts replacement (100% inspection)						▽(Plan presentation)																
	3. Defect rate estimation (including L/R combination)				▽																		
3	**Radiator blocking**																						
	1. Buyback of affected vehicle		▽Negotiation with vehicle owner											▽									
	2. Verification by disassembling affected vehicle														▽			▽					
	3. Duplication test						▽				▽												
	4. Investigation into coolant used by HAM				▽		▽Corrosion test ~ End/OCT																
	5. Investigation into customer usage				▽		3K																
	6. Ultimate symptom to which coolant passage block in cylinder head can lead							▽	Engine durability test		▽			▽Verification by disassembly									

Supplementary Data

Causes of Poor Cooling Performance When Riding Continuously at Low Speeds (When Riding in Parade Mode)

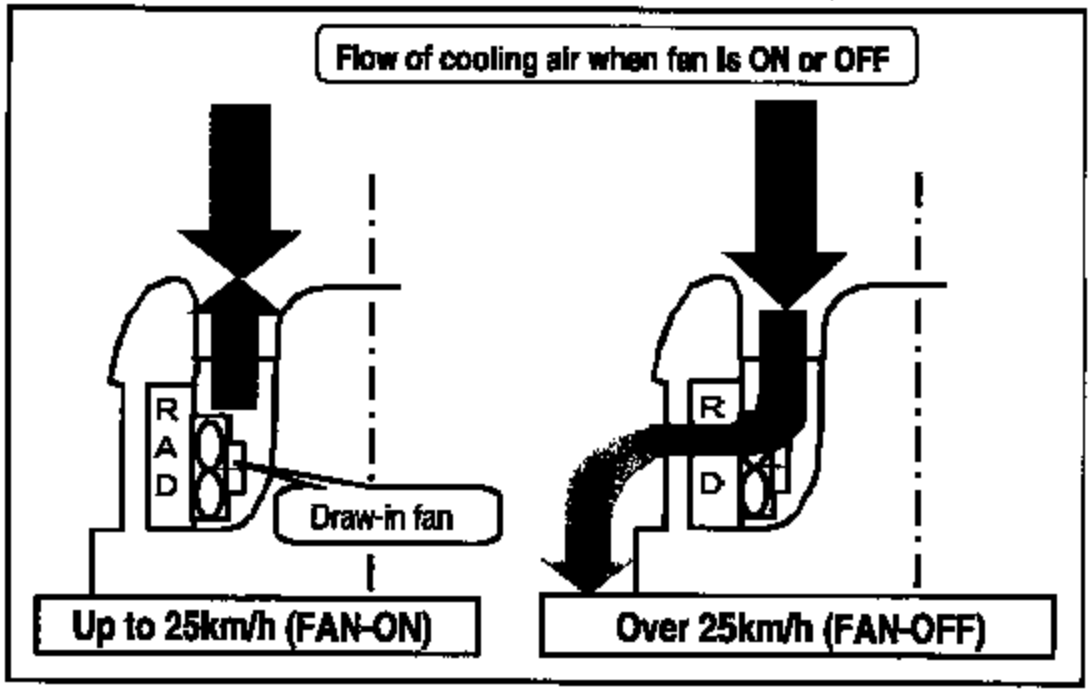
The main factor is that we lacked consideration of how GL would be used.

1) It has been proved that all the "A" requirements are fulfilled by testing in ordinary riding mode.
2) The vehicle was not supposed to be ridden continuously at low speeds in LOW gear (not supposed to be ridden in parade mode).

* Specification was such that the air discharged by the cooling fan would confront the incoming air at vehicle speeds which would be most frequently used in parade mode.

The cooling fan is designed to come ON when the vehicle speed drops below 25km/h and has such layout that cooling air is drawn in from the side of the vehicle body and hot air is discharged in the forward direction of the vehicle body.

GLX1800 cooling system



Aims
- Improvement in appearance grade and marketability
- Improvement in rider's comfort (protection from hot air)
- Improvement in fan noise (quietness)

Specification Changes Related to Temperature Gauge

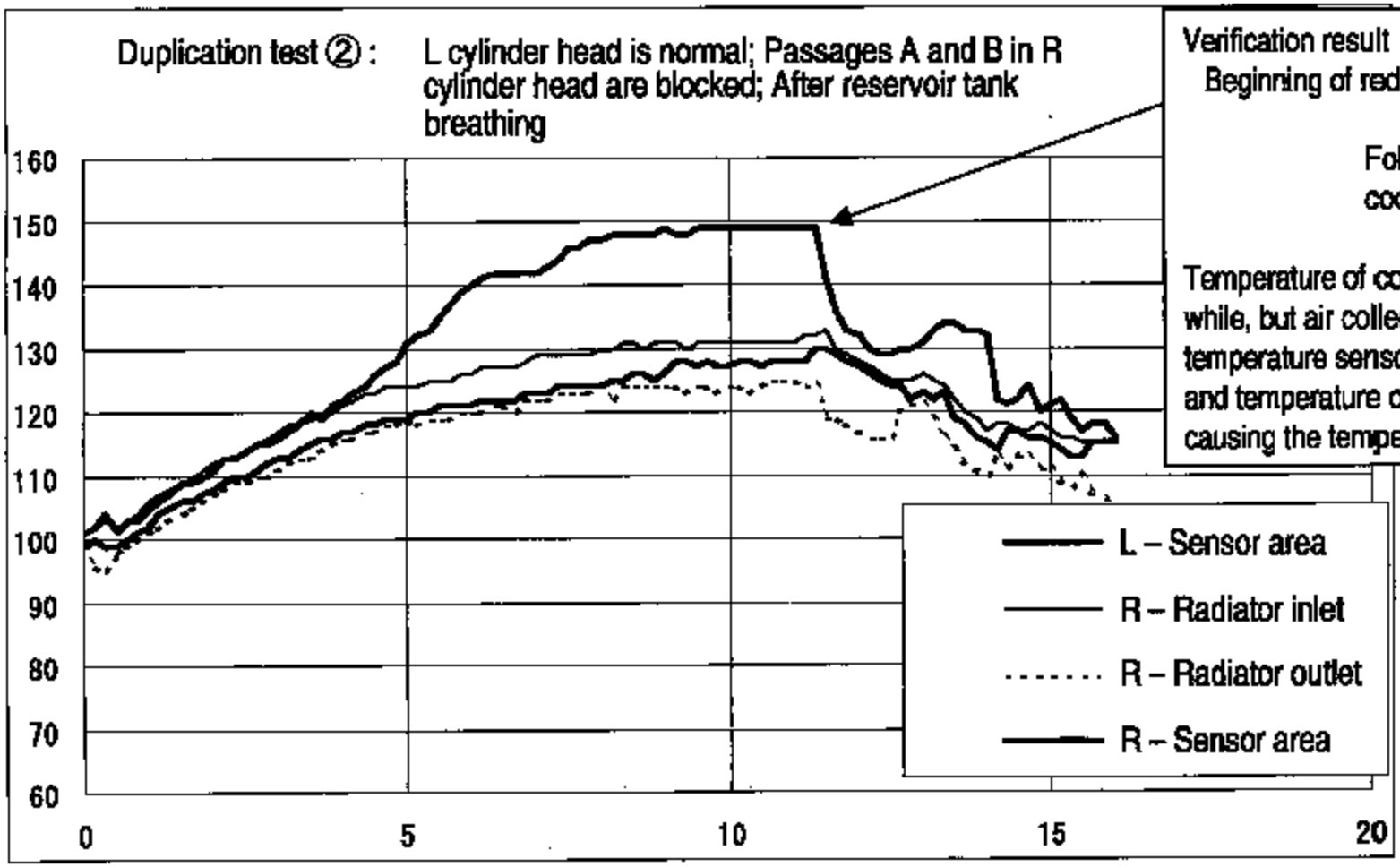
	Model	Name	Destination	Coolant tem. sensor	Actual coolant temperature	Red zone beginning temperature	Cooling fan layout
1	2001	MCAA	A、EC	Temperature of trapped air	2.7Ω resistor added (Sub harness)	Aimed at 122°C	Internal draw-in fan
2					2.7Ω resistor added (Fairing harness)	Aimed at 122°C	↑
3	2002	MCAF	A、EC			Set at 122°C	↑
4			K		1.2Ω resistor added (Sub harness))		↑
5					1.2Ω resistor added (Fairing harness)		↑
6	2003	MCAH	A、EC、K		Temperature gauge inside		↑
7	2004	MCAJ	A、EC、K		↑		↑
8	2005		A、EC、K				External draw-in fan

Coolant Passage Block in Cylinder Head of GLX

Under the following conditions, coolant expulsion won't occur before the temperature gauge climbs to the red zone:

- There is no blocking in L cylinder head but passages A and B in R cylinder head are blocked, and
- Vehicle is ridden continuously at 15km/h in LOW gear.

Duplication test ② : L cylinder head is normal; Passages A and B in R cylinder head are blocked; After reservoir tank breathing



Verification result

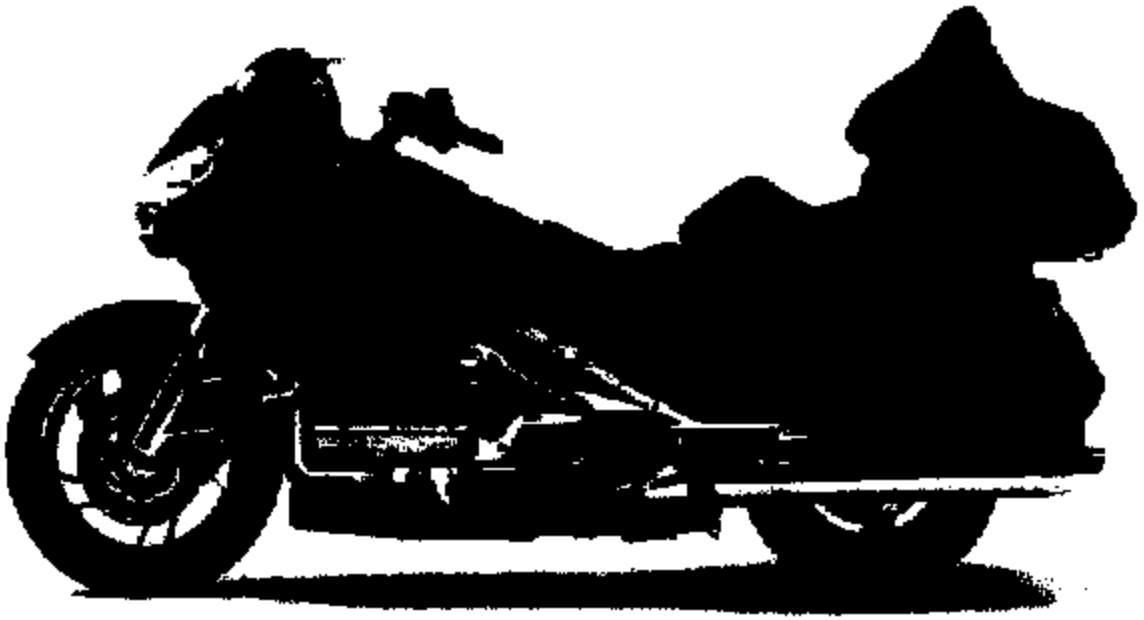
Beginning of red zone at this point

↓

Followed immediately by coolant expulsion

Temperature of coolant is measured for a while, but air collects in the coolant temperature sensor area with the lapse of time and temperature of air is measured, thus causing the temperature gauge to climb rapidly.

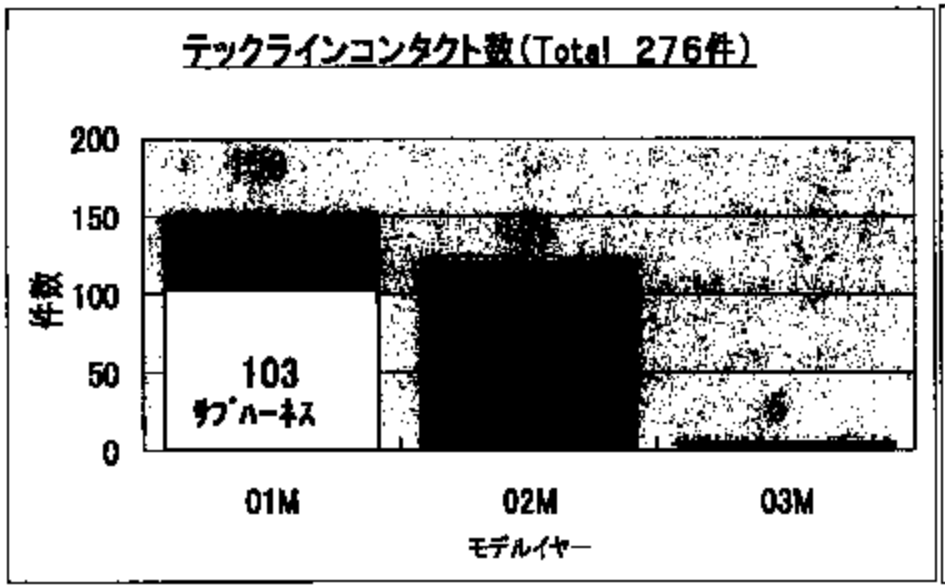
GLX1800(MCA)　水温高い

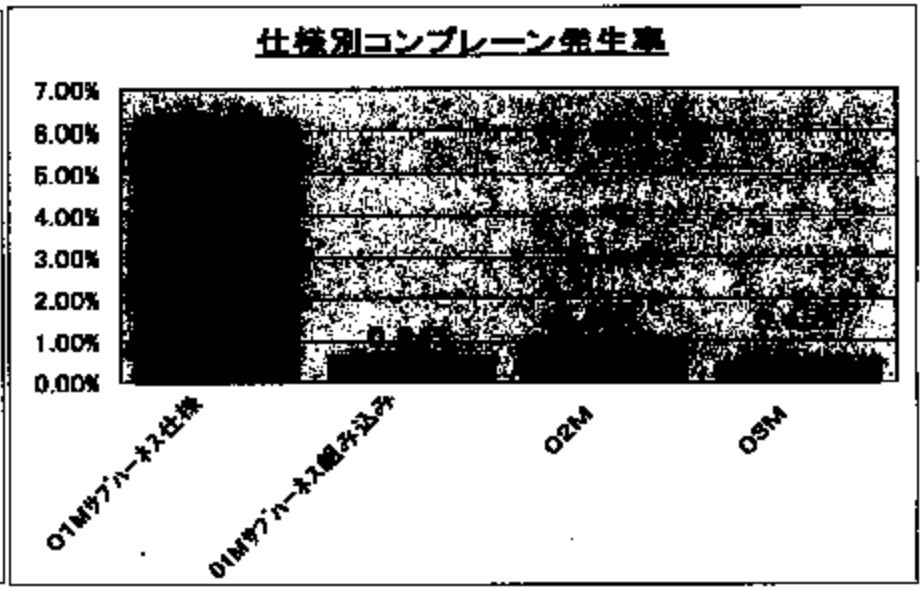


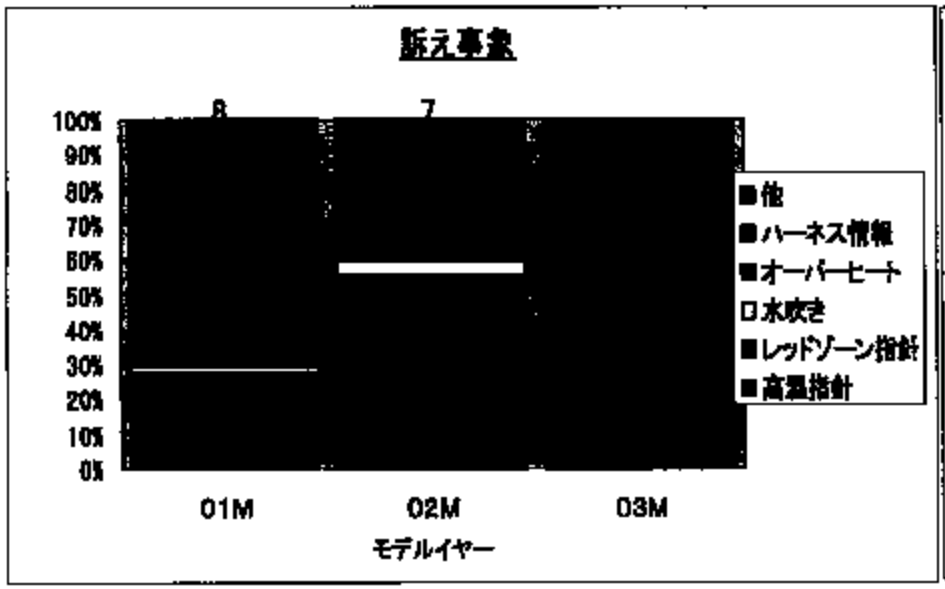
GQM(9月30日)

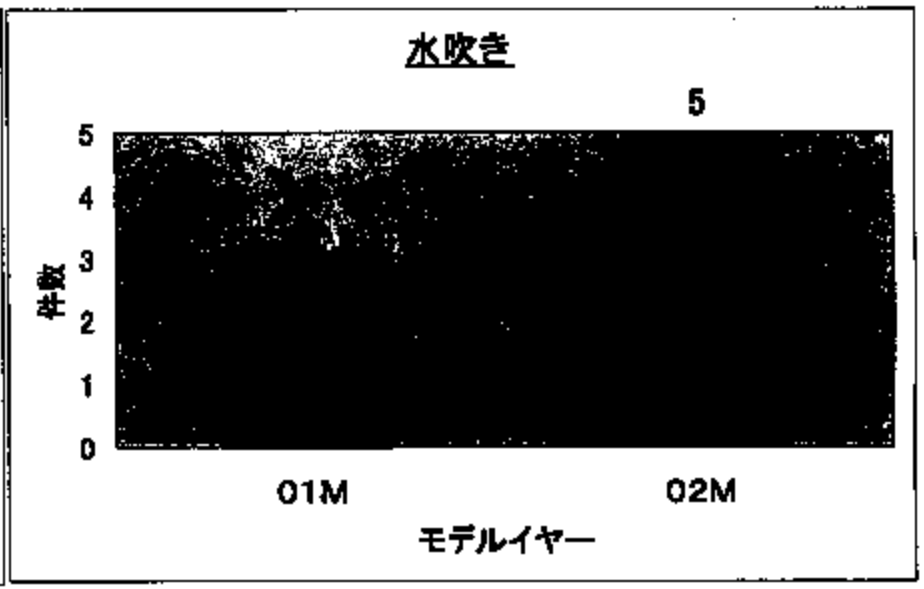
市場情報(テックライン情報)　GL1800水温計

US販売台数:01‘ 8917台　02’ 12689台 03‘ 1094台





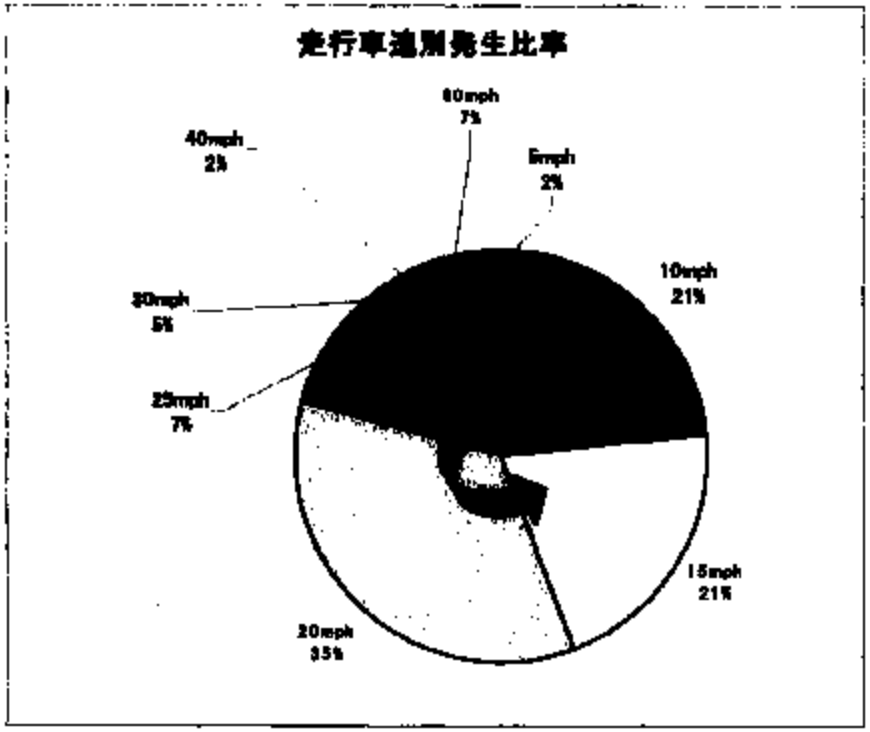


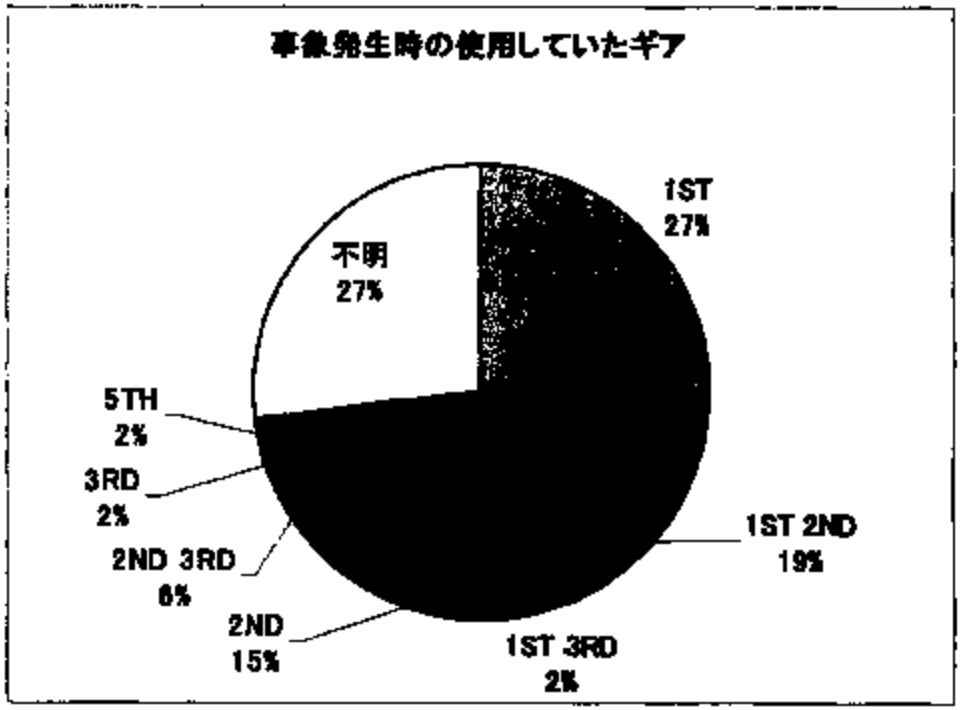


GL1800 水温不具合

《アンケート結果 01‘12名 02’36名》

[redacted]





GL1800 水温不具合

[redacted]

01'YM
ﾍｯﾄﾞ・エアー溜り
サブハーネス追加

02'YM
センサー位置変更
センサー:空気⇒水温

03'YM
RZ温度変更
122⇒126℃

2件(国内/US)
ﾗｼﾞｴｰﾀｰ閉塞

1件(US)
ﾍｯﾄﾞ水通路閉塞
L側
R側

[redacted]

市場ｺﾝﾌﾟﾚｰﾝ・ｸﾚｰﾑ

[redacted]

GL1800 水温不具合

[redacted]

01'YM
ヘッド・エアー溜り
サブハーネス追加

02'YM
センサー位置変更
センサー：空気⇒水温

03'YM
RZ温度変更
122⇒126℃

2件（国内/US）
ラジエーター閉塞

1件（US）
ヘッド水通路閉塞
L側
R側

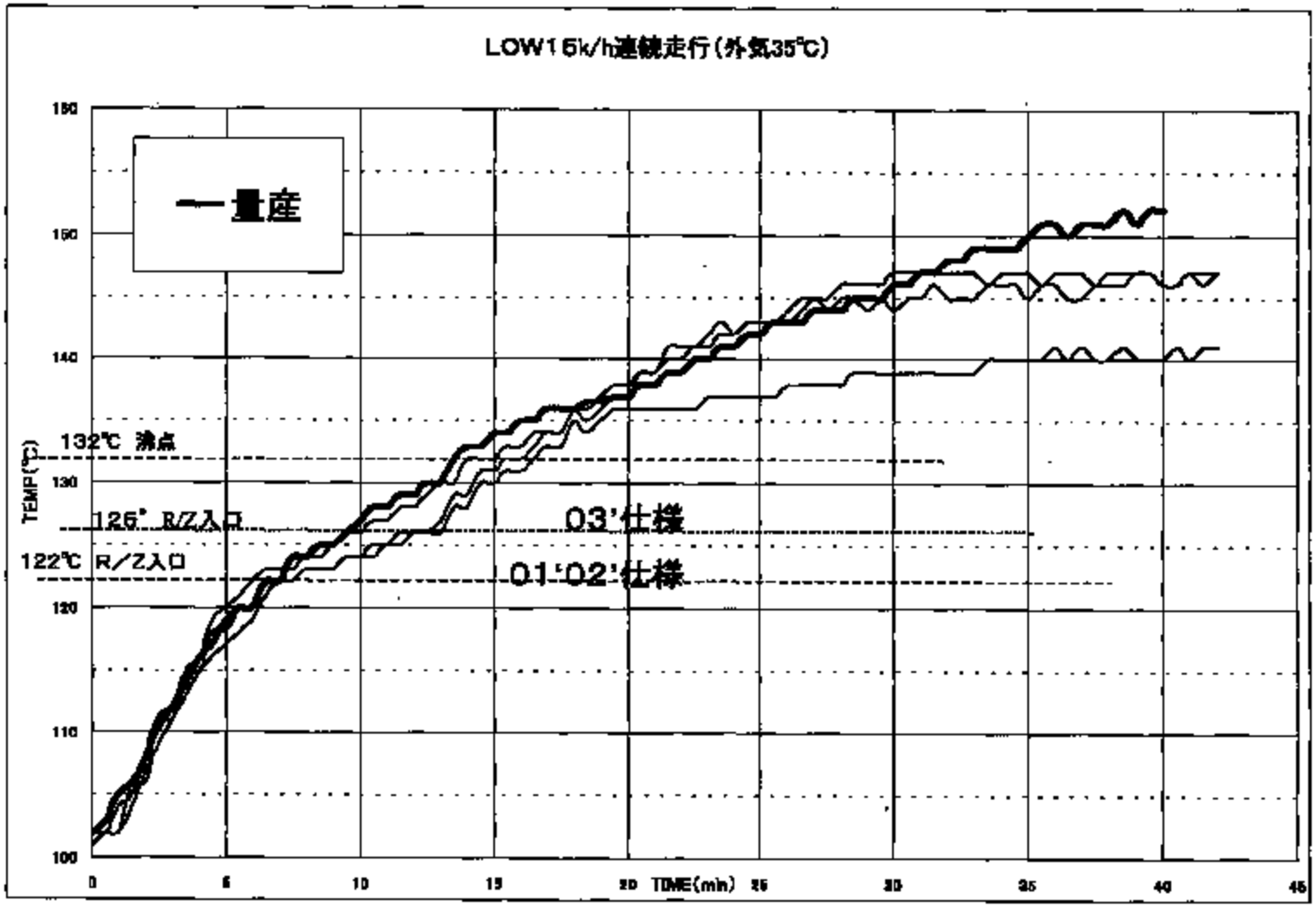
[redacted]

市場コンプレーン・クレーム

[redacted]

GL1800 水温不具合

GL1800低速域性能



GL1800 水温不具合

水温低下対策案

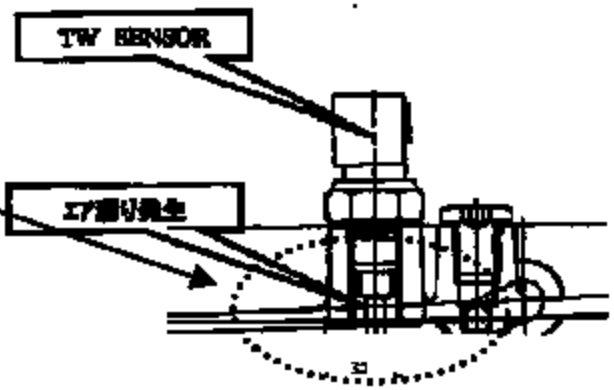
		冷却性能				ファン騒音	外観影響	熱居住性	補機類耐熱	その他
		アイドル	低速走行		高速走行					
			延命効果	水漏き						
1	量産仕様	○	×	×	○	○ 63dB	○	○	○	
2	ファンCUT速度変更	○	×	×	○	○	○	○	○	
3	↑＋ファン逆転	×	×	×	○	×	○	×	○	
4	シュラウド無し	○	○	×	×	○	○	×	×	
5	じゃま板	○	○	×	×	○	×	○	○	
	じゃま板 ＋FAN能力UP	○	○	×	○	○	○	○	○	
7	引きファン×1 押しファン×1	×	○	×	○	×	○	×	○	
			②	○						
9	押しファン×2	×	○	×	○	× 69dB	○	×	○	
			①	○						
8	05モデルL/O （ファン外付け）	○	○	○ 117℃ サチレート	○	○ 61dB	×	○	○	

■US持ちこみAS案

GL1800 水温不具合

01 'YM R/Z入口温度122℃設定

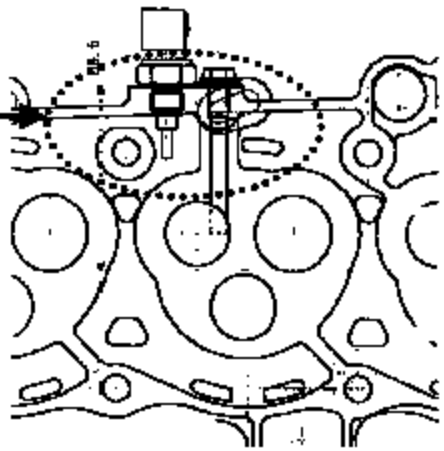
・水温センサーエアー溜まりにより水温計の指示が高く表示



・サブハーネス及びハーネスに補正抵抗(2.7Ω)を追加対応

02 'YM R/Z入口温度122℃設定
但し日本使用については渋滞を考慮し、R/Z入口温度を126℃とした

・ヘッドセンサー部を変更し、エアー溜まりを無くした。



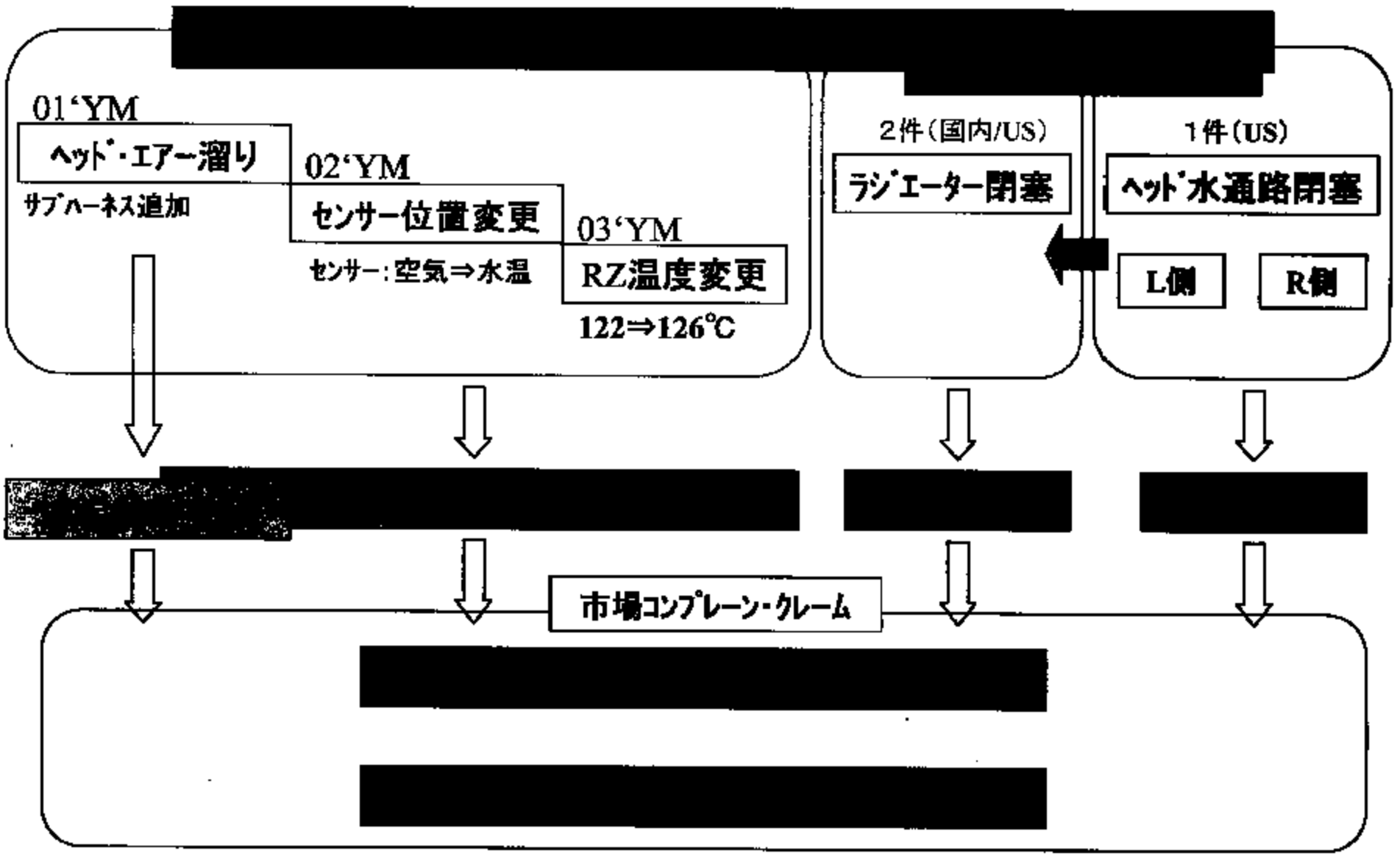
03 'YM R/Z入口温度126℃設定

[redacted]

対応としてR/Z入口温度126℃仕様のサブハーネスを用意しモニターを行なった。
結果:50%の効果は確認されたが126℃用のサブハーネスはAHとしては市場対応を断念

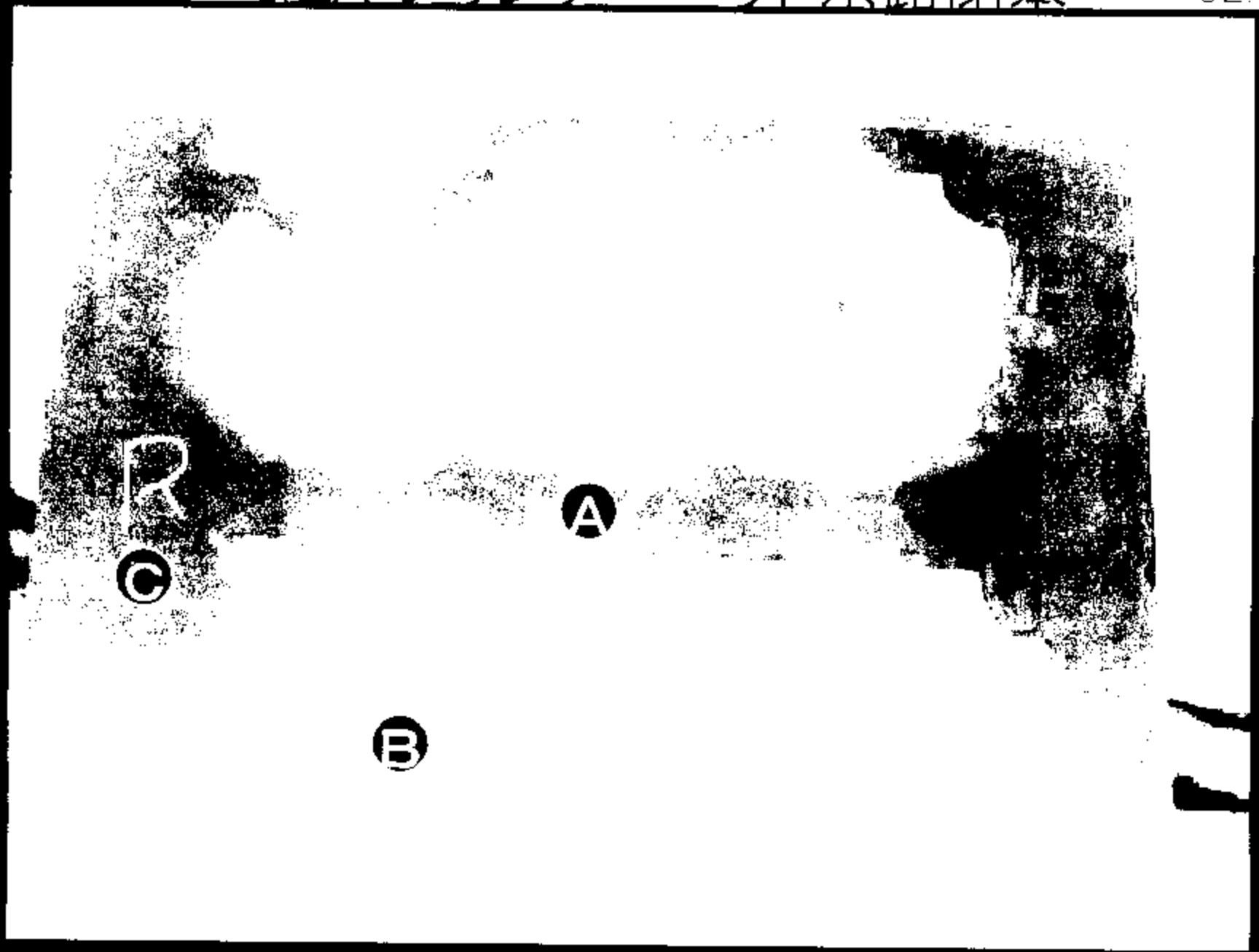
04 'YM 03 '仕様継続

GL1800 水温不具合



●GDC－　GLX シリンダーヘッド水路閉塞

02. 09. 2

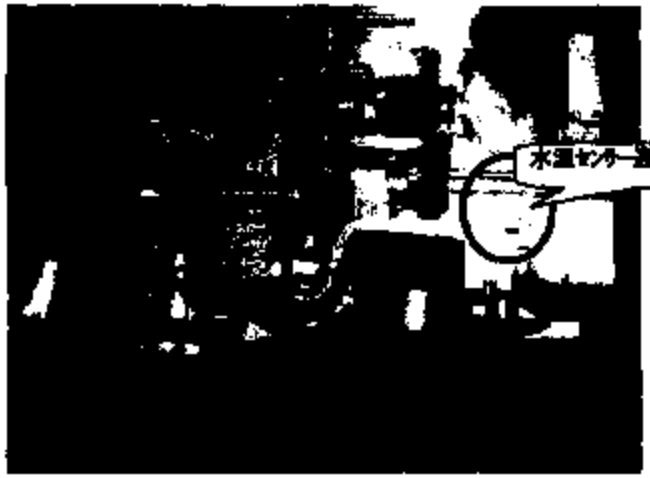


第一発見MMPにて

MCA　　冷却水通路 閉塞 #1

B閉塞

A閉塞(半閉塞)



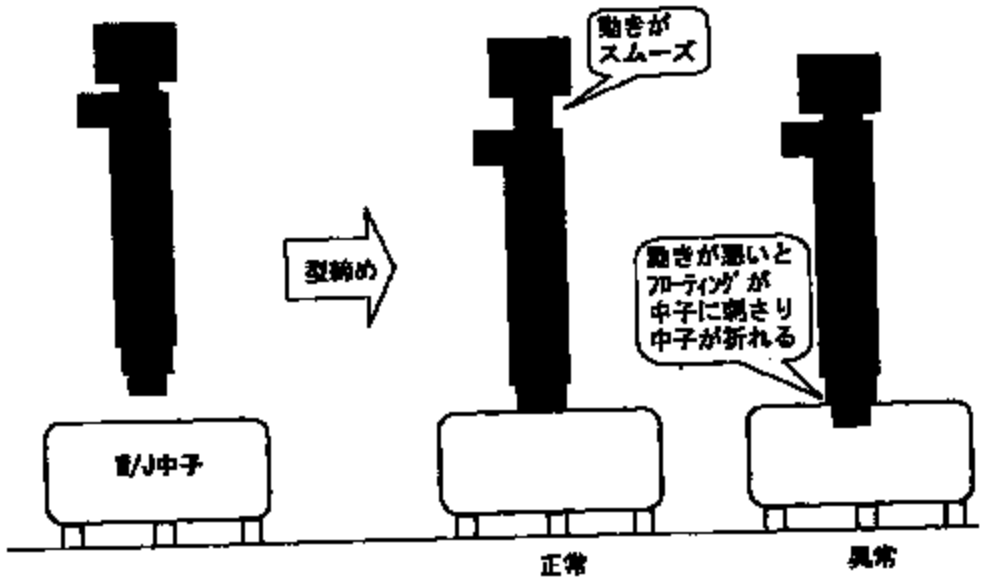
GLXシリンダーヘッド水路閉塞

フローティングベントの不具合によるW/J折れのメカニズム

フローティングベント
（中子のガスを抜く）

る）

W/J押さえピンの中でフローティングベントが可動する



●GDC M　GLXシリンダーヘッド水路閉塞

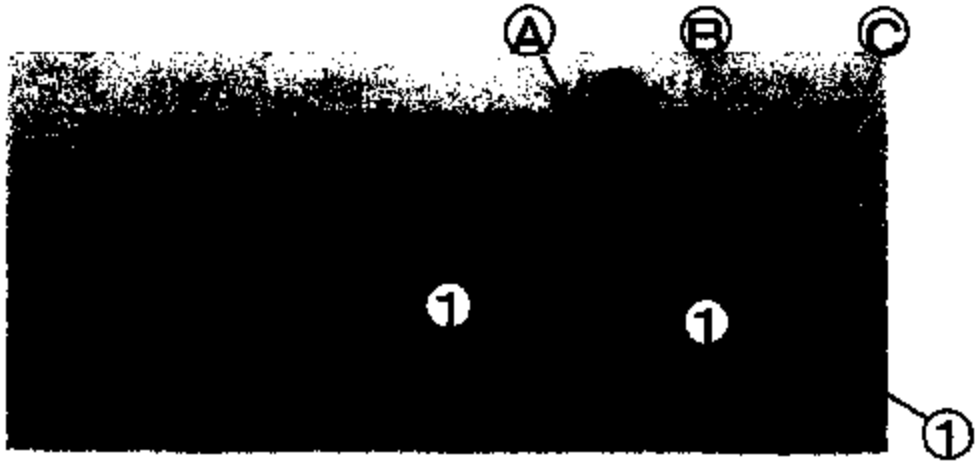
●流動品選別結果

(水路閉塞率)GDC・機械・日通・MMP

	AB閉塞	A閉塞	B閉塞	C閉塞	TTL
L	120／5093 2.4%	78／5093 1.5%	734／5094 14.4%	0／5094 0.0%	932／5095 18.3%
R	7／5319 0.1%	227／5319 4.3%	90／5319 1.7%	0／5319 0.0%	324／5319 6.1%

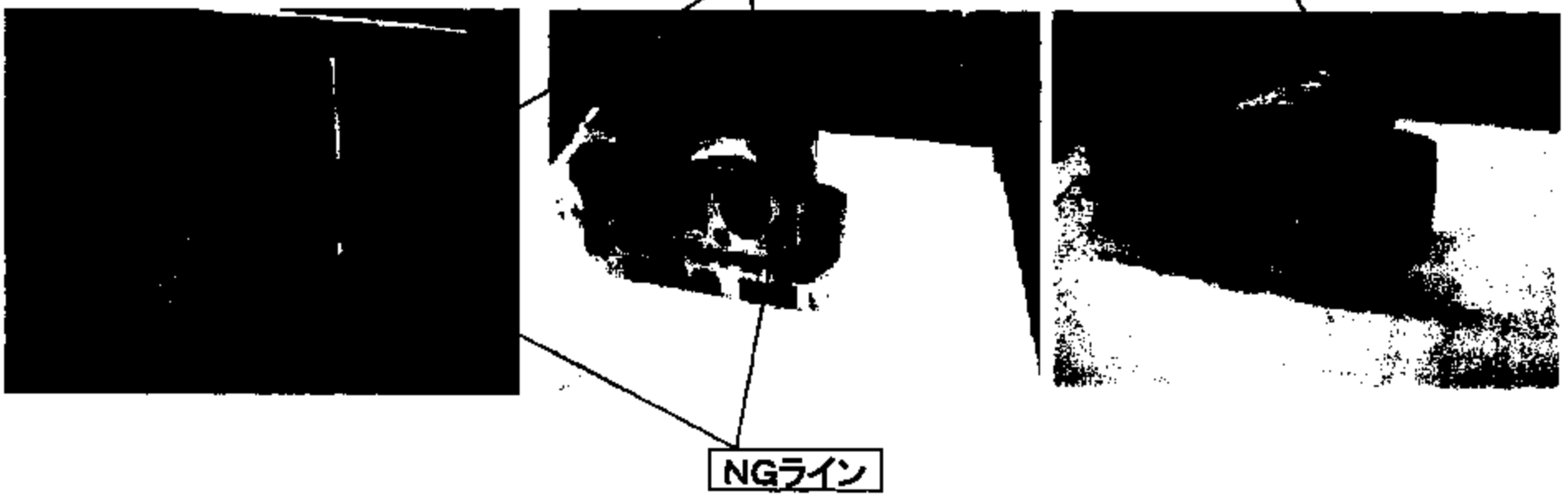
発生原因

	中子折れの種類	折れの発生工程	折れの原因	製品への影響	備考
I	Aのみ	造型工程	造型後の中子収縮	閉塞なし A閉塞	
II	ABC全て	鋳造工程	シーリング部①の押さえが強い 下型のP/J位置決め部②にバリ残りで中子セット	閉塞なし A閉塞 B閉塞 AB閉塞	(B閉塞の考察) ②の位置決め部を支点とし開く為回転軸より距離の長いBのみ間隔が大きく開く



●GDC-M　GLXシリンダーヘッド水路閉塞

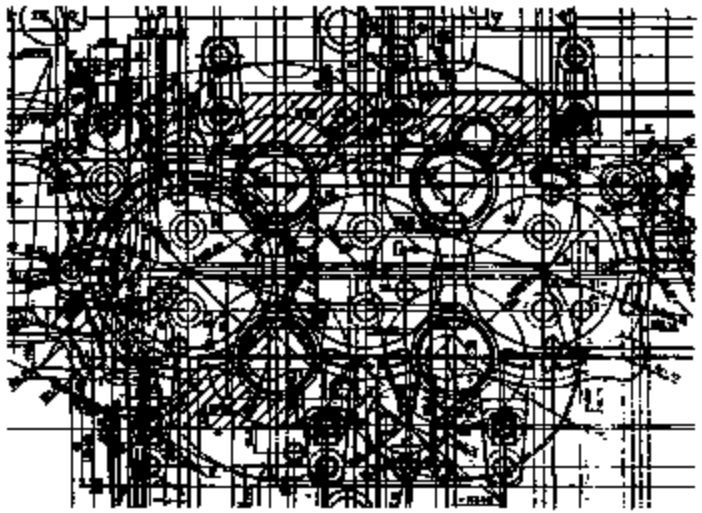
Φ3mm針金を水路形状に曲げ差込確認



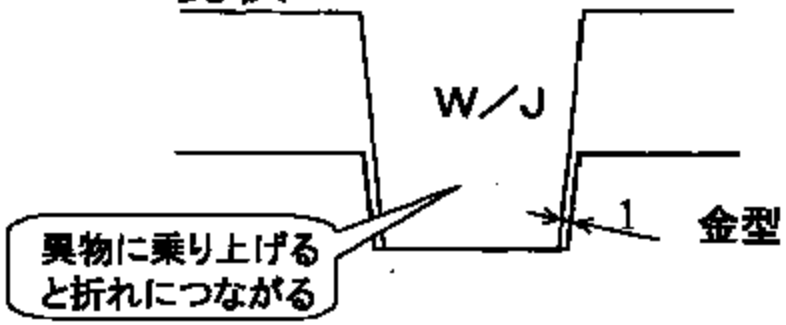
GDGM

金型改修内容

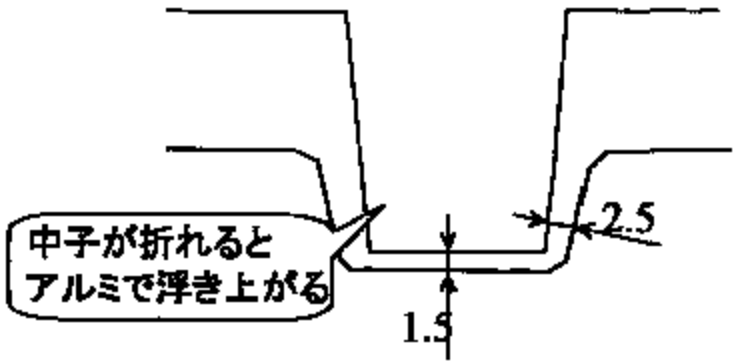
・折れた中子が幅木から離脱する様にする。
・折れ部にある足2箇所(a)がバリ等の異物に乗り上げないようにする。



現状



対策



GL1800 水温不具合

[redacted]

01'YM
ヘッド・エアー溜り
サブハーネス追加

02'YM
センサー位置変更
センサー：空気⇒水温

03'YM
RZ温度変更
122⇒126℃

2件（国内/US）
ラジエーター閉塞

1件（US）
ヘッド水通路閉塞
L側
R側

[redacted]

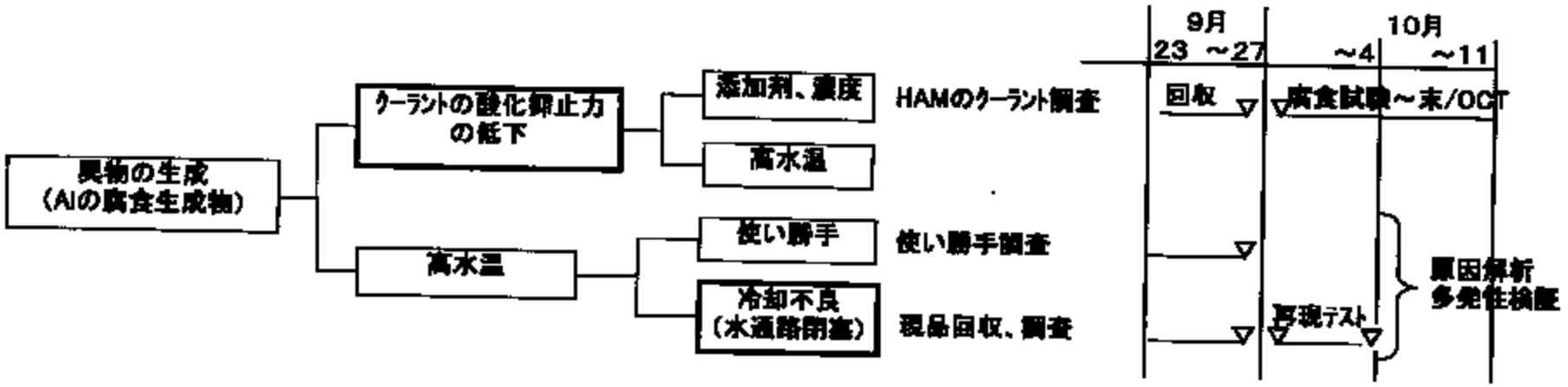
市場コンプレーン・クレーム

[redacted]

ラジエター内異物によるオーバーヒートの概要(発生2件)

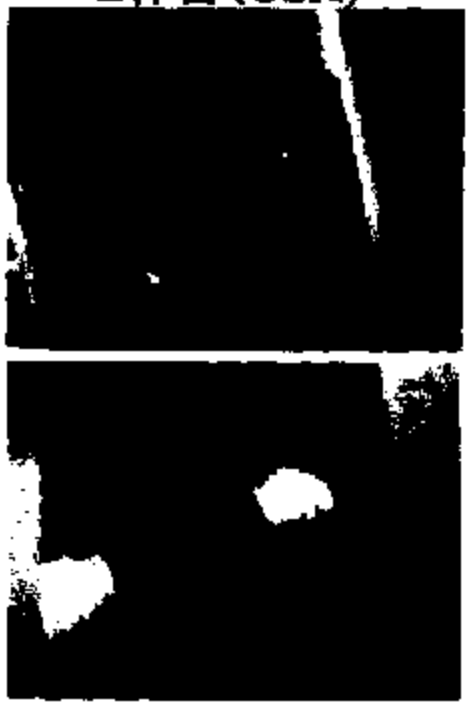
	1件目(日本)	2件目(USA)
発生日	2002年 7月23日	2002年 9月9日
登録日	2002年 2月22日(02'YM)	2001年 9月9日(02'YM)
走行距離	2566km	8000mile(12800km)
Frm No	SC47−1000157	1HFSC47092A101134
訴え事象	オーバーヒート 走行していると水温計が振りきれる	20分間ハイウェイスピードで走行すると 水温計がレッドゾーンに入る
確認結果	左ラジエターに異物が詰まっていた	赤外線温度計でラジエターを測ると 左:38℃ 右:92℃ ラジエターを外すと異物が詰まっていた
過去のメンテ歴	クーラントのメンテ歴なし	メンテ歴なし

異物の推定原因: 高温でのクーラントの劣化→アルミの腐食生成物の発生

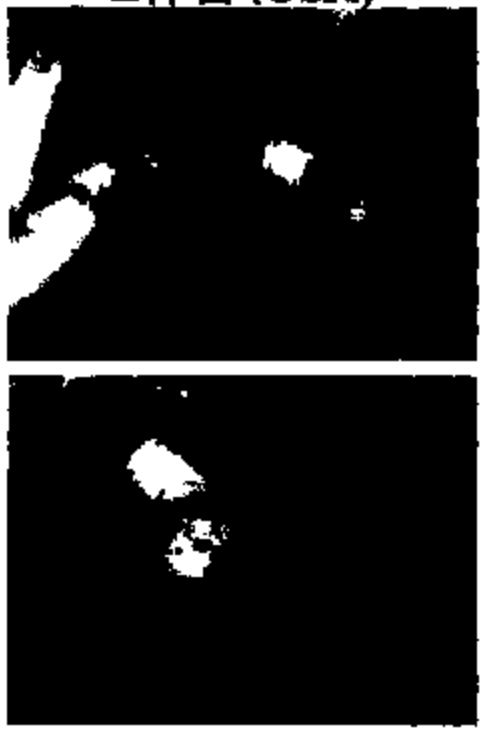


現品の状態

2件目(USA)



2件目(USA)



1件目(日本)

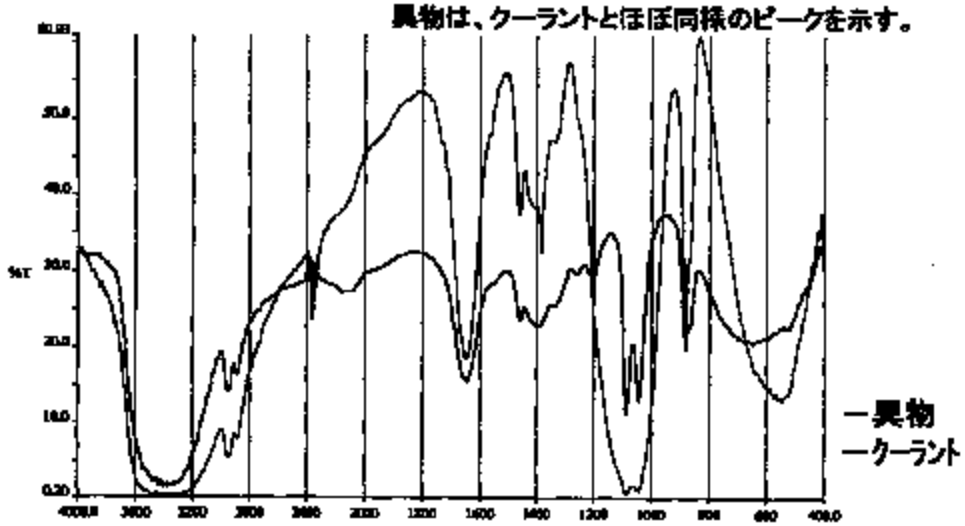
1件目(日本)

ラジエター内異物調査結果

9-22-02
HGA 3研 藤高

FT-IR分析結果

異物は、クーラントとほぼ同様のピークを示す。



EDS分析結果

C	33.97 %
O	34.17
Na	2.67
Al	11.92
Si	1.73
P	9.34
S	0.72
K	4.30
Mo	1.17

クーラントに含まれる成分と
アルミ酸化物が検出。

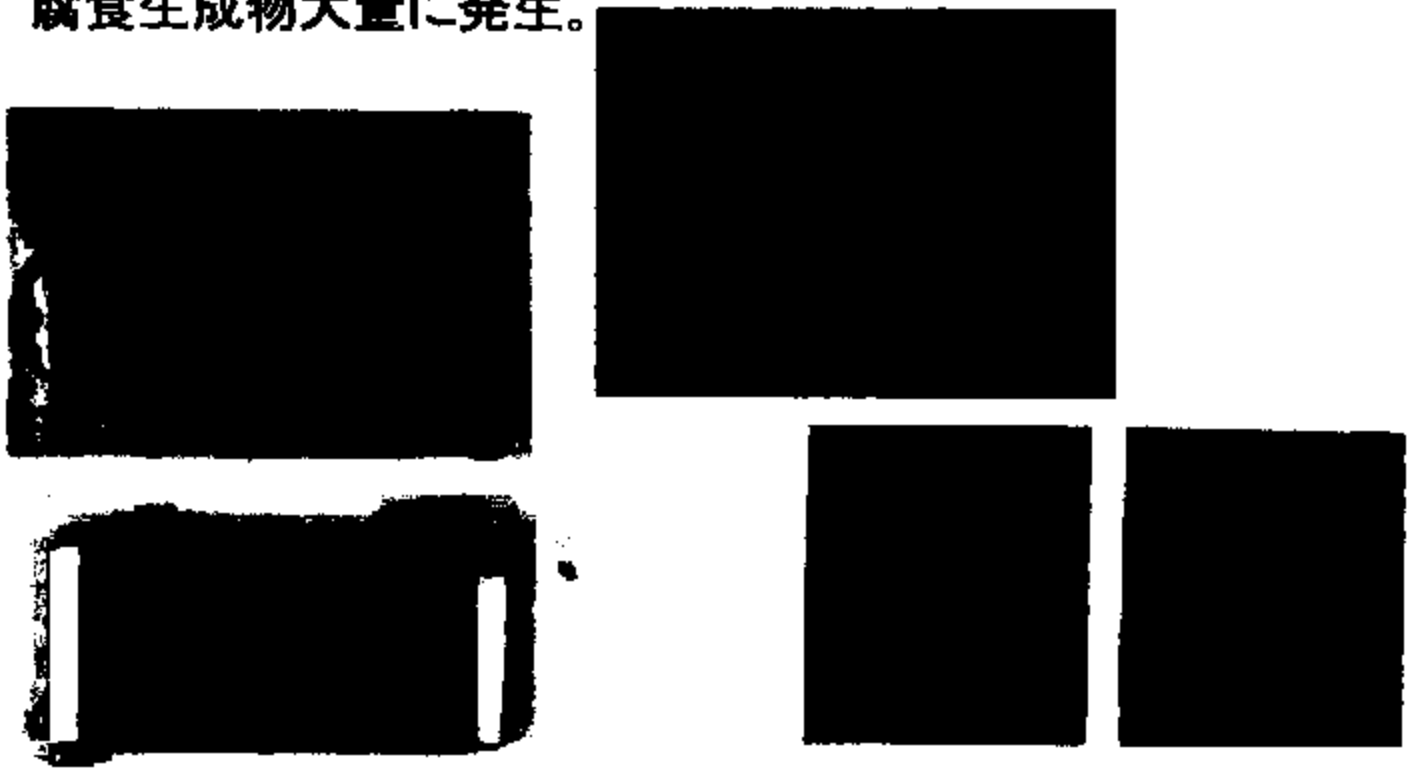
過去トラ

クーラント名: **FORD FLUID PARA RADIADORES(ブラジル)**

ホンダSPECを満足しないが、供試したﾌﾞﾗｼﾞﾙ市販クーラント5種の中では、ベスト品。

MV9(CBR600) EH高耐 60時間

・水通路のアルミ部品(Cylヘッド、オイルクーラー、ラジエター)の**著しい腐蝕**及び**腐食生成物大量に発生。**



US市販クーラントテスト結果

・市販クーラントのアルミ防食性能は、工場充填品に対し、劣っている。

・今回、ユーザーから市販クーラントの注ぎ足しはないとのコメントであるが、
市販クーラントを注ぎ足した場合、更に腐食が激しくなると考えられる。

	SIERRA	PRESTONE	PEAK	ALL－CLIMATE	工場充填品 Valvoline 340-2
アルミ電熱面 腐蝕試験結果	○	×	○	○	○
ﾎﾝﾀﾞSPEC 腐蝕量 ≦0. 20 (mg/cm2)	0.15	0.21	0.05	0.18	0.07

今後の予定

＊「詰まり」トラブル拡大性調査

・ラジエター以外の水通路部品のチェック

・オーバーヒート頻度の高い車(「詰まり」に到っていない車)のチェック

・R側ヘッドの水通路閉塞での再現テスト

＊ MMPクーラント性能再確認

'91年に性能確認(OK)

①BASF→Valvolineに変更

②コスト競合により，納入価格低減　などがあったことから，

現在の実力を再確認する．

GLX1800(MCA)水温高い　棚卸し

1、MCAA('01)～'03までの仕様変化(振り返り)

2、AHへのAS案提示

3、今後の対応　と　'05モデル以降の対応

3、W／J閉塞

2002/9/21　2K　YAMASHITA

水温計廻りの仕様変化

	モデル	呼称	仕向	水温センサー	補正抵抗	R／Z入口温度	冷却ファンL／O
1	2001年	MCAA	A、EC	エア温度	2．7Ω追加 （サブハーネス対応）	122℃狙い	ファン内置／内引き
2					2．7Ω追加 （フェアリングハーネス対応）	122℃狙い	↑
3	2002年	MCAF	A、EC			122℃設定	↑
4			K		1．2Ω追加 （サブハーネス追加）		↑
5					1．2Ω追加 （フェアリングハーネス対応）		↑
6	2003年	MCAH	A、EC、K		メーター内部で対応		↑

02－8月時点の総括

水温表示が高い

01YM：エア溜りの温度を測っていた

02YM：水温を測れる様に改善した

03YM：R/Z入口温度122℃→126℃

次モデル以降の対策は？

●02～03YM開発時、外観変更せずに
根本対策出来る玉を、見出せなかった。

●低速連続走行（パレード走行）に対しては、
①水温計R/Z入口122℃→126℃
②ソフト対応（ex：2ndでの走行を推奨）

●05YMで根本対策を行う。

水温計廻りの仕様変化と今後の対応(案)

下記内容はAHとのラインナップ調整時に報告した資料です。

＊2005年外観変更が可能となる為、冷却ファンL／O変更にて抜本的に対策する。

モデル	フロー	開発内容	仕向	水温センサー	水温計タイプ	補正抵抗	R／Z入口温度	冷却ファンL／O
2001年	PD	FMC	A, EC	エア温度	中間安定	2.7Ω追加 (サブハーネス追加) (フェアリングハーネス対応)	122℃	ファン内置
2002年	M	カラスト VA 現調拡大 派生追加 市場問題対応	A, EC		↑	———	↑	↑
			K		↑			↑
2003年	C	カラスト VA 現調拡大 市場問題対応	全		↑	———		↑
2004年	CorM	カラスト VA 現調拡大 市場問題対応	全		↑	———		↑
2005年	MorPD	30周年記念 バージョン追加	全	↑	リニアor 中間安定	———	122℃	ファン外置

AS対応案まとめ―AHへの提案　　GL1800水温計

			冷却性能					ファン騒音	外観影響	熱居住性	補機類耐熱	コスト
			アイドル	低速走行			高速走行					
				R/Z突入	延命効果	水沸き						
1	量産	量産仕様	○	×	×	×	○	○	○	○	○	—
2		ｷｬｯﾌﾟ圧 1.8kg/cm2 水温計R/Z入口139℃	○	×	○	×	○	○	○	○	○	3000 1000
3	AS―①	冷却FAN外付け	○	×	○	○	○	○	△	×	○	89950
4		ｷｬｯﾌﾟ圧 1.8kg/cm2 水温計R/Z入口139℃	○	◎	○	◎	○	○	△	×	○	
5	AS―②	L側FAN2個 R側押しFAN	○	×	○	×	○	×	○	○	○	104073
6		ｷｬｯﾌﾟ圧 1.8kg/cm2 水温計R/Z入口139℃	○	○	○	○	○	×	○	○	○	

今後の対応　　GL1800水温計

AHの要望を整理すると、

1. レッドゾーンへ針が突入するのはダメ。
2. ライダーとパッセンジャー居住性（熱害）は、現行MCA同等。
   最低でも旧GL1500同等の快適性を確保願います。
3. 市場措置案のコスト安く。
   （一件対応では無くて顧客に案内した形での措置を希望）
4. 外観変更は避けてほしい。
   外観変更（一件対応）は、どうしてもインターネット等で口コミで広がるので、
   既販のコンプレーン顧客さまで情報を得たお客さまが殺到するので、
   外観の変更は避けたい。できれば、外観変更無しで廉価な一件対応を
   要望。（バイバックの方が安い）

＊05での外観変更は可であるので、その間のASとして、上記条件を
満たす仕様を要望している。

現在HGAの総智を結集し、AHの要望をクリアーすべく玉出しの最中です。（19／SEP　所内玉だし会実施）

・・・・・・・・至急有効な玉の確認推進。

右記諸元(下記③ 別案詳細表)にて目標達成可能と判断する。

		JBP	MCAA (01`～04`)	ベース比
RAD放熱量		32.2kw	26.4kw	1.22倍
FAN	フロー	外引	内引	2.7倍
	径	φ210	φ157	
モーター回転数		3700rpm	3350rpm	

	RADサイズ	放熱量	FAN	モータ	パレート流行	トレラー牽引	熱居住性	充放電	FAN騒音	備考
量産	270*158*24 P2.75	26.4kw(MCAA)	φ157*2	MCA	△	△	○	○	○	内側FAN引
①	270*158*24 P2.75	↑	φ157*2	MCF	△	(△)	△	(△)	○	外側FAN引
②	270*193*24 P2.75	1.22倍	φ177*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
③	270*193*24 P2.75	1.22倍	φ210*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
④	280＊180*32 P2.5	1.48倍	φ177*2	MCF	(○)	(○)	(○)	(△)	(○)	↑
⑤	270*158*24 P2.75	26.4kw(MCAA)	φ128*4	MEE	○	(△)	△	(△)	○	↑
⑥	270*158*24 P2.75	↑	φ157*2	MCF	(○)	(○)	(△)	(△)	(○)	2気筒休止外側FAN引

ここから
W／J閉塞

ＧＬＸシリンダーヘッド水路閉塞

水温が高い(R／Z入口を指す)となる走行条件の整理

	L			R			低速走行		定常走行				走行後ソーク (ENG STOP)	走行後 アイドル放置
	A	B	C	A	B	C	パレード 15k/h~20k/hの Lowギヤ連続走行	渋滞走行 (通常のGO-STOP)	50k/h	100k/h	150k/h	Vmax		
ヘッド正常	○			○			×	○	○	○	○	○	○	○
W／J閉塞	■	○ ×	○ ×	○ ×		○ ×	×	×	×	×	×	×	×	×
	L側のAが閉塞した場合、水温センサー部にエア噛みが発生し、どの組み合わせ／走行モードでも、水温計のR／Zに入る(夏													
	○	○	○	×	×	○	×	○	○	○	○	○	○	○
	○	○	○	■	■	■	×	×	×	×	○	○	×	×
	R側はABC閉塞の場合のみ、通常走行モードでも、水温計のR／Zに入る(夏季)													
RAD異物							(×)	(×)	(×)	(×)	(×)	(×)	(×)	(×)

ＧＬＸシリンダーヘッド水路閉塞

●パレード走行での水沸き

事象が低速時のオーバーヒートということで、商品性問題として推進。

●W/J中子折れにより水路が閉塞し水沸き
●異物によるＲＡＤ閉塞→水沸き

最悪事象として、水温計がR/Zに入る前に水沸き

↓

走行中リヤタイヤに飛散

↓

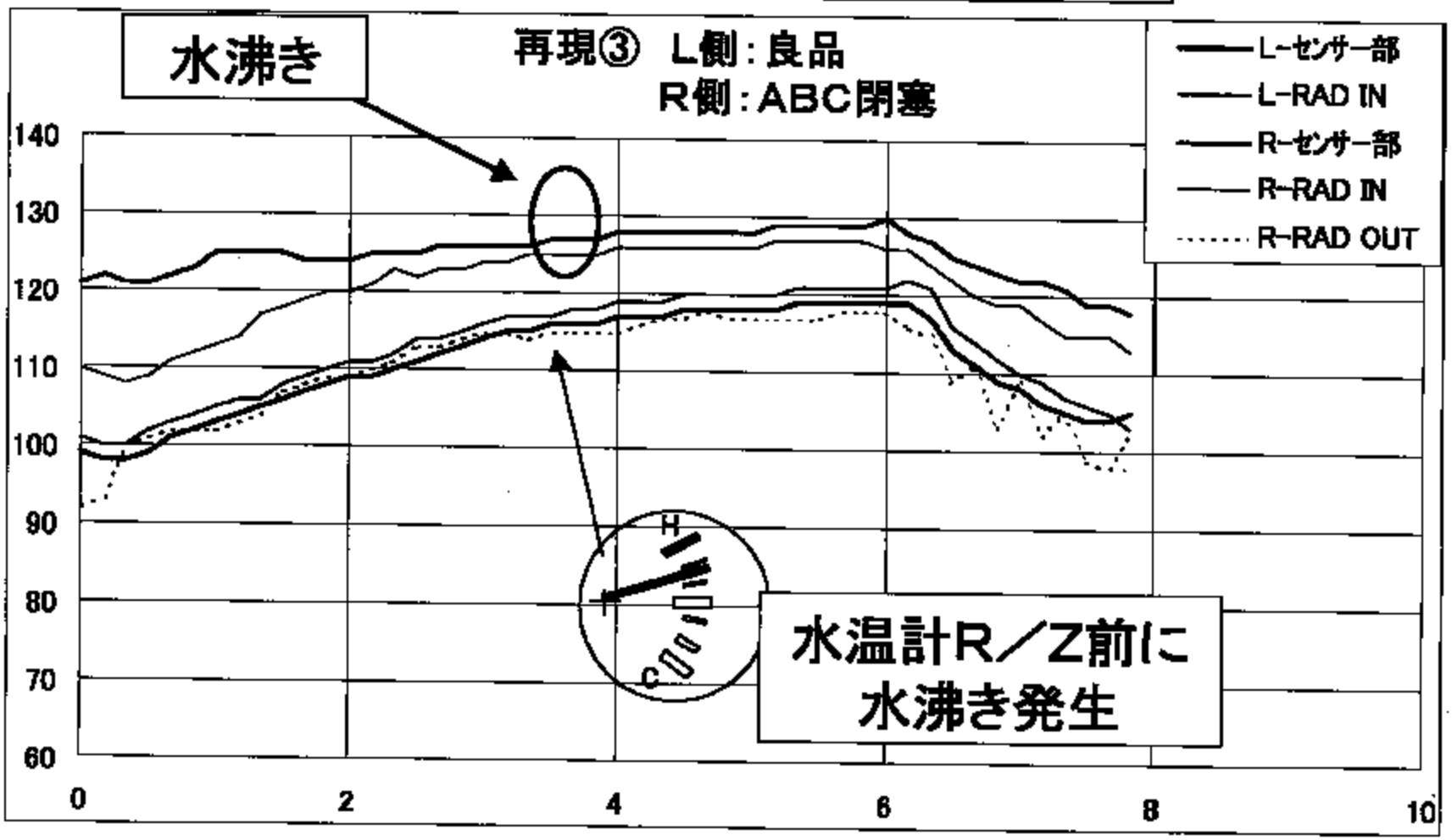
安欠？？

①L側：正常（水温ｾﾝｻｰ側）、
　R側：ABC閉塞品での発生事象
②異物

ＧＬＸシリンダーヘッド水路閉塞

下記条件でR／Z入口前で水沸き発生する。

- HEAD閉塞最悪品(L:良品　R:ABC閉塞)
- Low15k/h連続走行



ＧＬＸシリンダーヘッド水路閉塞

GL1800 オーバーヒート時の冷却水オーバーフロー吐出経路とRrタイヤ位置

走行条件	パレード走行		強制的(冷却風CUT)なオーバーヒートでの確認			
	20km/h走行		80km/h走行		120km/h走行	
	直進	スラローム	直進	スラローム	直進	スラローム
判定	○	○	○	×	×	×
状況	タイヤサイドから30mm外側に吐出。	路面上の吐出航跡に左ターンでもタイヤ接地面は乗らない。	20km/h同様にサイドから約30mm外側に吐出。	路面上の吐出航跡に左ターンでタイヤが乗る。	吐出水は走行風によりミスト状となり拡散。 タイヤトレッド，サイドウォールが量は少ないが被水する。	

尚、一連の実走確認を通して、アスファルト舗装路ではタイヤスリップを感じる事は無かった。

ＧＬＸシリンダーヘッド水路閉塞

●至急下記残部分を確認し安欠の判断要す

	L			R			R／Z入口前の水沸き	リヤタイヤへの水掛り	ENG最終事象	安欠判定
	A	B	C	A	B	C				
ヘッド正常							無し	無し	OK	OK
W／J閉塞	■	○ ×	○ ×	○ ×	○ ×	○ ×	無し	無し	未	
	○	○	○	×	×	○	無し	無し	未	
	○	○	○	■	■	■	■	無し	未	
RAD異物に繋がる可能性	○	○	○	×	×	○	無し	無し	未	
	このパターンが、ユーザーに認知されず、走り続けられる可能性がある為、異物に繋がる可能性大									

GL1800 水温不具合

今後の展開

		SEP						OCT														
		23	24	～	27	～	30	1	2	3	4	5	6	7	8	9	10	11	12	～	29	30	31
							☆GQM報告																
1	RAD容量不足 1. 恒久仕様PRテーマ推進中 2. 1件対応 玉だし 済み		05' YM対応 ▽								▽												
2	W／J閉塞 HGAテスト 1. L側OK品R側NG品 2. ENG耐久テスト要否会議 Mss 1. 流出防止 ・閉塞全検体制(MMP) 8／29～ ・鋳造品OK 8／28～ 2. パーツ入れ替え(全検) 3. 不良品発生予測(L／R組合せ含む)																						
3	RAD閉塞 1. 事象車買取 2. 実車分解検証 3. 再現テスト 4. HAMのクーラント調査 5. 使い勝手調査 6. ヘッド水路閉塞最終事象		▽ユーザとネゴ																				

補足資料

低速連続走行(パレード走行)での冷却性能不足の原因

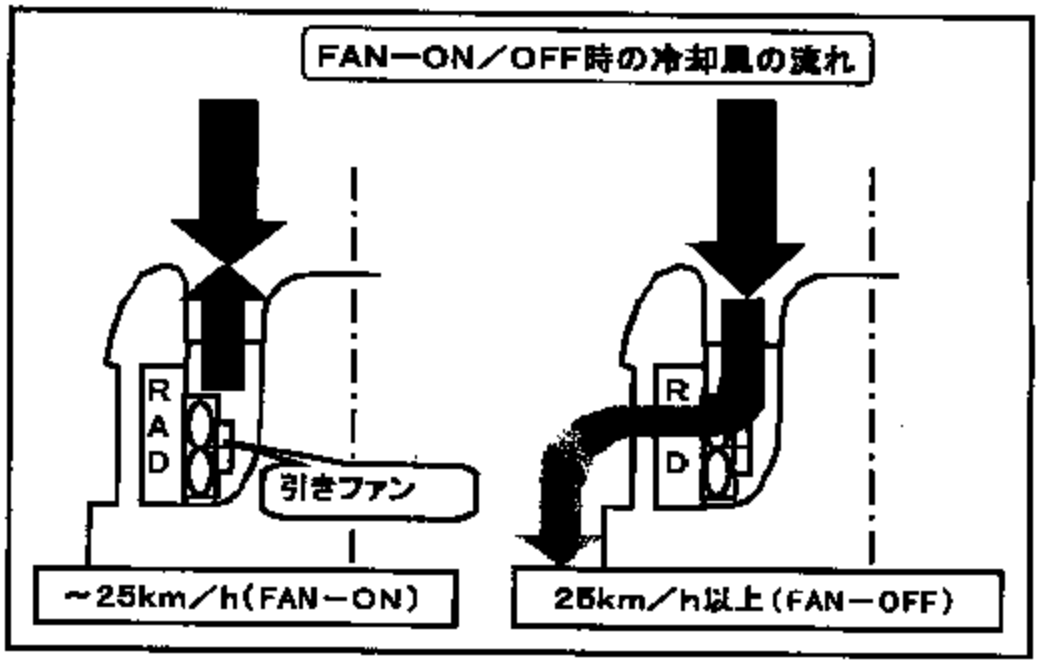
GLの使い勝手の配慮不足が主要因

1)通常のA用件でのテスト確認走行モードは全てクリアできている。
2)Lowギヤ固定での低速連続走行(パレード走行)の使い勝手を考慮しなかった。

＊パレード走行で多用されると思われる車速域で、冷却ファンを走行風と対峙する仕様設定を行った。

冷却ファンは25km/h以下で作動し、冷却風は車体サイドより入り車体前方に排出するL/Oを持っている。

GLX1800冷却システム



狙い
・外観商品性
・ライダー熱居住性の向上
・FANの騒音(静粛性)向上

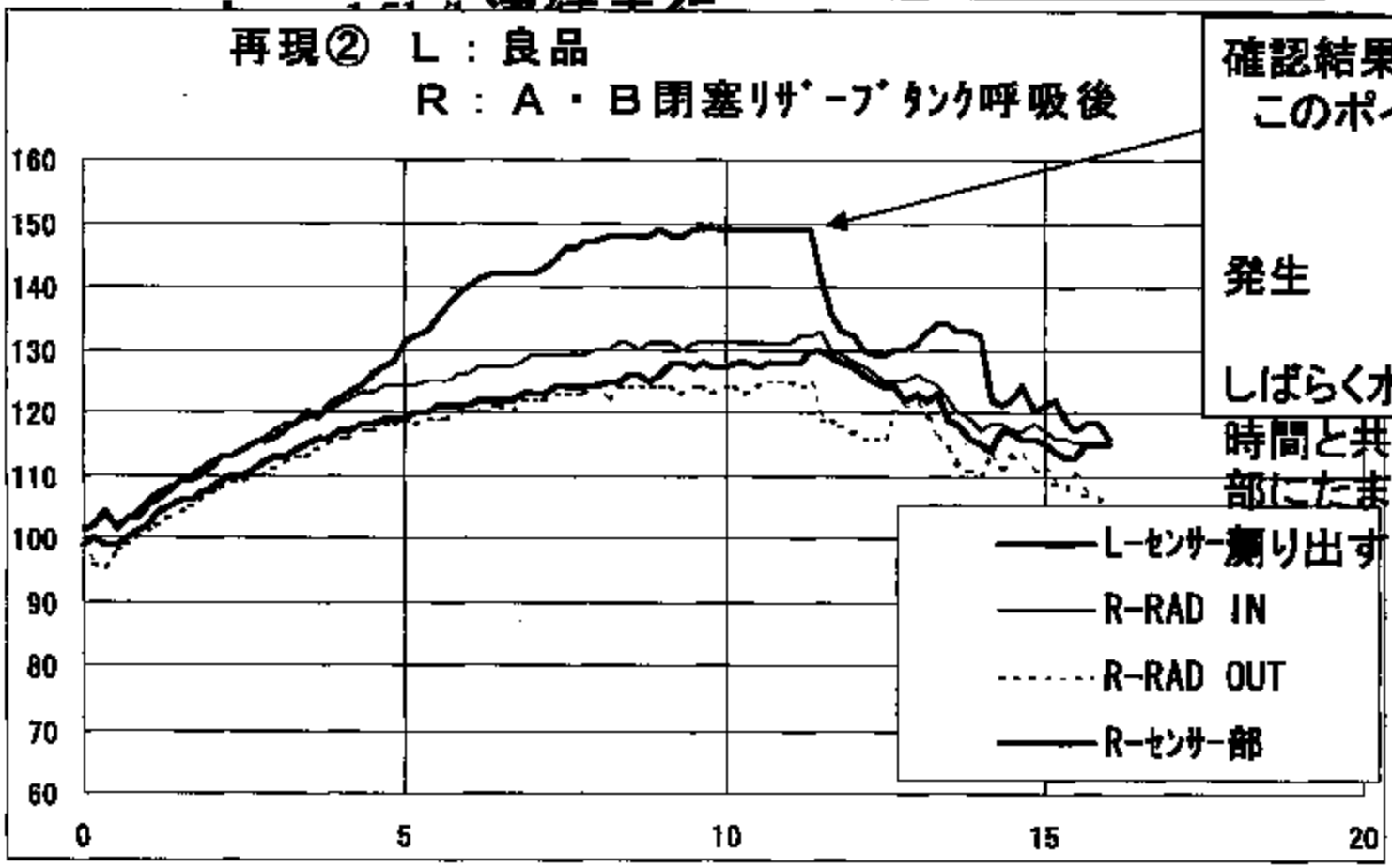
水温計廻りの仕様変化

	モデル	呼称	仕向	水温センサー	補正抵抗	R／Z入口温度	冷却ファンL／O
1	2001年	MCAA	A、EC	エア温度	2．7Ω追加 （サブハーネス対応）	122℃狙い	ファン内置／内引き
2					2．7Ω追加 （フェアリングハーネス対応）	122℃狙い	↑
3	2002年	MCAF	A、EC			122℃設定	↑
4			K		1．2Ω追加 （サブハーネス追加）		↑
5					1．2Ω追加 （フェアリングハーネス対応）		↑
6	2003年	MCAH	A、EC、K		メーター内部で対応		↑
7	2004年	MCAJ	A、EC、K		↑		↑
8	2005年		A、EC、K				ファン外置／外引き

ＧＬＸシリンダーヘッド水路閉塞

下記条件では、R／Z入口前で水温沸き無し。

- HEAD閉塞最悪品（L:良品　R:AB閉塞）



確認結果
このポイントでR／Z入口
↓
直後に水沸き
発生

しばらく水温を測れているが、
時間と共にエアがセンサー
部にたまり　エアの温度を
測り出すので、高く表示する

Masayuki Murakami/HONDAAM 2002/08/28 07:58:58

To: Taizo Uchiyama/MJP/HONDA@HONDA, Teruzo Iida/MJP/HONDA@HONDA, Michinori Nakajima/HAM/AM/HONDA@HONDAAM, Yoshihisa Miyata/MJP/HONDA@HONDA
cc: Yukihiro Suzuki/MJP/HONDA@HONDA, Hayato Urushibata/MJP/HONDA@HONDA, Kazuhiro Miyabu/HAM/AM/HONDA@HONDAAM, Masaichi Ogusu/HAM/AM/HONDA@HONDAAM, Layne Coleman/HAM/AM/HONDA@HONDAAM, Toru Ejima/HAM/AM/HONDA@HONDAAM, Koichi Takenaka/HAM/AM/HONDA@HONDAAM
Subject: MCA trouble with temperature gauge

Title: Report on analysis of MCA trouble found in mass production and request to Mss for cylinder head inspection
Request: Investigation into changes in mass production
Causes of occurrence/Inspection method/Recurrence prevention/PC No. of affected parts supplied to HAM
Date of manufacture: Manufactured by HAM at the end of July or before that time
Symptom: Temperature gauge climbed to or above the red zone and cooling fan stayed on
Discovery: Discovered during the assembly repair of GL1800
Date of occurrence: End of July 1 unit up to now
Analysis: We had great difficulty in determining the cause. Beginning with electrical, we found our way to cylinder head at last. Yesterday we received guidance on inspection method from Mr. Uchiyama of GDC, and were finally able to determine the cause by this method.
Inspection method:
We poured tap water into OK cylinder head and NG cylinder head from their respective coolant inlets, and found that there was an apparent difference between the two. (Water squirted out of the NG cylinder head with considerable force, though the OK cylinder head presented no such symptom.) On investigation it was found that a coolant passage in the cylinder head was blocked up and the flow of water was thereby impeded. The blocked location was at the left of the coolant inlet of the combustion chamber on the opposite side of the cam chamber as viewed from the backside of the cylinder head.

Results of cylinder head verification by cutting (Attached please find MCA cylinder head coolant passage.xls and photos)
1. Coolant passage was found blocked at 1 location
2. Coolant passage was found narrower than specified at 1 location
3. Core sand was found remaining (not removed completely)
Supplementary explanation from AEP Casting:

If core sand remains, it will increase coolant-flow resistance and impede flow of coolant and eventually affect the cooling performance. Therefore, severe control is in place on this matter for automobiles.
Judgment on the present level of water jacket internal quality is required.

Mass production inspection

Today we conducted advanced screening of 20 R/L cylinder heads, and found that 2 cylinder heads had a partial block in #2 passage in the coolant temperature sensor installation location. The defect rate was high.

Lot No.: M2 21 Cam holder No.: LC095 M2 20 Cam holder No.: LC113

When a light is shone from the opposite side of the coolant passage, the light can be seen if the passage is not blocked. (See the attached data)

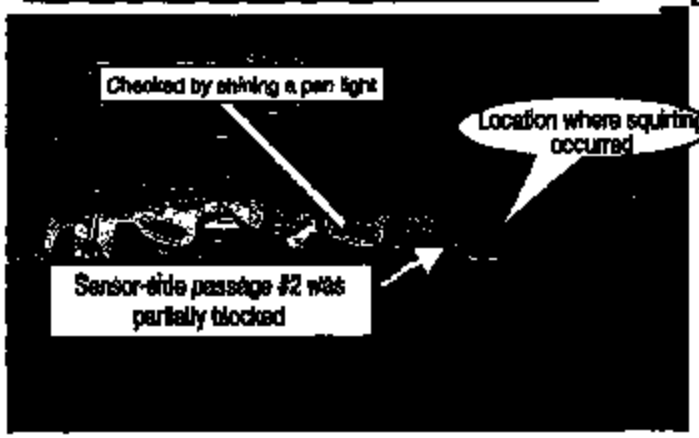
This time, inspection was done using tap water and no passage was found completely blocked by this inspection.

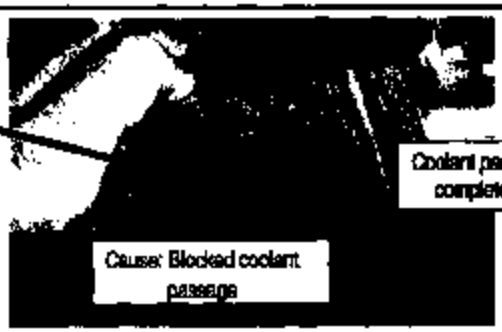
We will conduct inspection of #1 passage tomorrow and will introduce inspection with fiberscope from AUG 29.

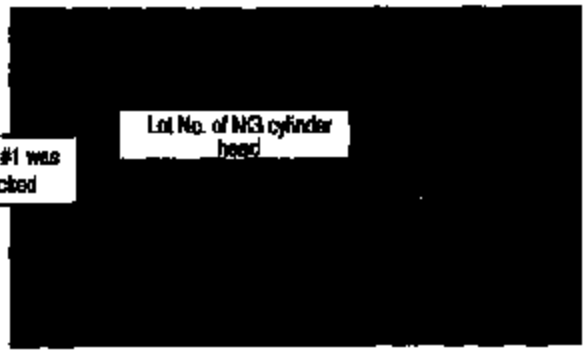
(We will keep you informed of the results of inspections)

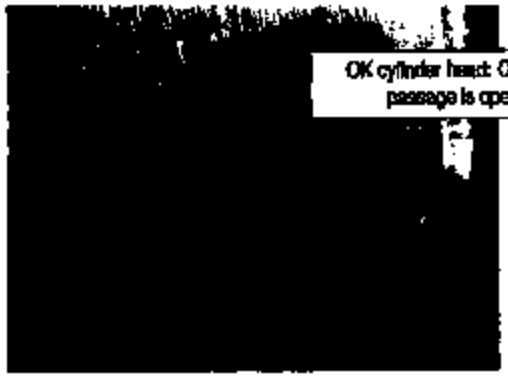
First discovery at MMP

Passage B blocked



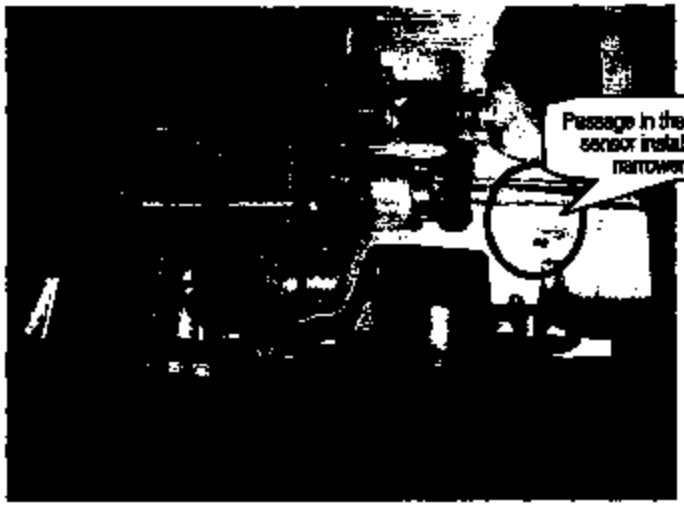






Result of coolant passage block check by pouring water
Water squirted out of the hole shown above, clearly indicating existance of a problem

Passage A (partially) blocked



M/M	U/L	Made by
Muramatsu	Muramatsu	Nakamura

TO: Asakura BL, Market Quality Block

Circumstances obliged us to replace MCA cylinder heads located in overseas countries, and this matter requires your cooperation.
Please confirm the following instructions and make the necessary arrangements.

Instructions

1. Suspend the use of parts currently located in overseas countries and return them to Japan.

Location	R	L	Total
U.S.A.	5	4	9
Europe	1	1	2

2. Forward the required (ordered) number of parts from Japan to each country.

* MCA part number for forwarding

R cylinder head 12010-MCA-780

L cylinder head 12020-MCA-780

* Department to bear expenses

Department code C650

Expense item No. 5381

Person in charge Akito Nakamura (Associate No. 0813095)

GDC/M, Hamamatsu Factory

TEL : 8-23-2475 or 2476

【Results of screening of parts on the line/in stock】

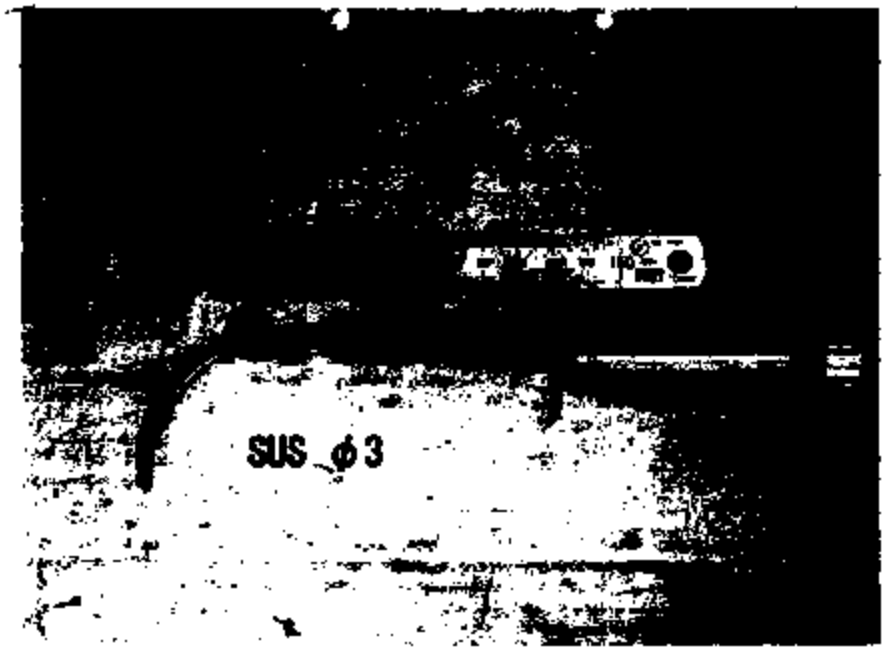
Cumulative total up to SEP 25

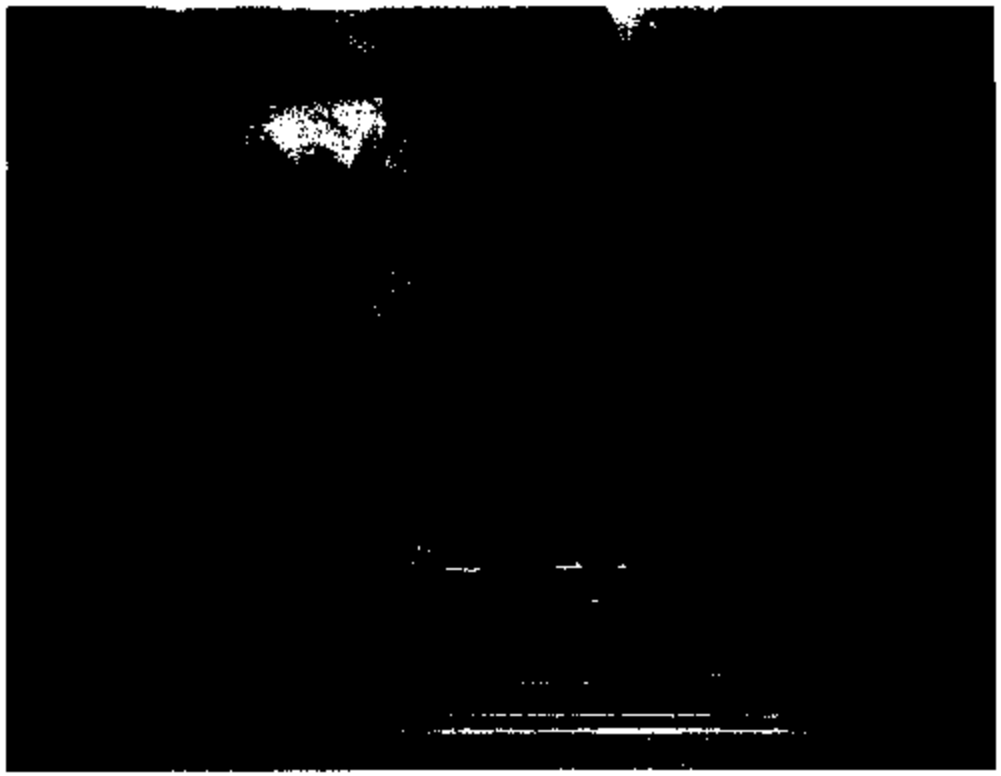
				Machining		Nippon Express		[redacted]		TTL	
L	[redacted]	4/2866	0.1%	22/942	2.3%	2/180	1.1%	112/1240	9.0%	140/5228	2.7%
	[redacted]	47/2866	1.6%	16/942	1.7%	2/180	1.1%	17/1240	1.4%	82/5228	1.6%
	[redacted]	59/2866	2.1%	152/942	16.1%	93/180	51.7%	468/1240	37.7%	772/5228	14.8%
	TTL	110/2866	3.8%	190/942	20.2%	97/180	53.9%	597/1240	48.1%	[redacted]	
R	[redacted]	7/2834	0.2%	0/1200	0%	0/180	0%	0/1240	0%	7/5454	0.1%
	[redacted]	127/2834	4.5%	47/1200	3.9%	3/180	1.7%	50/1240	4.0%	227/5454	4.2%
	[redacted]	77/2834	2.7%	13/1200	1.1%	0/180	0%	0/1240	0%	90/5454	1.7%
	TTL	211/2834	7.4%	60/1200	5.0%	3/180	1.7%	50/1240	4.0%	[redacted]	

● Method of MCA Cylinder Head Repair on Blocked Water Jacket GDC－M

Using the specified tool for repair, punch through the blocked portion and clear away debris with an air gun.

Tool for repair





●GDC−M Coolant Passage Block in Cylinder Head of GLX 02. 10. 11

● Measure to eliminate root cause (Check for broken core)

Model	MBR
Part Name	HEAD CYLINDER

LPDC Casting Conditions

Inspecting Engineer	U/L	U/S
Uchiyama	Muramatsu	Kogeyu

Original approved

1. Conditions

No	Item		Set value	Casting spec	Check method	Remark
1	Air pressure PRG		7		Operation panel display	
2	Cooling Model No.		7		↑	
3	Molten metal temp. °C		690	690 ± 10	Direct thermometer	
4	Intermediate sticker °C		600	600 MIN	Operation panel display	
5	Preheating temp. °C	Upper die	——	250 MIN	↑	
		Lower die	——	350 MIN	↑	
		Spare color				
6	Pouring weight kg		3. 6		↑	

1-I. Air pressure control

Step	LP No.1 & 2						LP No.3					
	MP PRS-7		Waste shot	Time			MP PRS-7		Waste shot	Time		
	Time	Pressure	Pressure	PRS-17	PRS-18	PRS-20	Time	Pressure	Pressure	PRS-17	PRS-18	PRS-20
Preparation	5	0.102	0.102	5	5	5	5	0.102	0.102	5	5	5
P1	5	0.201	0.200	5	5	5	5	0.198	0.190	5	5	5
P2	15	0.294	0.350	20	20	20	15	0.291	0.340	20	20	20
P3	4	0.350	——	——	——	——	4	0.345	——	——	——	——
Holding	150	——	——	40	90	120	150	——	——	40	90	120
Exhaust	10	——	——	10	10	10	10	——	——	10	10	10
Holding 1	7	——	——	7	7	7	7	——	——	7	7	7
Holding 2	15	——	——	15	15	15	15	——	——	15	15	15

1-II. Die temperature control (Model-7)

Type	Position	ch	Cooling location	Start-up time (sec)	Cooling time (sec)	Flow rate
Water cooling	Upper die	1	PG pin #1	15	150	2.5 l/min
		2	PG pin #2	15	150	2.5 l/min
		3	PG pin #3	15	150	2.5 l/min
		4	PG pin #4	15	150	2.5 l/min
	Lower die	5				
Air cooling	Upper die	6				
	Lower die	7	Lower die	150	190	120 l/min
		8	Lower die	150	190	120 l/min
		9				

LP No.2

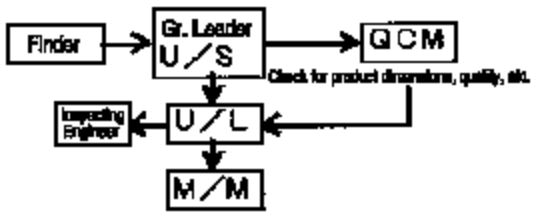
Type	Position	ch	Cooling location	Start-up time (sec)	Stop-up time (sec)	Flow rate
Water cooling	Upper die	1	PG pin #1	15	150	2.5 l/min
		2	PG pin #2	15	150	2.5 l/min
		3	PG pin #3	15	150	2.5 l/min
		4	PG pin #4	15	150	2.5 l/min
Air cooling	Lower die	5				
		6	Lower die	150	190	120 l/min
		7	Lower die	150	190	120 l/min

*Range of tolerance on flow rate for cooling :

Upper die water cooling ... ±0.3 l/min

Lower die air cooling ... ±20 l/min

⑨ Trouble reporting route



2. Quality confirmation items, etc.

1	Appearance inspection	As per OP Appearance Check Sheet
	Temperature at start of preheating	0.5 l/min (Must be checked. In specified cooling condition value prior to start of cooling)

3. Precautions

-1. Precautions (to prevent clogging of part/pipe/vent area with specimen due to slow condensation) after preheating of die

In order to remove moisture from plug pin area, stop cooling the plug pin 3 to 5 minutes prior to end of preheating.

-2. Waste shot

3 shots after preheating by setting (without wire netting/cooling).

1 to 2 shots after other preheating (without wire netting/cooling).

1 shot after supplying molten metal (without wire netting).

-3. Replace upper die flooting vent and IN die gas vent pipe with cleaned ones at intervals of 3 hours.

-4. Apply LNO to plug pins and badly scored portions after preheating die.

-5. Check for proper die clamping once/shift by removing core and checking it for breakage, and record the result in daily report.

Check for broken core once/shift

Rev.	Description of revision	Date	Prepared by	Approved by
	(broken core) check added	02/10/9	Nakamura	
⚠	Range of tolerance on flow rate for cooling specified	02/6/21	Nakamura	Uchiyama
⚠	Flow rate for lower die cooling specified	02/6/7	Nakamura	Uchiyama
	Initial issue after form change	01/7/20	Sugimoto	——

●GDC－M Coolant Passage Block in Cylinder Head of GLX 02. 10. 11

● Measure to eliminate root cause (Floating vent check for movement)

Approved by / Date	Confirmed by / Date / Date	Operation Standard (Regular Operation)	Worker Check / Date / Date / Date / Date	Prepared by
		Issue date :		

Part Name : Cylinder Head
Process : Floating Vent Check
M/C No. :
Protective Equipment: Helmet, Safety glasses, Ear plugs, Double gloves, Boots

R	Main step	Vital point (for success, safety or workers)	Why
1	Check the collar of floating vent. • Make sure the collar is not broken (cracked or deformed). *Floating vent when assembling	• Check at every maintenance/ assembly of die. Check visually. - Action to take if problem is found - • If you find a floating vent cracked or deformed, immediately replace it with a new one. • If you have difficulty in assembling a floating vent, clean the insertion hole to remove extraneous matter and try again. If you find any problem with the floating vent, immediately replace it with a new one.	*Quality reasons • If floating vent fails to move smoothly, core can break or gas cannot completely escape to the outside.
2	Check the floating vent for movement. • Set the floating vent in the die and check to see if the floating vent moves smoothly when it is moved up and down with hand.	• Check at every maintenance/assembly of die. Make sure the floating vent moves smoothly. - Action to take if problem is found - Immediately replace the floating vent with a new one.	*Quality reasons • If floating vent fails to move smoothly, core can break or gas cannot completely escape to the outside.

Die maintenance

* Whenever you encounter trouble, immediately report it to your process trainer or L/S.

Approved by / Date	Confirmed by / Date / Date	Operation Standard (Regular Operation)	Worker Check / Date / Date / Date / Date	Prepared by
		Issue date :		

Part Name : Cylinder Head
Process : Floating Vent Check
M/C No. :
Protective Equipment: Helmet, Safety glasses, Ear plugs, Double gloves, Boots

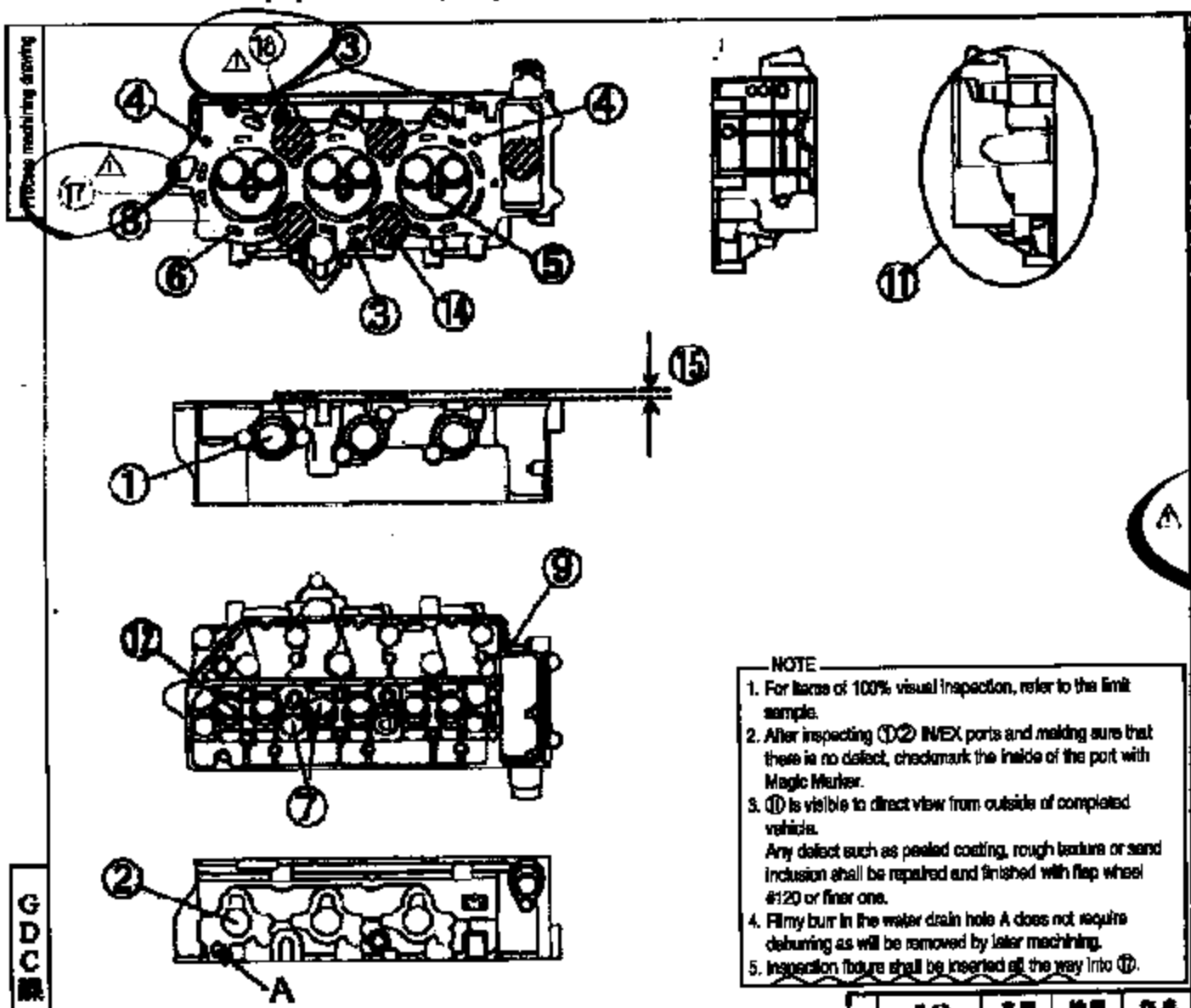
R	Main step	Vital point (for success, safety or workers)	Why
1	Check the collar of floating vent. • Make sure the collar is not broken (cracked or deformed).	• Check at die unclamping/shot. Check visually.	* Quality reasons • If floating vent fails to move smoothly, core can break or gas cannot completely escape to the outside.
2	Check the floating vent for movement. • Check to see if the floating vent moves smoothly when it is moved up and down by applying an air gun.	• Check at die unclamping/shot. Make sure the floating vent moves smoothly. - Action to take if problem is found - * If the floating vent won't go up • Lightly tap with a hammer to restore the floating vent to original position, then check for movement again. If trouble occurs If the floating vent does not move smoothly, replace it with a new one. If trouble occurs	* Quality reasons • If floating vent fails to move smoothly, core can break or gas cannot completely escape to the outside. * If the floating vent won't go down • With the air gun, let air flow through the floating vent and make sure the floating vent goes down, then check for movement again.

Casting

* Whenever you encounter trouble, immediately report it to your process trainer or L/S.

●GDC－M Coolant Passage Block in Cylinder Head of GLX 02. 10. 11

● Measure to stop problem (Inspection prior to release)



NOTE

1. For items of 100% visual inspection, refer to the limit sample.
2. After inspecting ①② IN/EX ports and making sure that there is no defect, checkmark the inside of the port with Magic Marker.
3. ⑪ is visible to direct view from outside of completed vehicle.
   Any defect such as peeled coating, rough texture or sand inclusion shall be repaired and finished with flap wheel #120 or finer one.
4. Filmy burr in the water drain hole A does not require deburring as will be removed by later machining.
5. Inspection fixture shall be inserted all the way into ⑰.

1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	↑	↑
3	[illegible]	[illegible]	[illegible]	↑	↑
4	[illegible]	[illegible]	↑	↑	↑
5	[illegible]	[illegible]	↑	↑	↑
6	[illegible]	[illegible]	↑	↑	↑
7	[illegible]	[illegible]	↑	↑	↑
8	[illegible]	[illegible]	↑	↑	↑
9	[illegible]	[illegible]	↑	↑	↑
10	[illegible]	[illegible]	↑	↑	↑
11	[illegible]	[illegible]	↑	↑	↑
12	[illegible]	[illegible]	↑	↑	↑
13	[illegible]	[illegible]	↑	↑	↑
14	[illegible]	[illegible]	↑	↑	↑
15	[illegible]	[illegible]	[illegible]	↑	↑
16	[illegible]	[illegible]	[illegible]	↑	↑
17	Broken jacket	Inspection fixture shall pass through	↑	↑	↑
18	Broken jacket	Inspection fixture shall pass through	↑	↑	↑

Identification of control point by color

- Vital point
- Functional point
- Appearance check point
- General check point

12	[illegible]	[illegible]	[illegible]	八田
Inspection prior to release				

可	HS1－M
部	12221 － MCA － 0000
名	HEAD L CYLINDER

GDC課

MCS C615-20-00

Inspection prior to release

Die Modification Instructions

Model Name MCA

Part Name Cylinder Head

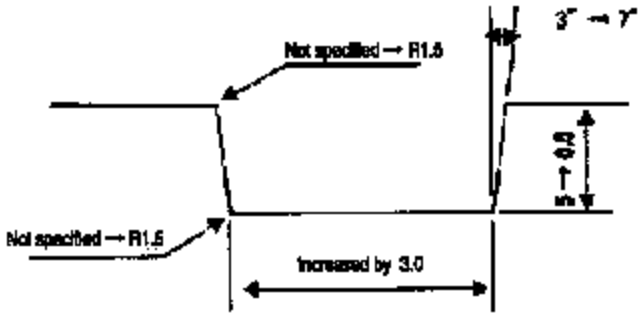
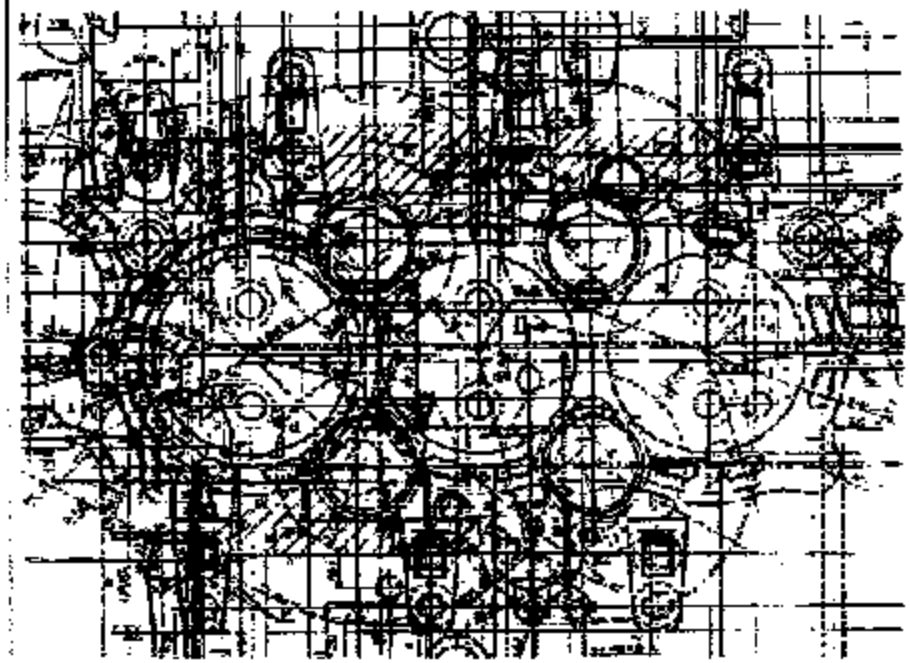
Die No. Master Mold R/L

~~Trial shot No. :~~

~~Date of casting :~~

Date of issue : 30 AUG 2002

Approved by	Confirmed by

No.	Item	Description of problem	Description of countermeasure (modification)	Responsibility
	Water jacket core broken	Core broke at the locations shown by red line	Changed the size of holes for 2 water jacket portions shown by red circle in the following drawing of lower die cavity (Modified die by grinding)  	GDC (Ocsumi Die)

Masayuki Marakoshi@HONDAAM 2001/08/28 07:56:55

宛先: Taizo Uchiyama/M/JP/HONDA@HONDA, Teruzo Iida/M/JP/HONDA@HONDA, Michinori Nakajima/HAM/AM/HONDA@HONDAAM, Yoshihisa Miyata/M/JP/HONDA@HONDA
cc: Yukihiro Suzuki/M/JP/HONDA@HONDA, Hayato Urushibata/M/JP/HONDA@HONDA, Kazuhiro Miyabu/HAM/AM/HONDA@HONDAAM, Masaichi Ogusu/HAM/AM/HONDA@HONDAAM, Layne Coleman/HAM/AM/HONDA@HONDAAM, Toru Iijima/HAM/AM/HONDA@HONDAAM, Koichi Takeruka/HAM/AM/HONDA@HONDAAM
件名: MCA水温異常の件

お世話に成ります。

本日の連絡　MCA 量産トラブル解析報告とシリンダーヘッド Mes点検のお願い

お願い　量産変化点の調査
発生原因 ／点検方法／流出防止／HAM対象品PO-NOの特定
製造日　7/末HAM製造または以前から？

発見動機　水温計上昇：冷却ファンが止まらない

発見　GL1800 組立修理で発見打上げ

発生日　7月末　現在 1台 （既に流出していたが、発見出来ない）

解析　原因の特定に非常にてこずり、電装から攻めて最後にシリンダーヘッドに行きつきました。

昨日GDC 内山さんからの点検方法の指導があり、やっと原因が特定できました。

点検方法　水道水を使い、ヘッドの水入り口に水を流し、良品ヘッドと比較すると
明らかに違いがある事が判りました。（NGは、水が高く噴水の様に出る）
ヘッド通路に壁がある為、水通りが悪く1ヶ所だけ噴水の様に水が出てきます
場所は、ヘッド 裏にして、カム室の反対側燃焼室の水入り口から左側。

ヘッドカット検証結果　MCAシリンダーヘッド通路.xls 写真添付

1.通路が閉塞　1箇所

2.通路が狭い（小さい）　1箇所

3.中子の砂がアルミ材に残る(除去不足)

AEP キャスティング園さん　未入からの補足がありましたので補足で書きます

中子の砂残りは、通路抵抗に成り、水流を妨げる、、冷却性能に影響するから4輪はシビアに管理しています。

現状のウオータージャケットの内部品質判断願います。

量産点検
本日先行選別　20台（RLヘッド）　※2 水温センサー通路閉塞　2件発見　発生率高い

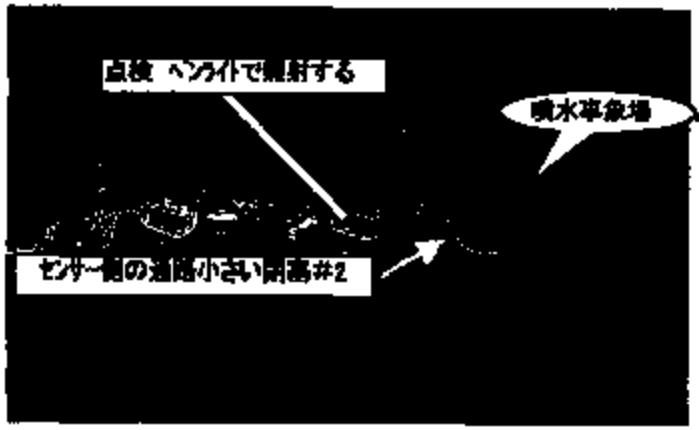
ロッドNO　M2 21　カムホルダーNO LC095　　M2 20　カムホルダーNO LC113

マグライトで水路反対側から照射すると光が見える（添付資料）
点検は、水道水で確認しましたが、大きい方の閉塞は本日のヘッドからは発生無し。

※1の点検は、明日量産 8/28からファイバースコープで点検します

（発生状況を連絡致します）

第一発見MMPにて



B閉塞

A閉塞（半閉塞）

M／M	U／L	作成
		中村

市場品質B／L　朝倉BL殿

いつもお世話になっております。今回 MCAシリンダーヘッドについて
現在、海外にあるパーツ部品の差し替えを行いたいと思います。
差し替えに当たっての指示を頂きたいと思いますので下記依頼事項を
確認の上お願い致します。

依頼事項
1．現在現地にあるパーツ部品の差し止め、及び日本へ返却

所在地	R	L	合計
アメリカ	5	4	9
ヨーロッパ	1	1	2

2．日本から各現地へ依頼数量分部品発送
　　必要数の発注数を各国へ発送

以上2点です。よろしくお願いいたします。

＊MCA発送部番
　R側　　12010－MCA－780
　L側　　12020－MCA－780

＊費用負担先
　振替部門　C650
　科目　　5381
　担当者　　中村明人　　職番 0813095
　浜松製作所 GDC／M
　TEL　8－23－2475・2476

【 流動品選別結果 】

9月25日まで累積

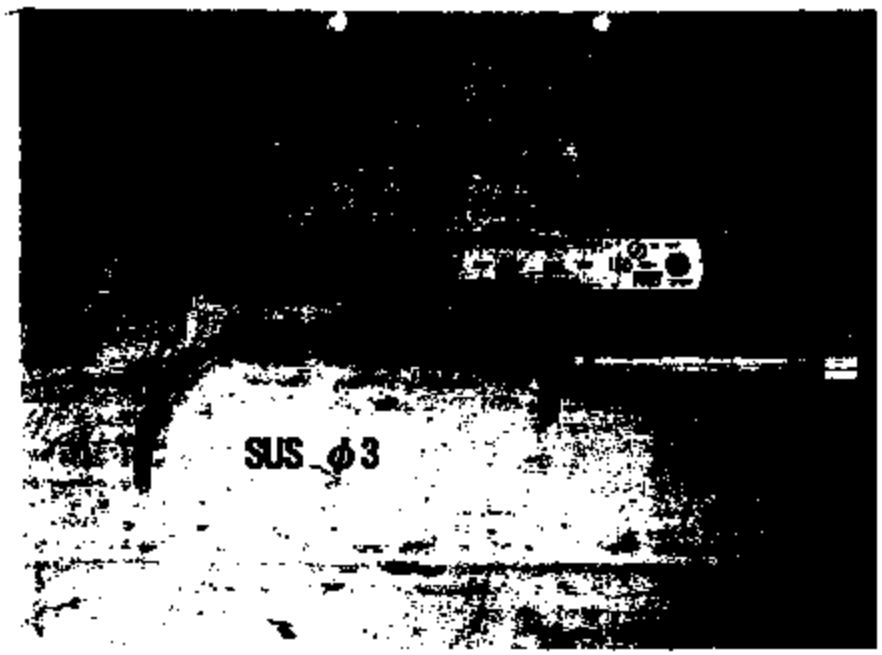
									TTL	
L	A-B	4/2866	0.1%	22/942	2.3%	2/180	1.1%	112/1240	9.0%	140/5228	2.7%
	A	47/2866	1.6%	16/942	1.7%	2/180	1.1%	17/1240	1.4%	82/5228	1.6%
	B	59/2866	2.1%	152/942	16.1%	93/180	51.7%	468/1240	37.7%	772/5228	14.8%
	TTL	110/2866	3.8%	190/942	20.2%	97/180	53.9%	597/1240	48.1%		
R	A-B	7/2834	0.2%	0/1200	0%	0/180	0%	0/1240	0%	7/5454	0.1%
	A	127/2834	4.5%	47/1200	3.9%	3/180	1.7%	50/1240	4.0%	227/5454	4.2%
	B	77/2834	2.7%	13/1200	1.1%	0/180	0%	0/1240	0%	90/5454	1.7%
	TTL	211/2834	7.4%	60/1200	5.0%	3/180	1.7%	50/1240	4.0%		

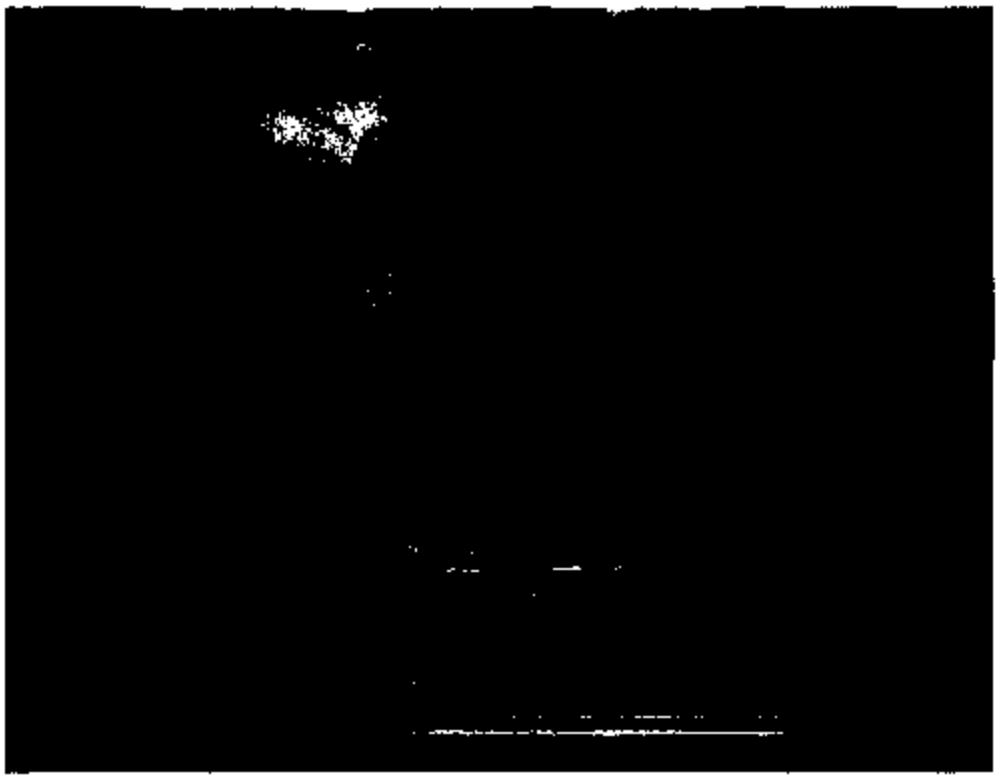
● MCA　W　J閉塞部修正方法

GDC－M

閉塞部を修正工具にて打ち抜き後、
エアーガンにて清掃。

修正工具





●GDC－M　GLX シリンダーヘッド水路閉塞　02. 10. 11

● 源流対策（中子折れ確認）

機種名	MBR
部品名	HEAD CYLINDER

ＬＰＤＣ　鋳造条件表

検技	U／L	U／S
内山	村松	小粥

原紙承認済み

1. 条件

No	項目		設定値	鋳造範囲	確認方法	備考
1	空圧 PRG		7		操作盤画面	
2	冷却 機種No		7		↑	
3	湯温 ℃		690	690±10	直接温度計	
4	中間ストーク ℃		600	500以上	操作盤画面	
5	型温 ℃	上型	—	250以上	↑	
		下型	—	350以上	↑	
		湯口ホラー				
6	鋳込み重量 kg		9.6		↑	

1-Ⅰ. 空圧制御

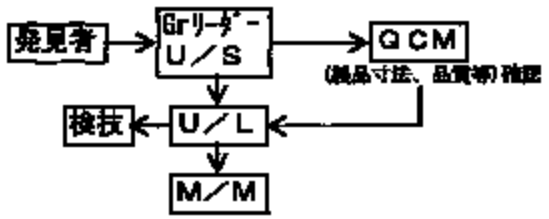
ステップ	LP1/2号 量産 PRG-7 時間	圧力	抽吹 圧力	時間 PRG-17	PRG-19	PRG-20	LP3号 量産 PRG-7 時間	圧力	抽吹 圧力	時間 PRG-17	PRG-19	PRG-20
予圧	6	0.102	0.102	6	6	6	6	0.102	0.102	6	6	6
P1	5	0.201	0.200	5	5	5	5	0.188	0.190	5	5	5
P2	15	0.294	0.350	20	20	20	15	0.281	0.340	20	20	20
P3	4	0.358	—	—	—	—	4	0.345	—	—	—	—
保圧	160	—	—	40	90	120	160	—	—	40	90	120
排気	10	—	—	10	10	10	10	—	—	10	10	10
保圧1	7	—	—	7	7	7	7	—	—	7	7	7
保圧2	15	—	—	15	15	15	15	—	—	15	15	15

1-Ⅱ. 型温制御（機種-7）

LP1/3号 種類	位置	ch	冷却箇所	開始時間*	冷却時間*	量	LP2号 種類	位置	ch	冷却箇所	開始時間*	冷却時間*	量
水冷	上型	1	PGピン#1	15	150	2.5ℓ/分	水冷	上型	1	PGピン#1	15	150	2.5ℓ/分
		2	PGピン#2	15	150	2.5ℓ/分			2	PGピン#2	15	150	2.5ℓ/分
		3	PGピン#3	15	150	2.5ℓ/分			3	PGピン#3	15	150	2.5ℓ/分
		4	PGピン#4	15	150	2.5ℓ/分			4	PGピン#4	15	150	2.5ℓ/分
	下型	5						下型	5				
空冷	上型	6					空冷		6	下型	150	130	120ℓ/分
	下型	7	下型	150	130	120ℓ/分			7	下型	150	130	120ℓ/分
		8	下型	150	130	120ℓ/分							
		9											

※冷却流量の管理幅：上型水冷…±0.2ℓ/分
下型空冷…±20ℓ/分

◎異常時の打ち上げルート



2. 品質確認項目他

1	鋳造外観	OP外観チェック表による
	上型冷却流量	0.5ℓ/分（鋳造開始前に必ず鋳造条件盤に戻す事）

3. 注意事項

～1. 金型予熱後の注意事項（結果に依る 見切り/ガス抜き部アルミ詰まり防止）
　プラグピン部水分除去の為 予熱終了３～５分前にプラグピン冷却を止める事。
～2. 捨て吹きについて
　セッチングによる予熱後 ３ショット（金網／冷却無し）。
　その他の予熱後 １～２ショット（金網／冷却無し）。
　給湯後１ショット（金網無し）。
～3. 上型フロートベント/IN型ガス抜きパイプは３時間毎に清掃品と交換の事。
～4. ＬＮＯ塗布は 金型予熱後にプラグピン及びおジリのひどい箇所に行う事。
～5. 型締め確認を１回/直 行い中子を取り外し折れ確認をし、日報へ記入の事。

中子折れ確認の 1回/直 実施

符号	変更、箇所、理由	年月日	作成	承認
	締め（中子折れ）確認追加	02/10/9	中村	
△2	冷却流量管理幅設定	02/6/21	中村	内山
△1	下型冷却流量管理化	02/6/7	中村	内山
	書式変更に依る新規発行	01/7/20	杉本	——

●GDC－M　GLX シリンダーヘッド水路閉塞　02. 10. 11

● 源流対策（フローティングベント動作確認）

承認	確認		作業標準（定常作業）	作業者確認欄				
月・日	月・日	月・日		月・日	月・日	月・日	月・日	作業者
			年　月　日発行					

部品名No　シリンダーヘッド
工程名　フローティングベント確認作業
機械名No

保護具標準

N	主なステップ	急所（成否安全やり易く）	なぜ
1	フローティングベントカラー確認	・金型整備組付け時毎確認	＊品質上
	・カラー確認抜き事	同様確認	・フローティングベント作動不良
	（割れ・変形確認）		に依る中子折れ・ガス抜き
			不良発生
	＊フローティングベント	－不具合発生時－	
	組付け時	・割れ・変形等認められる場合	
		速やかに新規部品に変更する	
		・組付け時入りにくい場合は、	
		挿入穴内の掃除を行い	
		付着物を除去し再度	
		組付けを行う	
		⇩	
		不具合ある場合は、速やかに	
		新規部品に交換する	
2	フローティングベント作動確認	・金型整備組付け時毎確認	＊品質上
	・フローティングベントを金型にセットし	確実に作動する事	・フローティングベント作動不良
	上下させる事に依りフローティングベント	－不具合発生時－	に依る中子折れ・ガス抜き
	の作動確認をする	速やかに新規部品に交換する	不良発生

金型整備

＊異常発生時は即工程訓練トレーナー及びU／Sに打上げる事！

承認	確認		作業標準（定常作業）	作業者確認欄				
月・日	月・日	月・日		月・日	月・日	月・日	月・日	作業者
			年　月　日発行					

部品名No　シリンダーヘッド
工程名　フローティングベント確認作業
機械名No

保護具標準

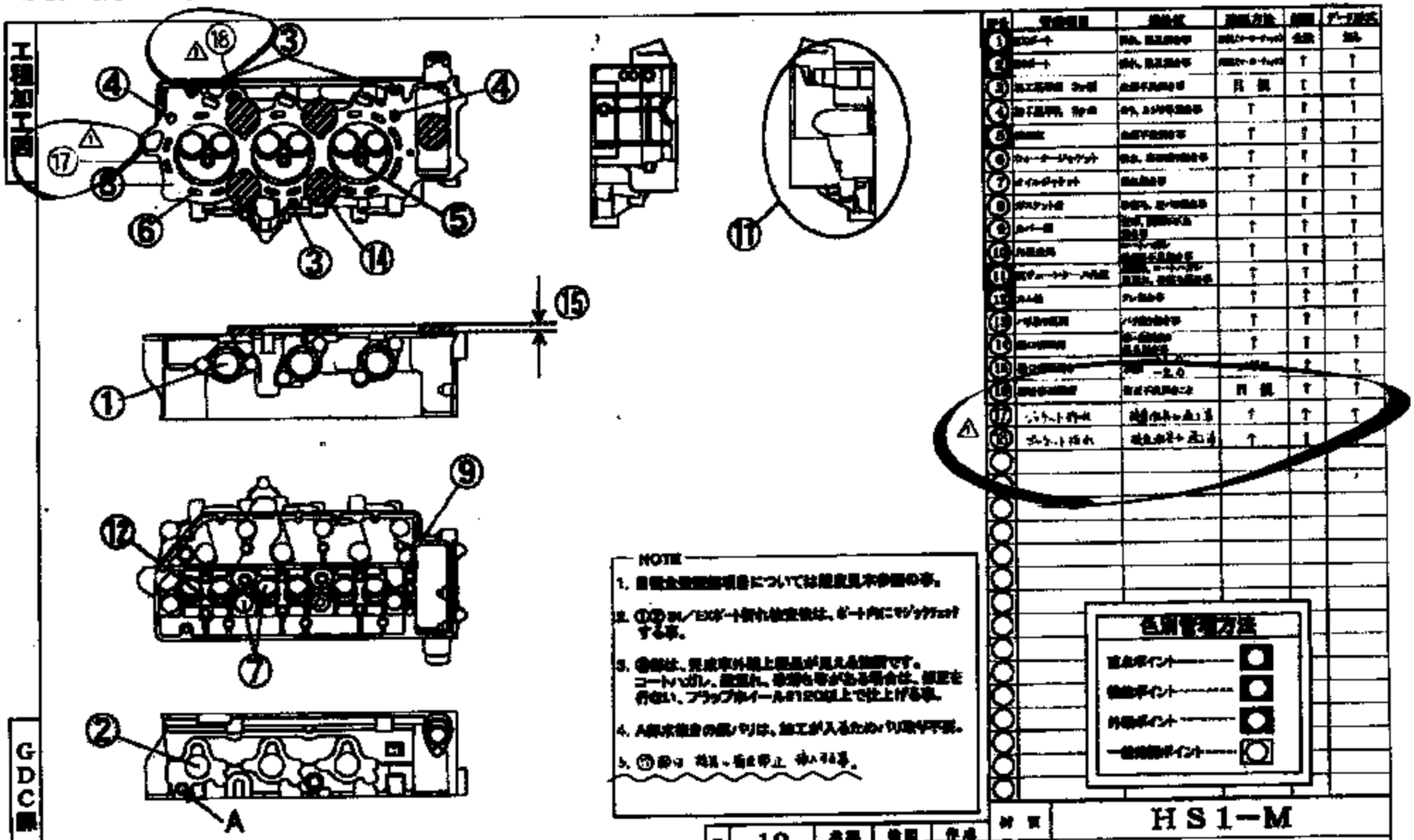
N	主なステップ	急所（成否安全やり易く）	なぜ
1	フローティングベントカラー確認	・毎ショット型開き時確認	＊品質上
	・カラー確認抜き事	同様確認	・フローティングベント作動不良
	（割れ・変形確認）		に依る中子折れ・ガス抜き
			不良発生
2	フローティングベント作動確認	・毎ショット型開き時確認	＊品質上
	・フローティングベント間にエアーガンを当て	確実に作動する事	・フローティングベント作動不良
	上下させる事に依りフローティングベント		に依る中子折れ・ガス抜き
	・の作動確認をする		不良発生
		－不具合発生時対応－	
		＊上らなくなった場合	＊下らなくなった場合
		・ハンマーにて軽く叩き、1度	・エアーガンにてエアー通
		戻した後再度作動確認をする	を行い、下がる事を確認
			し、再度作動確認をする

鋳造

不具合発生
作動不良発生時は、フローティングベントを交換する
不具合発生時

＊異常発生時は即工程訓練トレーナー及びU／Sに打上げる事！

● 流出防止(払い出し検査)



品名	管理項目	基準値	測定方法	頻度	データ記入
①	[illegible]	[illegible]	[illegible]	全数	○
②	[illegible]	[illegible]	↑	↑	↑
③	[illegible]	[illegible]	目 視	↑	↑
④	[illegible]	[illegible]	↑	↑	↑
⑤	[illegible]	[illegible]	↑	↑	↑
⑥	[illegible]	[illegible]	↑	↑	↑
⑦	[illegible]	[illegible]	↑	↑	↑
⑧	[illegible]	[illegible]	↑	↑	↑
⑨	[illegible]	[illegible]	↑	↑	↑
⑩	[illegible]	[illegible]	↑	↑	↑
⑪	[illegible]	[illegible]	↑	↑	↑
⑫	[illegible]	[illegible]	↑	↑	↑
⑬	[illegible]	[illegible]	↑	↑	↑
⑭	[illegible]	[illegible]	↑	↑	↑
⑮	[illegible]	[illegible]	↑	↑	↑
⑯	[illegible]	[illegible]	目 視	↑	↑
⚠⑰	[illegible]	[illegible]	↑	↑	↑
⚠⑱	[illegible]	[illegible]	↑	↑	↑

NOTE
1. [illegible]
2. ○○ [illegible]
3. [illegible]
4. A [illegible]
5. [illegible]

色別管理方法
- 重点ポイント
- 他加ポイント
- 外観ポイント
- 一般加工ポイント

工順	12 (1/1)
工程名	払出し検査
作成	八田
品番	HS1－M
品名	12221－MCA－0000
名称	HEAD L CYLINDER

⚠	02. 9/19	[illegible]	[illegible]	[illegible]	⚠
改訂	02. 6/27	新規発行			
履歴	年月日	改訂内容	加工	品証	

MCS CHS-20-00

試吹記録

金型改修指示書

機種名 ： MCA

部品名 ： シリンダーヘッド

型番 ： 主型 R／L

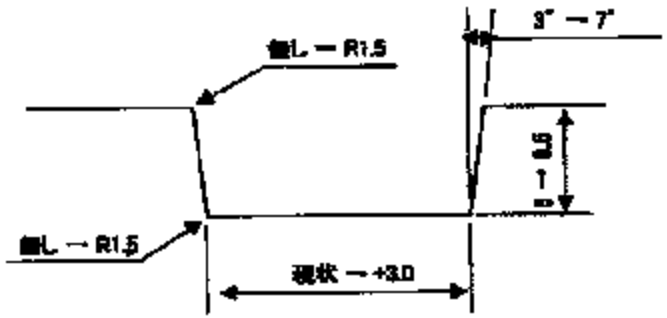
第＿＿＿回試吹

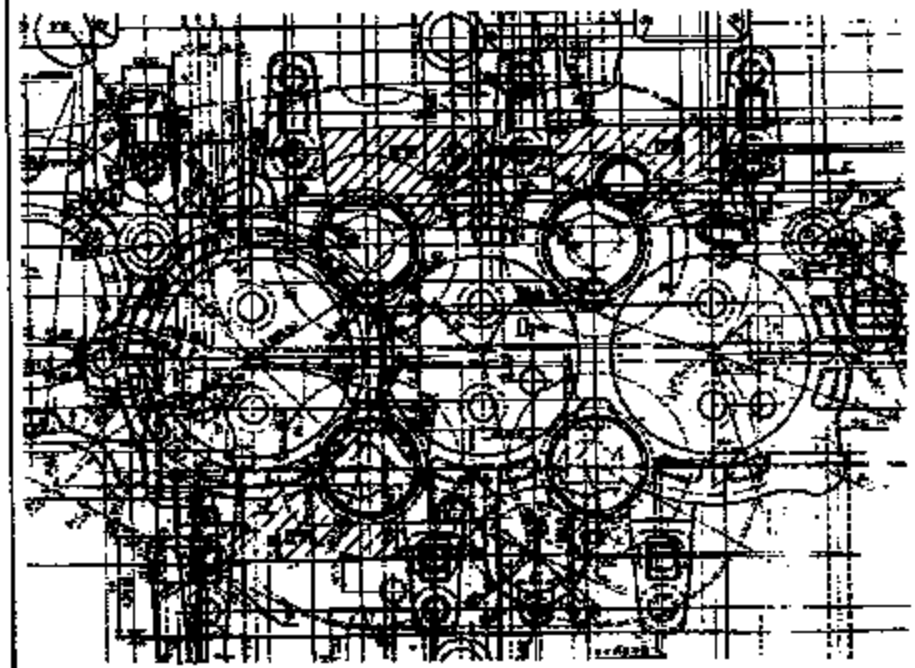
修造日 ／ ／

発行日： 2002年 8月 30日

承認	確認

No.	項目	不具合内容	対策（改修）内容	責任区 (mm)
	W／J中子折れ	下図の— 部で中子が折れる	下型キャビティーの下図○ 部のW／J足部2箇所の穴サイズ変更 （金型削り修正）	GDC （材工金型）



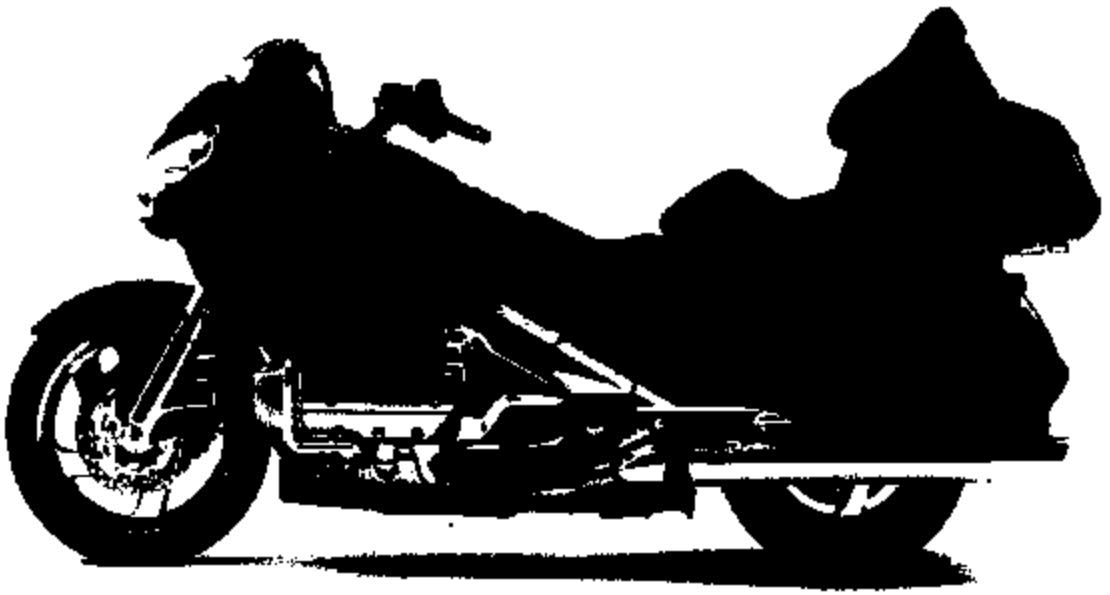


Approved by	Prepared by
Kanda	Ido

GL1800 (MCA) Cooling System Problems

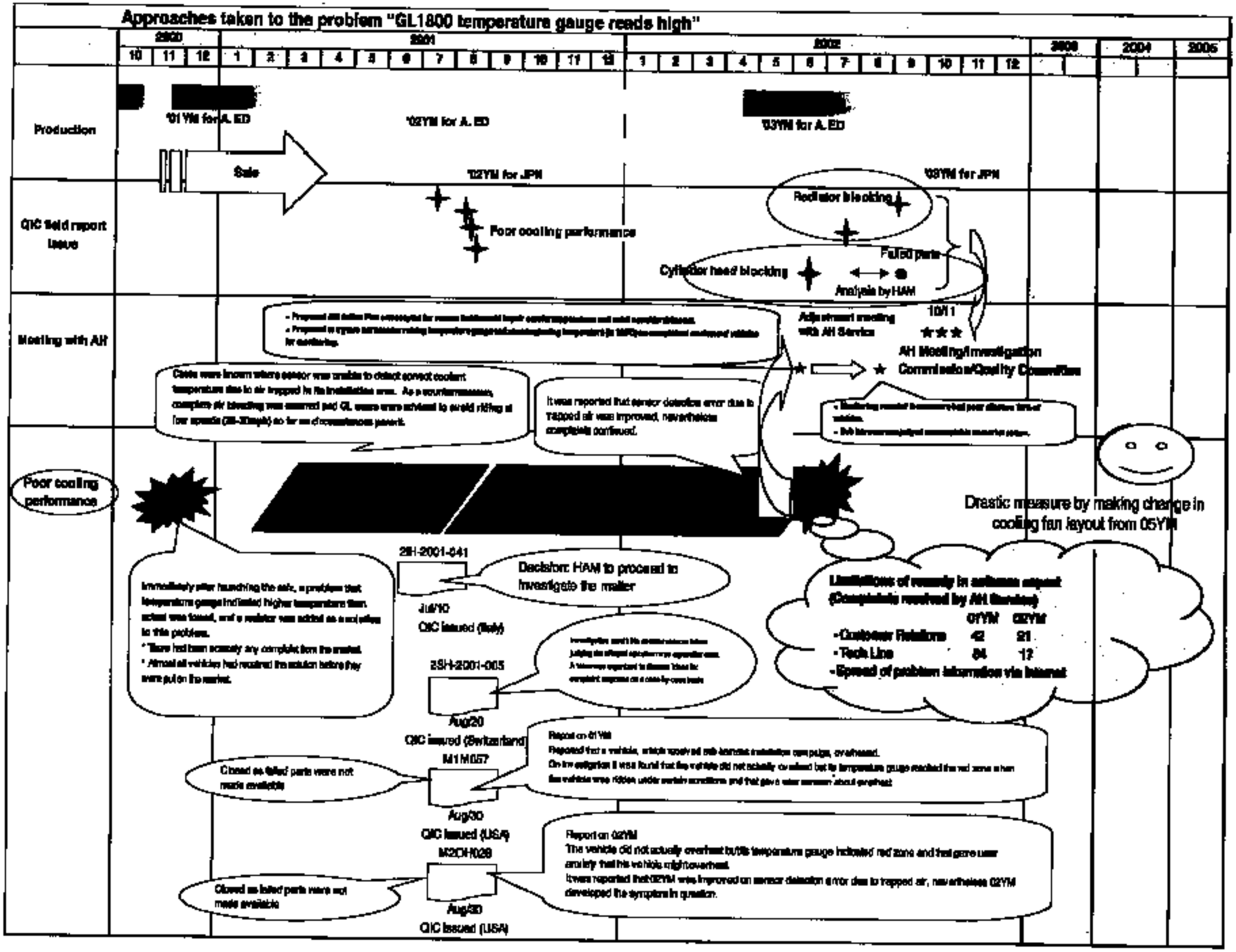
Data for presentation to Market Quality Information Investigation Commission

1. Occurrence in the Market
2. Overview of Problems
3. Poor Cooling Performance at Low Speeds
4. Blocking of Cylinder Head Water Jacket
5. Blocking of Radiator
6. Results of Confirmation of Alleged Symptoms
7. Proposal of Market Action to Take
8. Method of Market Action
9. Estimate of Cost of Market Action
10. Future Activity

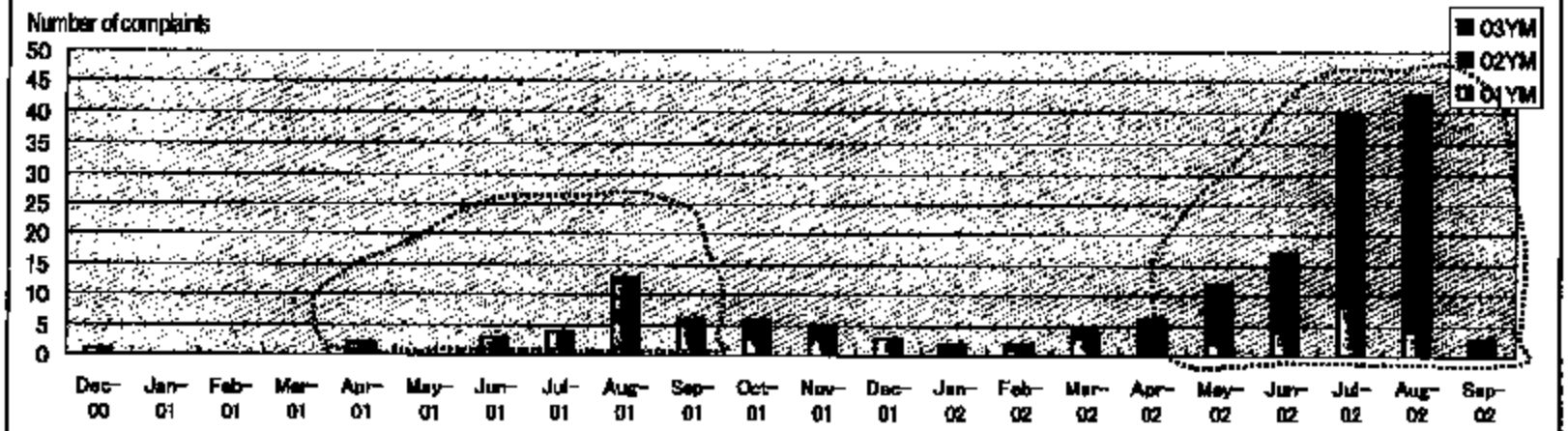


2002/10/28

1-1. Occurrence in the Market



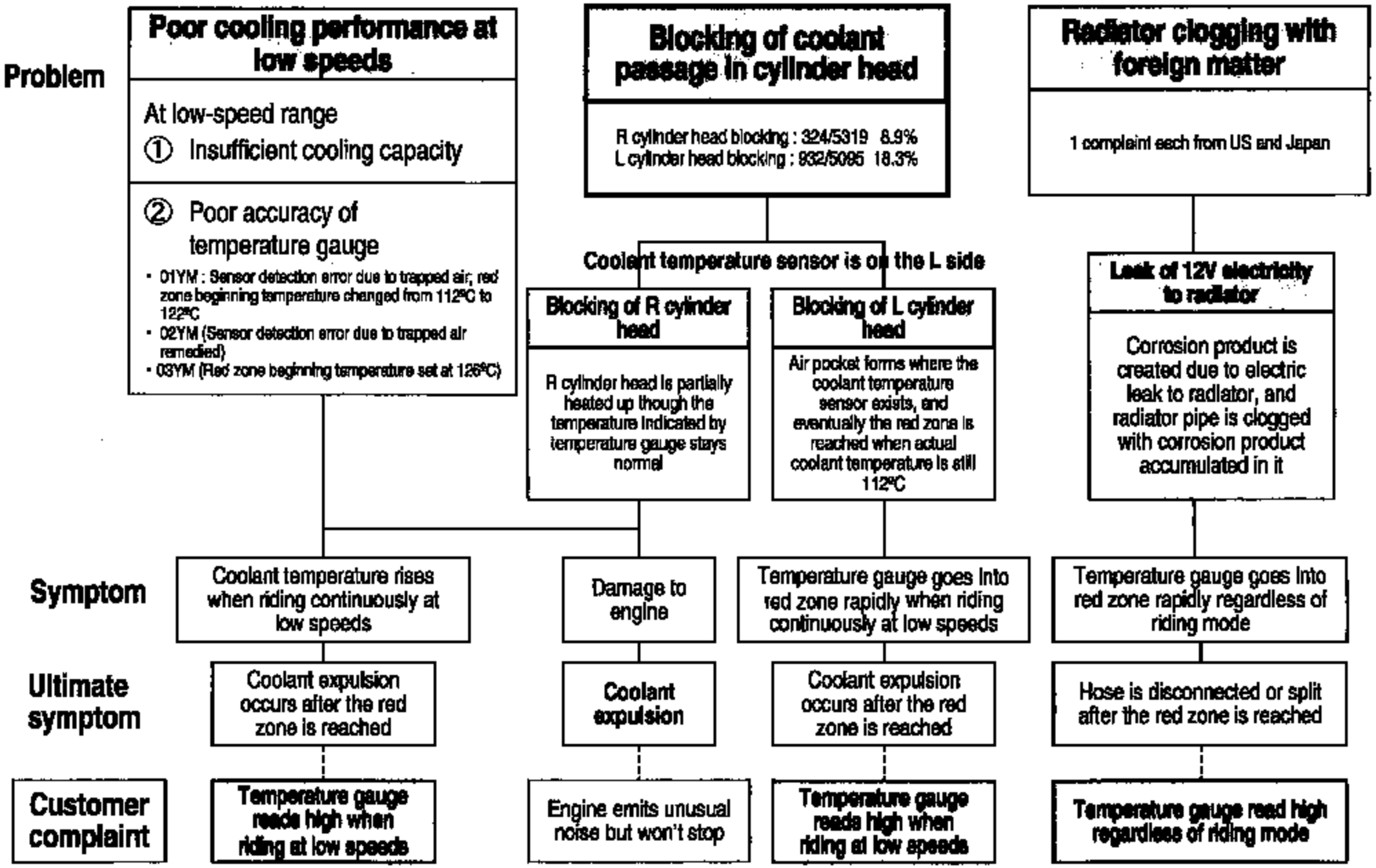
GL1800 (MCA) 1-2. Occurrence in the Market

Complaints received by Tech Line **'01 = 60 complaints** **'02 = 107 complaints** **'03 = 5 complaints** **TTL = 172 complaints**	
QIC/QID reports (Date of registration of affected vehicle)	×: Overheat □: Cylinder head W/J blocked △: Radiator clogged

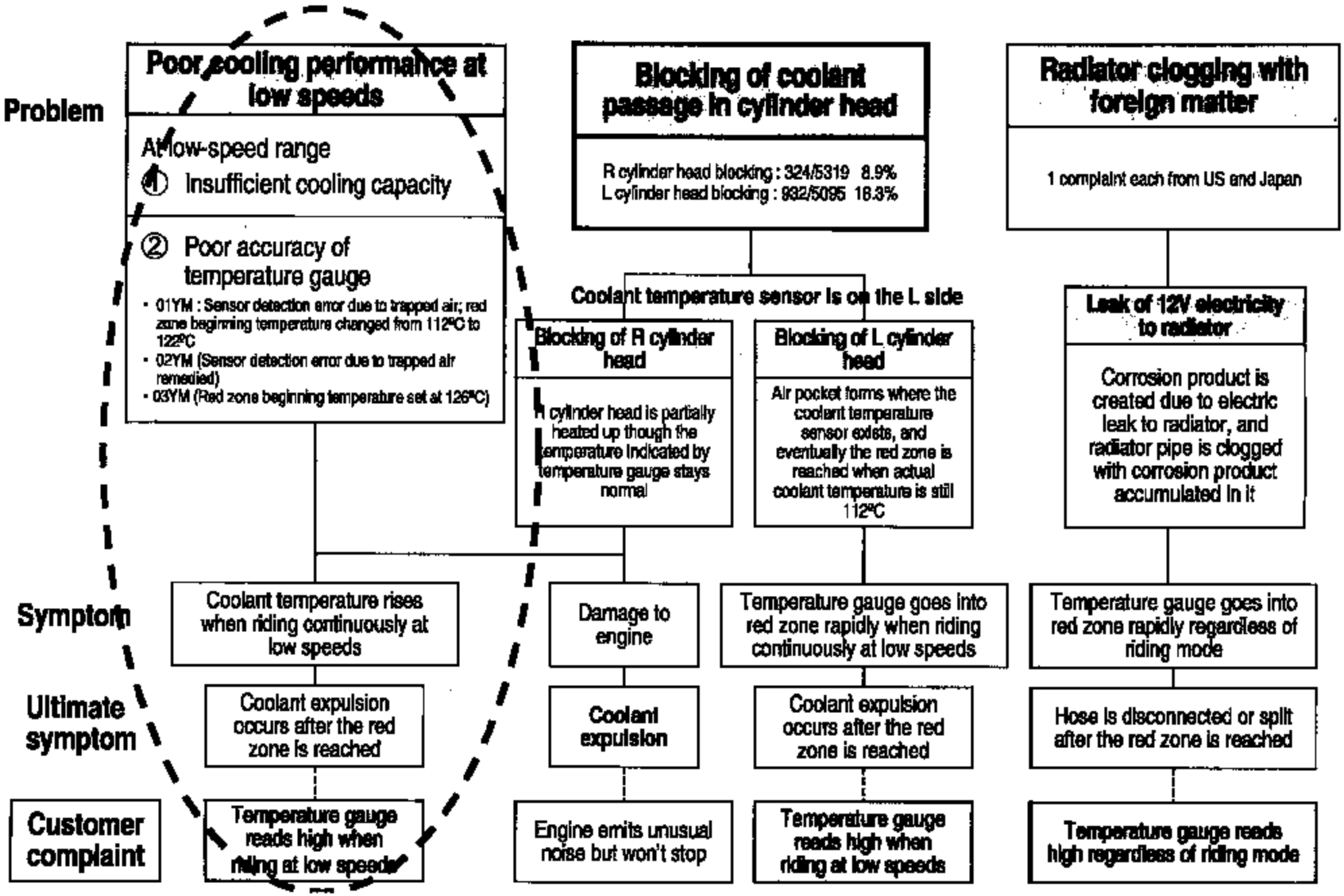
YM	01	02	03
Rate of occurrence	**0.43%**	**0.59%**	**0.07%**
Number of vehicles produced	13,914 vehicles	18,080 vehicles	7,240 vehicles
	Total 39,234 vehicles		

Comment
- Both '01YM and '02YM received more complaints in summer than in other seasons.
- '03YM received the fewest complaints among the three.

2. Overview of Problems

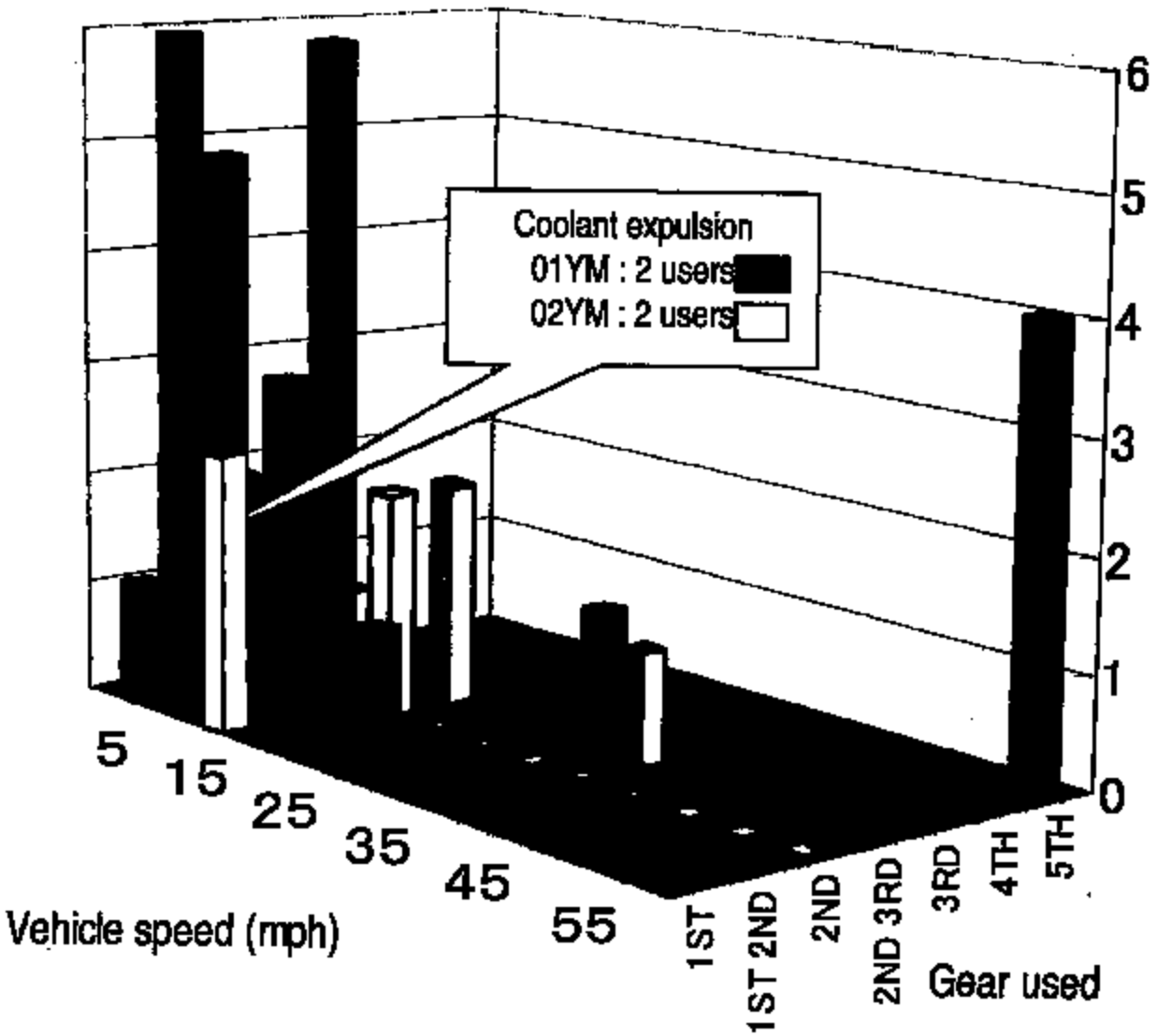


GL1800 (MCA) 3-1. Poor Cooling Performance at Low Speeds

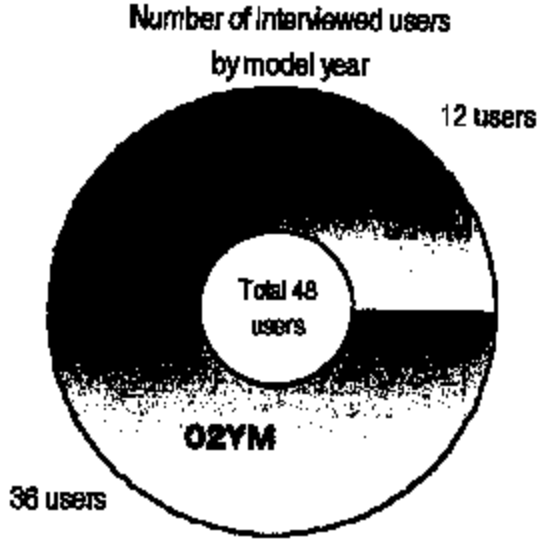


3-2. Occurrence in the Market

《Result of interview with users》



- Users have experienced cooling system problems mostly when riding at slow speeds from 10 to 20mph in 1st or 2nd gear.
- Though few in number, some users have also experienced cooling system problems when riding at mid-to-high speeds in 3rd, 4th or 5th gear.

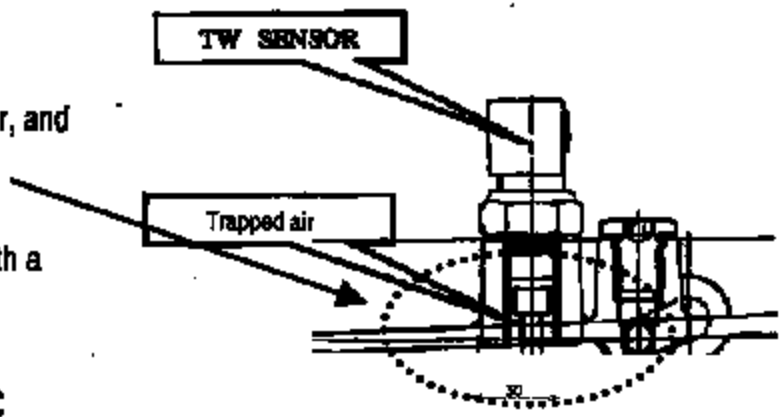


GL1800 (MCA) 3-3. Poor Cooling Performance at Low Speeds

01 'YM **Red zone beginning temperature was set at 122ºC**

- Air was trapped in the temperature detecting area of the coolant temperature sensor, and this caused the temperature gauge to indicate higher temperature than actual.

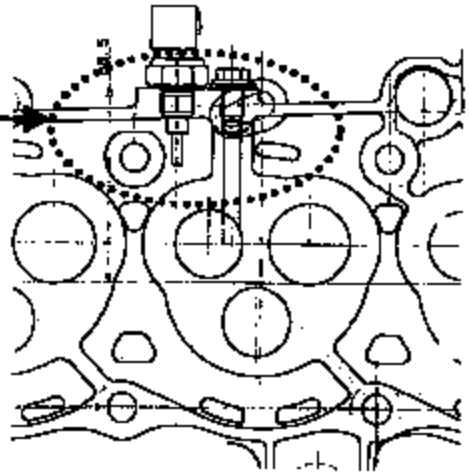
- As a countermeasure, the existing sub harness was replaced with a sub harness with a 2.7 Ω resistor for vehicles that were off the line, and a fairing harness with a built-in 2.7 Ω resistor was applied to vehicles on the line.



02 'YM **Red zone beginning temperature was set at 122ºC**

For Japanese version, red zone beginning temperature was set at 126ºC in consideration of traffic congestion.

- Coolant temperature sensor area of the cylinder head was modified to prevent air from being trapped.



03 'YM **Red zone beginning temperature was set at 126ºC**

In the US market, frequent complaints were made on the issue of coolant temperature of '01YM and '02YM.

As a countermeasure, sub harness for correcting red zone beginning temperature to 126ºC was prepared and tried on complained customers' vehicles for monitoring.

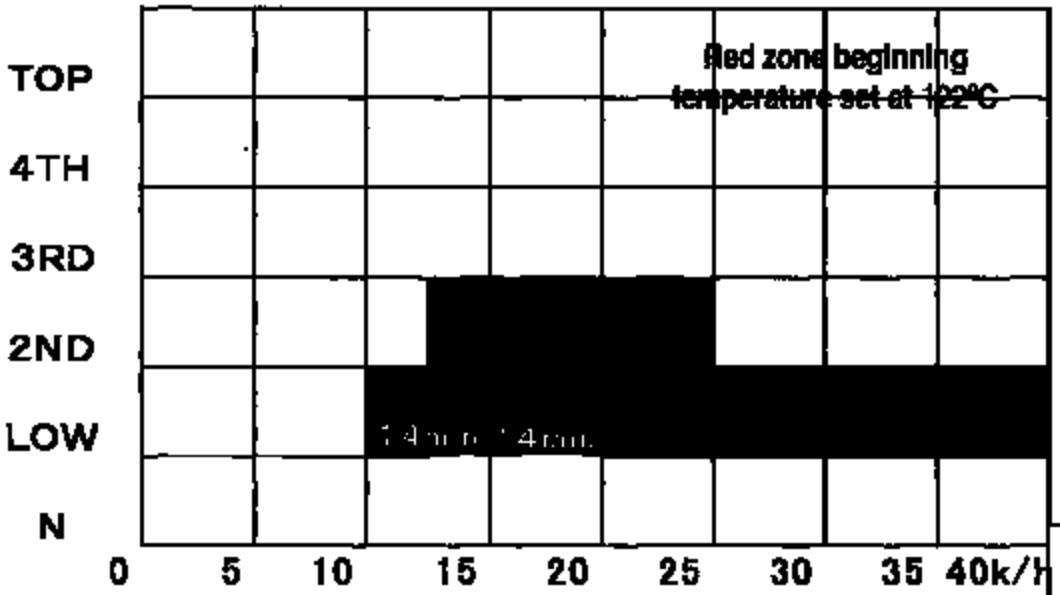
Result : The sub harness proved 30% effective but AH refused to accept it as appropriate field action to use on affected vehicles.

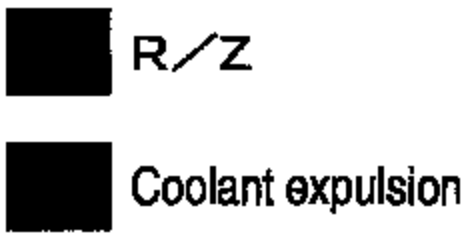
04 'YM **Same as '03YM**

3-4. Poor Cooling Performance at Low Speeds

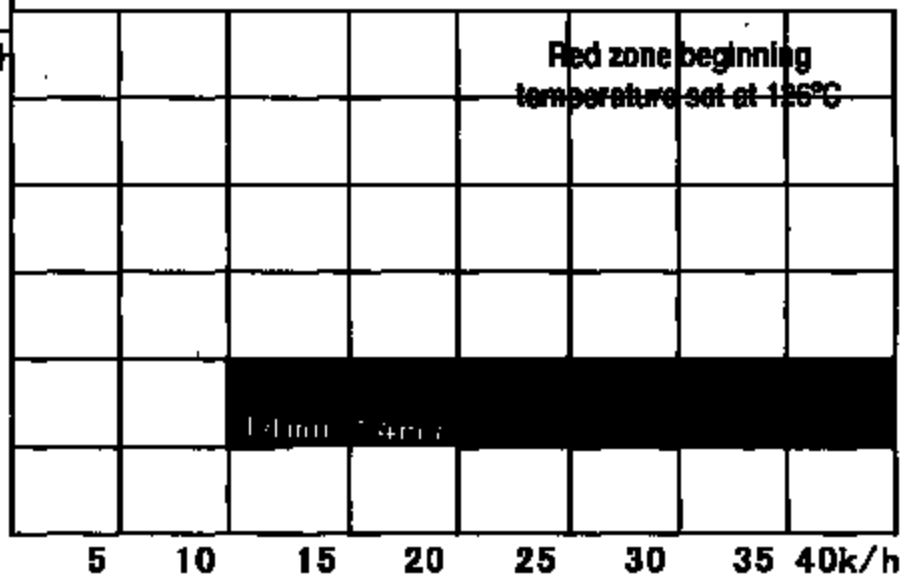
《Cooling performance when cylinder heads are non-defective and effect of red zone beginning temperature change》

Conditions : In an atmospheric temperature of 35ºC, continuously drive down a level road with the gear in LOW position, starting with the coolant at 100ºC





* After changing the red zone beginning temperature to 126ºC



3-5. Poor Cooling Performance at Low Speeds

【Conclusion】

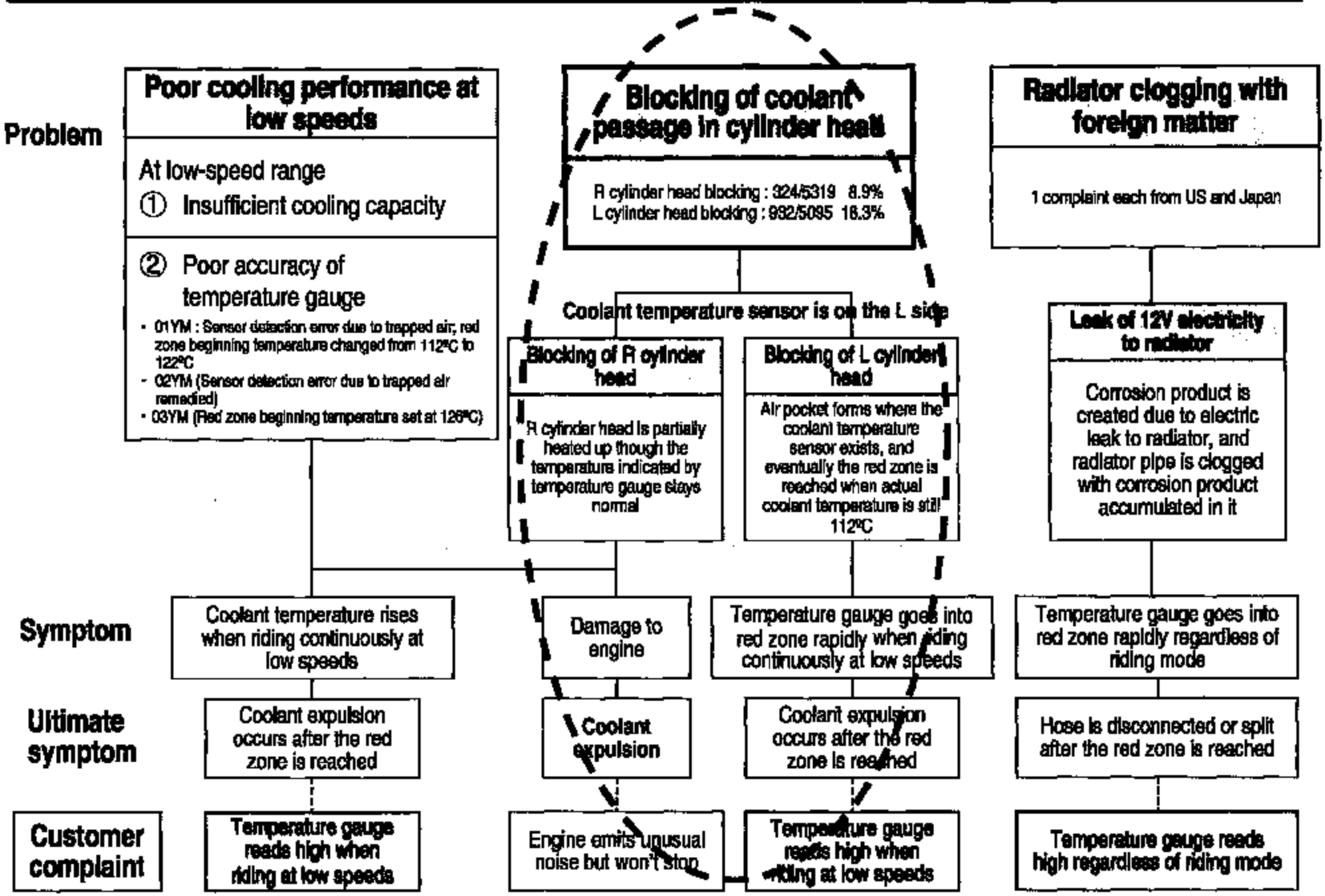
- **Insufficient cooling capacity of the radiator constitutes a factor causing the pointer of temperature gauge to climb to the red zone and coolant to be expelled from the overflow tube of reservoir tank when riding continuously at low speeds.**

《Cooling system specifications for '05 and subsequent model-year vehicles (JBP)》

We judge the following specifications suit our purpose.

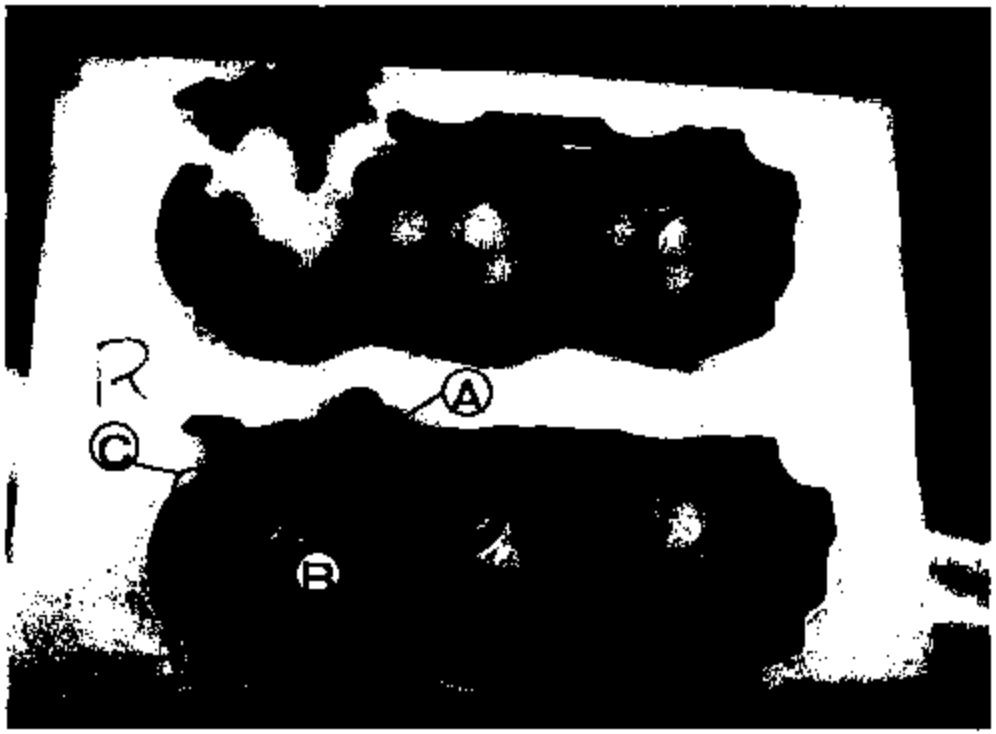
		JBP	MCAA ('01~'04)	As against base
Heat radiation of radiator		32.2kw	26.4kw	1.22 times larger
FAN	Flow	External draw-in fan	Internal draw-in fan	Quantity of airflow 2.7 times larger
	Diameter	ϕ210	ϕ157	
Motor revolving speed		3700rpm	3350rpm	

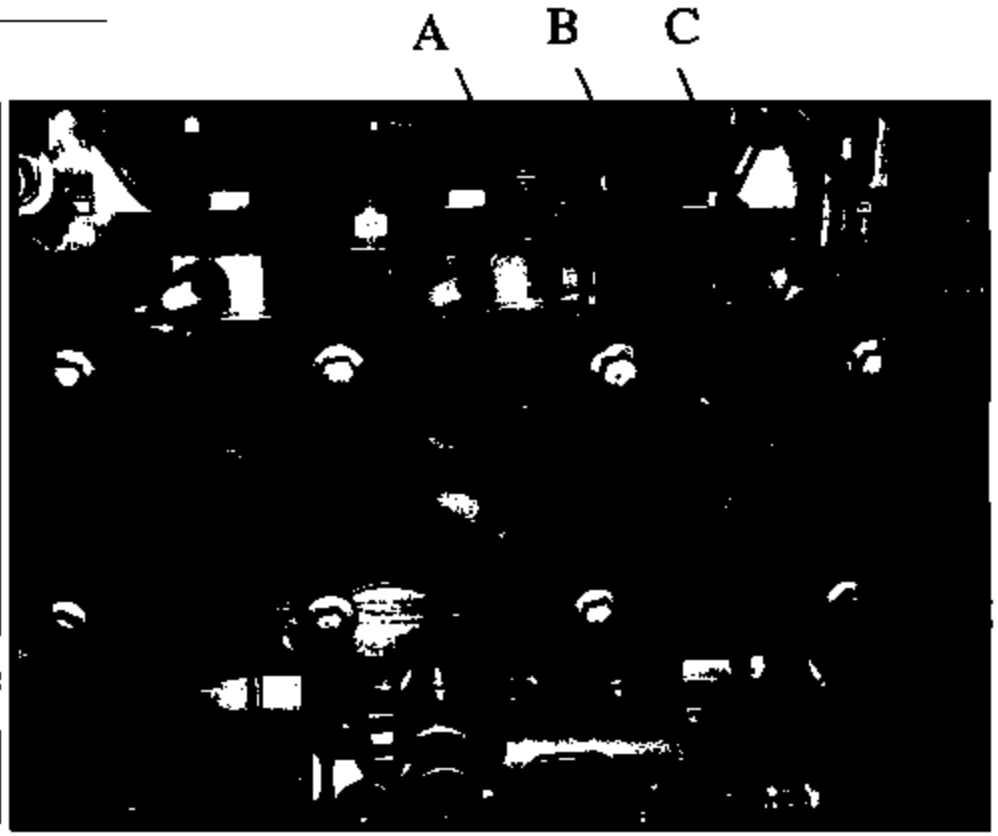
GL1800 (MCA) 4-1. Blocking of Cylinder Head Water Jacket



4-2. Blocking of Cylinder Head Water Jacket

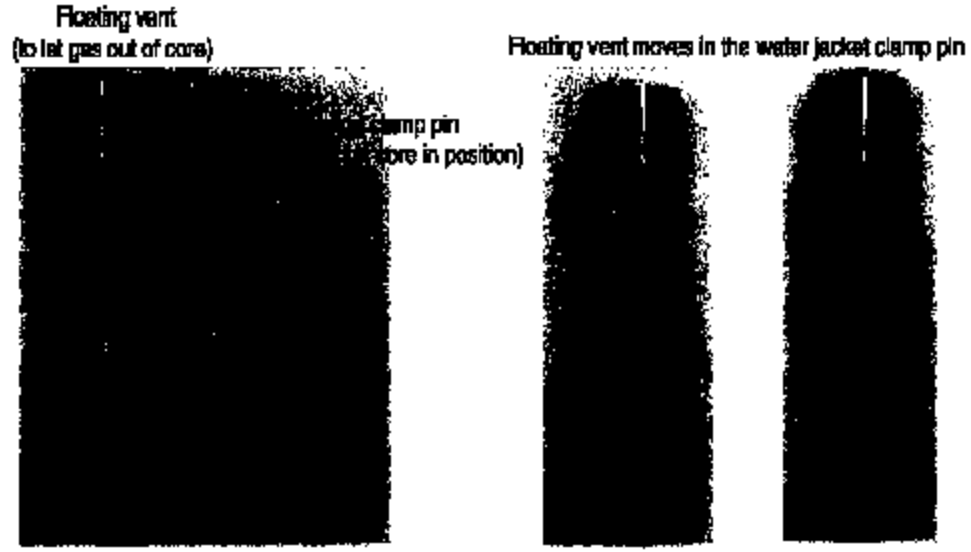
- **Vehicles fitted with a cylinder head whose coolant passage was blocked due to broken water jacket core were allowed to flow onto the market. (It was impossible to determine the lot numbers/serial numbers of affected '01 and subsequent model-year vehicles)**





4-3. Blocking of Cylinder Head Water Jacket

▪ Mechanism of water jacket core breakage due to floating problem

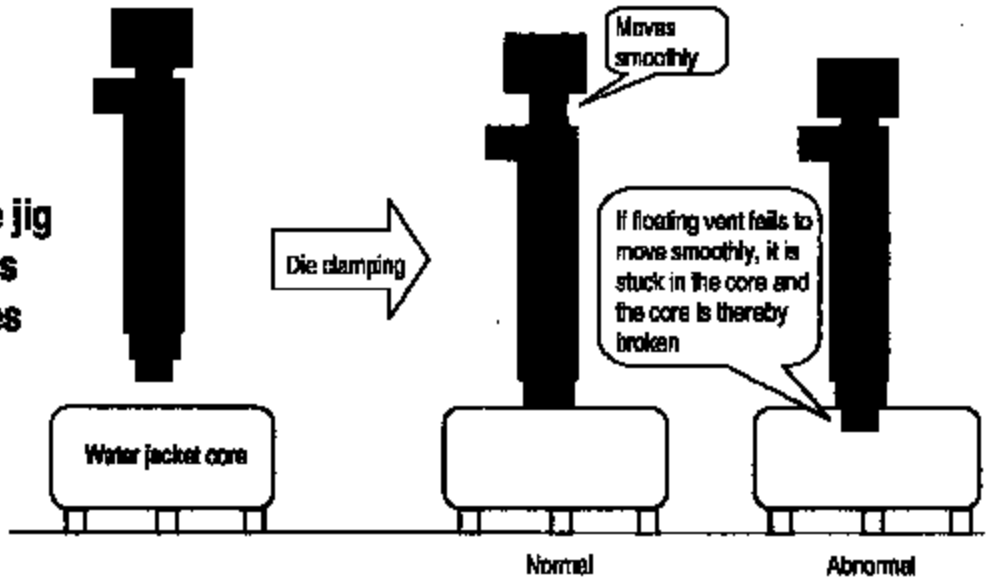


There has been no change since the floating vent was first applied (from '01YM)

It is impossible to determine which one is defective

- **Revised Operation Standard has been effective since September 12**

  The obsolete version specifies that the jig should be checked when a problem has arisen, but the revised version specifies that the jig should be checked when unclamping die after every shot.



GL1800 (MCA) 4-4. Blocking of Cylinder Head Water Jacket

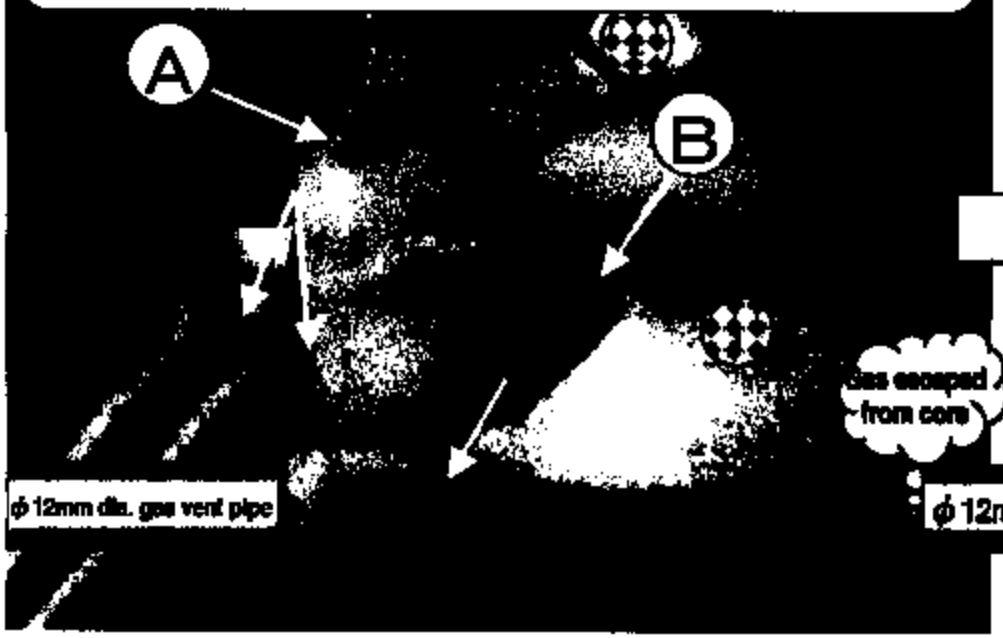
[Conclusion]

We conclude that none of the products flowed onto the market have a block in coolant passage C in the cylinder block.

Reasons why coolant passage block does not occur at the (C) location

1. The core broke at all the (A), (B) and (C) locations, and swiveled about an axis passing through the core prints (locating portions) and the (C) location where the fracture surfaces got hitched on each other (because of a large sectional area), and as a consequence the core was raised on a slant without leaving any gap at the (C) location.
2. The gas vent pipe had the effect of preventing the (C) location from opening.
   (Insertion of aluminum does not occur unless the gap is 0.5mm or wider)
   (Clearance between gas vent pipe and core is 0 to 0.2mm)

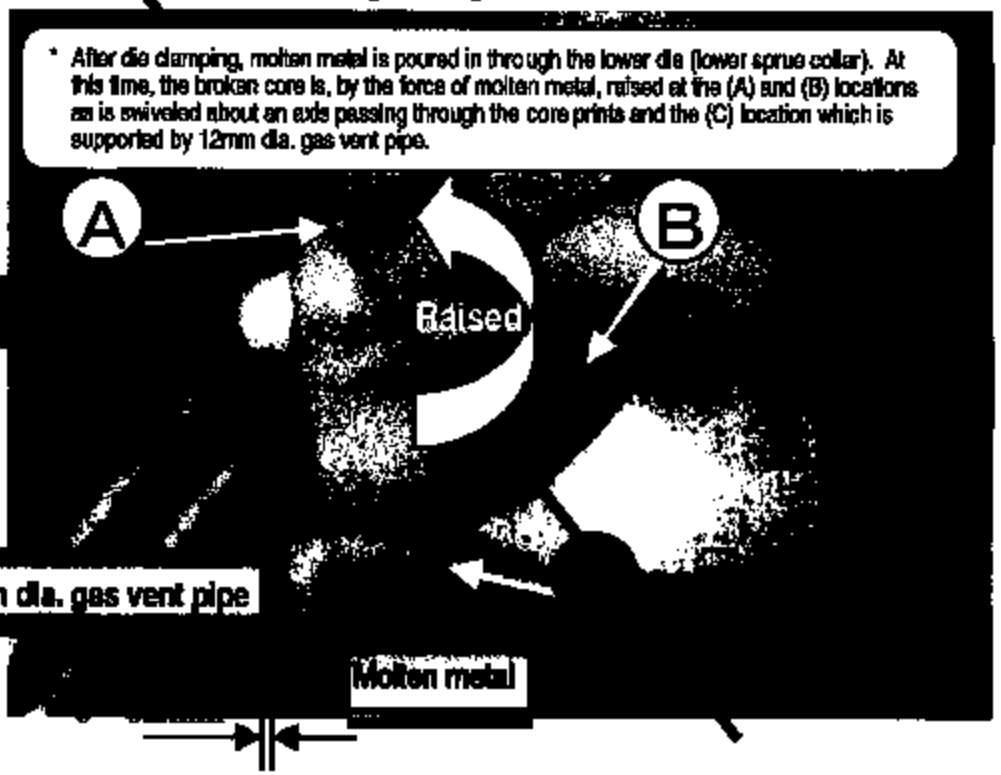
* During die clamping, the floating vents fail to move smoothly and press the ① and ② portions strongly. This causes stress concentration in the (A) and (B) locations where no support is provided with core prints (locating portions) and the core is thereby broken.



Axis of rotation

Fracture surfaces get hitched on each other as they are rough and large in sectional area

* After die clamping, molten metal is poured in through the lower die (lower sprue collar). At this time, the broken core is, by the force of molten metal, raised at the (A) and (B) locations as is swiveled about an axis passing through the core prints and the (C) location which is supported by 12mm dia. gas vent pipe.



GL1800 (MCA) 4-5. Blocking of Cylinder Head Water Jacket

Estimated number of defective units and defect rate

Not blocked

Blocked

For calculation, 43,701 which is the number of units produced by the end of August 2002 is used as a population parameter.

R cylinder head (8.9%)

L cylinder head: Defect rate / Number of units	Not blocked	A	B	AB
Not blocked		4.2% / 1,835	1.7% / 743	0.1% / 44
A	1.6% / 699	0.07% / 31	0.03% / 13	0.002% / 1
B	14.8% / 6,468	0.6% / 262	0.3% / 131	0.02% / 9
AB	2.7% / 1,180	0.1% / 44	0.05% / 22	0.003% / 1

(18.3%)

[redacted]

Number of cylinder heads found defective by inspection

- R cylinder head = 5,544
- L cylinder head = 5,318

Total 10,862

Result

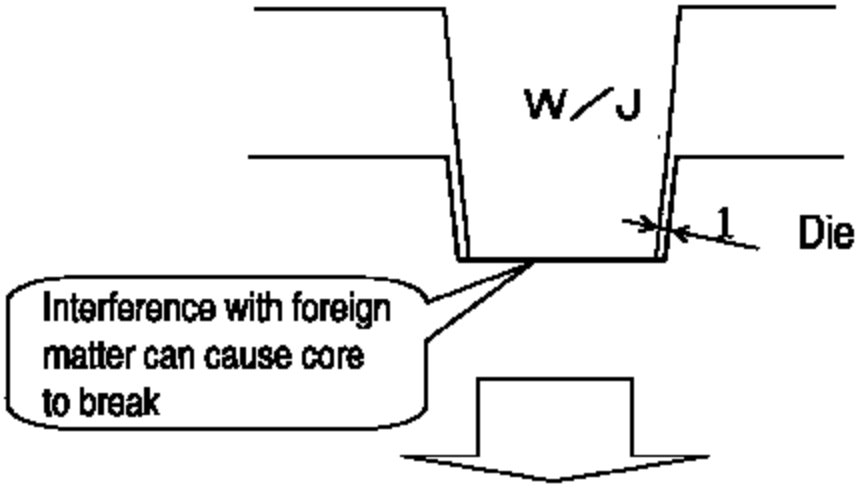
- Occurrence rate of cylinder head water jacket blocking is 27.2%.

4-6. Blocking of Cylinder Head Water Jacket

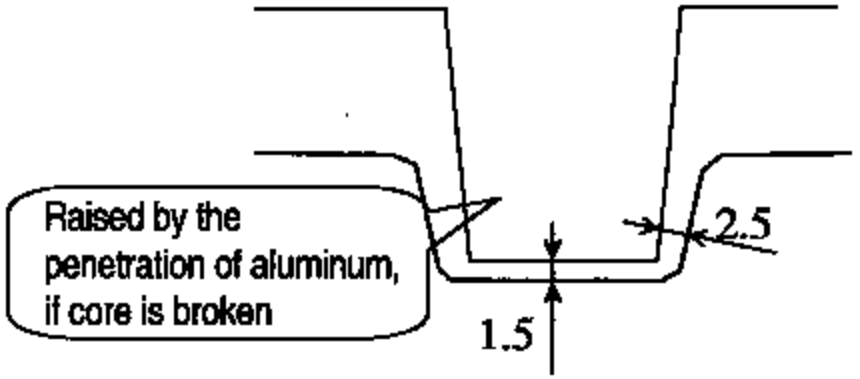
- It was so arranged that the core would be, if broken, separated from the core print.
- It was so arranged that the two portions (indicated by "a") at where breakage had occurred would not interfere with foreign matter such as burr.

These preventive measures have been effective since August 29

Before C/M



After C/M



4-7. Blocking of Cylinder Head Water Jacket

Riding conditions in which a vehicle with blocked water jacket(s) or radiator(s) develops the symptom that the pointer of temperature gauge goes higher or climbs to red zone

- The L cylinder head has a coolant temperature sensor in it, and if the passage A is blocked and air pocket is thereby formed, the sensor fails to detect correct temperature, thus increasing the likelihood that the temperature gauge goes into the red zone even in other riding modes than parade mode.
- There is no coolant temperature sensor in the R cylinder head, and it gives a negative aspect that coolant passage block in R cylinder head cannot immediately lead to any symptom.

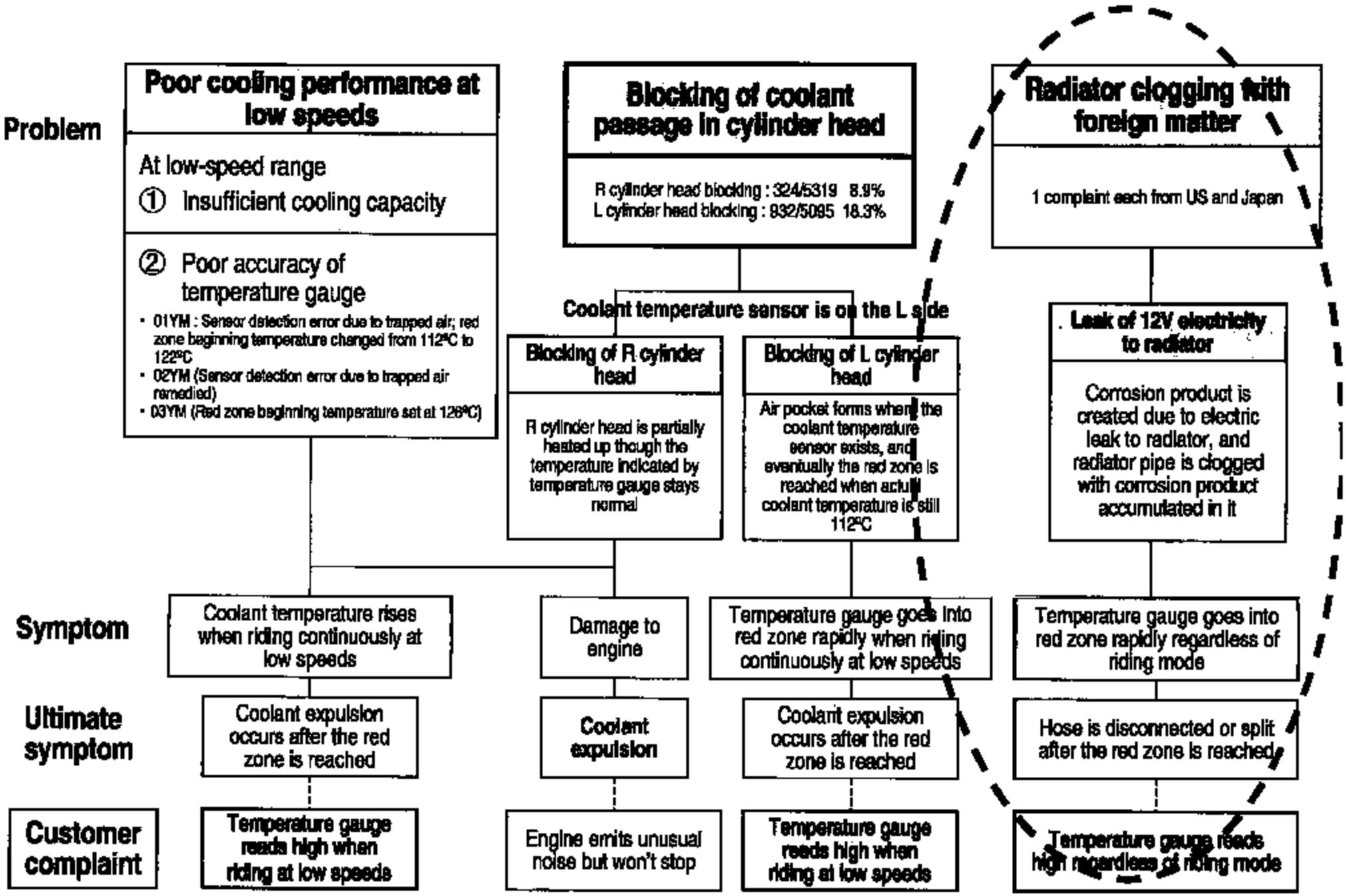
R/Z : 122°C or higher

△ : 115°C or higher (1 range below red zone)

	L			R			Low-speed running		Steady running				Soak (engine stop) after running	Idling after running
	A	B	C	A	B	C	Parade: Continuous riding at 15–20km/h in LOW gear	Stop-and-go: (Riding in ordinary stop-and-go traffic)	50km/h	100km/h	150km/h	Vmax		
Normal cylinder head	○			○			R/Z	○	○	○	○	△	○	△
Water jacket blocked	×	○	○	○	○	○	R/Z	R/Z	R/Z	○	△	R/Z	○	R/Z
	×	×	○	○	○	○	R/Z	R/Z	R/Z	△	△	R/Z	○	R/Z
	○	×	○	○	○	○	R/Z	○	○	○	○	○	○	○
	○	○	○	○	×	○	R/Z	○	○	○	○	○	○	○
	○	○	○	×	○	○	R/Z	○	○	○	○	○	○	○
	○	○	○	×	×	○	R/Z	○	○	○	○	○	○	○

	L RAD	R RAD								
Radiator clogged with foreign matter	×	×	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z
	×	○	R/Z	○	○	○	R/Z	R/Z	○	○
	○	×	R/Z	○	○	○	○	R/Z	○	○

5-1. Blocking of Radiator



5-2. Blocking of Radiator

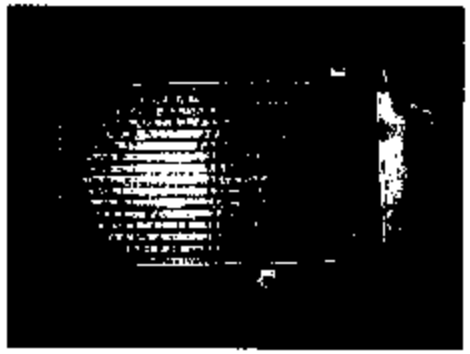
Brief description of complaints about overheat that was found caused by foreign matter in radiator (2 complaints)

	First complaint (Japan)	Second complaint (USA)
Date of occurrence	July 23, 2002	September 9, 2002
Date of registration	February 22, 2002 ('02YM)	September 9, 2001 ('02YM)
Total distance traveled	2566km	8000 miles (12800km)
Frame No.	SC47-1000157	1HFSC47092A101134
Alleged symptom	When riding, vehicle has given overheated indication by the temperature gauge climbing above the red zone.	Temperature gauge went into the red zone after 20 minutes of riding at highway speeds.
Check result	The L radiator was clogged with foreign matter.	When measured with infrared thermometer, the temperature of L radiator was 38°C and that of R radiator was 92°C. When the radiator was removed, it was found clogged with foreign matter.
Past maintenance record	No coolant maintenance has been done	No maintenance has been done

5-3. Blocking of Radiator

Conditions of Returned Parts

Second complaint (USA)



Second complaint (USA)

First complaint (Japan)

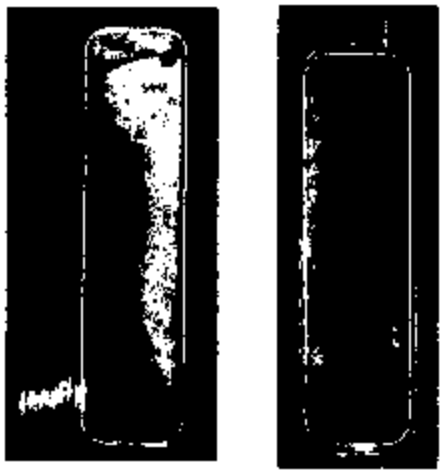
First complaint (Japan)

GL1800 (MCA) 5-4. Blocking of Radiator

《Result of investigation of affected radiators》

Occurrence: July 23, 2002 in Japan after traveling 2,566km

Outlet side



After cleaning

Inlet side

After cleaning

Findings

① Both the inlet side and the outlet side had heavy accumulation of foreign matter and were badly corroded in the vicinity of pipe.

② Corrosion had attacked the pipe not only on its internal surface but also on its external surface in contact with the hose.

We presumed that an electric load between radiator and engine was the cause of corrosion.

Condition of radiator pipe

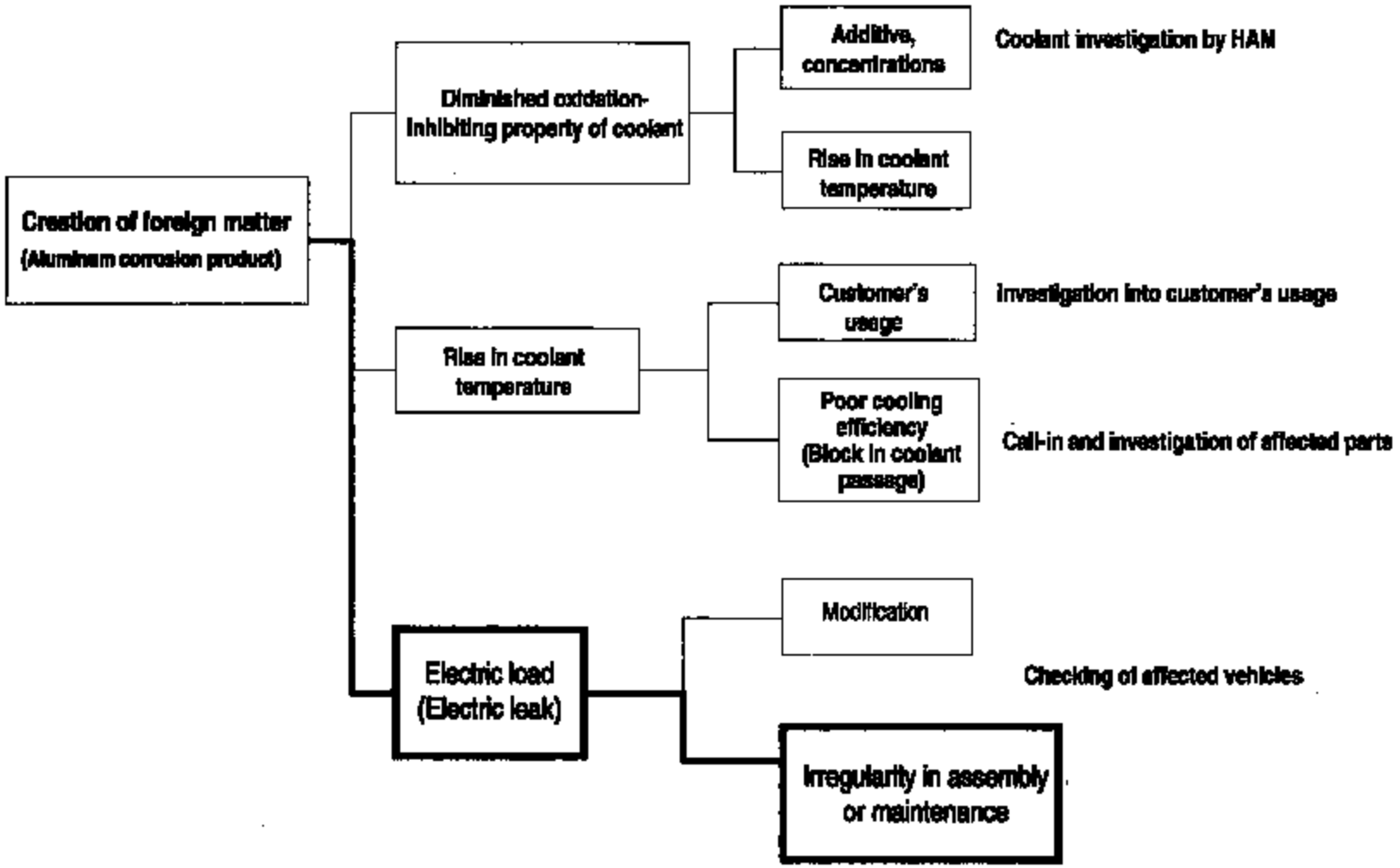
Damaged portion of harness

Taping was peeled and cord sheath was damaged.

There was a sharp edge on the end face of the front SUS clip on top of the radiator.

5-6. Blocking of Radiator

[redacted]



5-7. Blocking of Radiator

Results of actual vehicle test conducted to establish duplicability of foreign matter creation in radiator

PART-1 : Test conditions

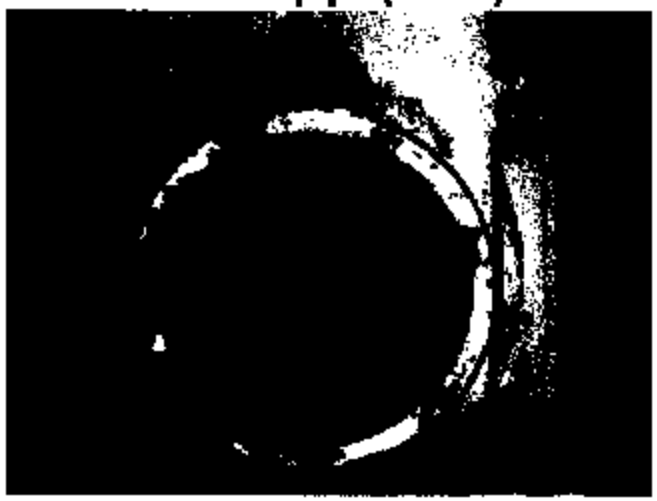
- Cylinder heads: Passages A&B in R cylinder head blocked, No blocking in L cylinder head
- Mode: Continuous running at 15km/h in LOW (with regulated quantity of airflow)

1) 0 ~ 300km	Coolant became turbid
2) 300 ~ 600km	Turbidity remained unchanged
3) 600 ~ 900km	Turbidity remained unchanged

PART-2 : PART-1 + Electric load of 12V

1) 0 ~ 300km (additional) **Gelled substance** was created on the inside of the radiator pipe and hose

Radiator pipe (outlet)



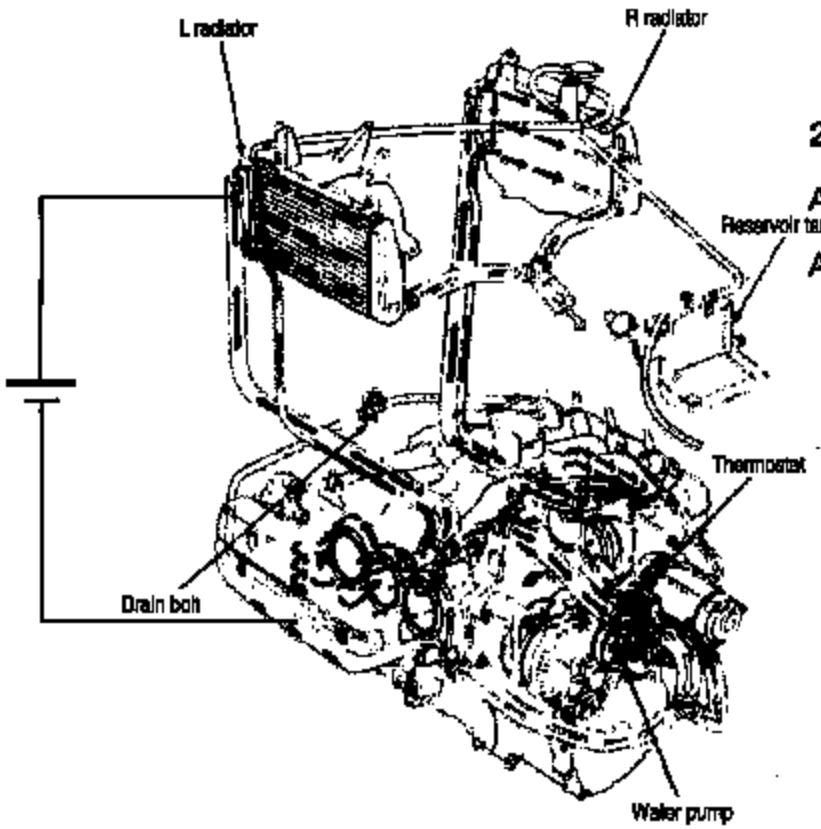
Air bleed pipe

5-8. Blocking of Radiator

The radiator was, due to some cause, charged with electricity, and electrolysis occurred between the radiator and engine as the coolant served as electrolyte.

Due to oxidation reaction in the radiator serving as positive electrode, silicate and phosphoric acid ion contained in coolant react on aluminum of radiator to precipitate corrosion product such as aluminum silicate and aluminum phosphate on the aluminum surface of radiator.

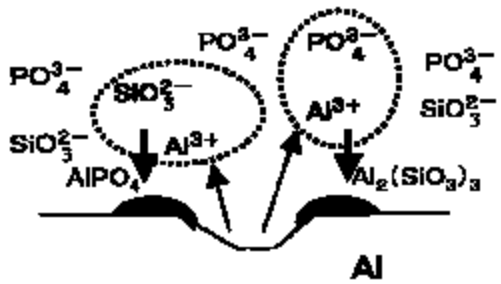
→ The corrosion product accumulates to clog the radiator.



$$2Al^{3+} + 6e^- + 3SiO^{2-}_3 \longrightarrow Al_2(SiO_3)_3$$

$$Al^{3+} + 3e^- + PO^{3-}_4 \longrightarrow AlPO_4$$

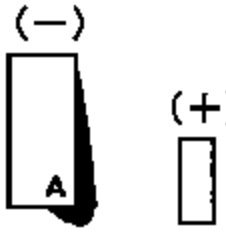
$$Al^{3+} + 3e^- + 3OH^- \longrightarrow Al(OH)_3$$



Reasons why the pipe, particularly its end, is badly corroded

- It is in a location closest to the engine where potential difference is the largest.
- Its current density is high.

<Reference> In case of plating



Plating of the A portion, which is closest to the electrode and has the highest current density, will be the thickest.

Leak Check Results

5-9. Blocking of Radiator

HAM MMP Radiator Current Measurements

NO	Factory No.	Office/Dept.	Vehicle category	TYPE	FRM. NO	YM (WANT)	Check result		Other observation	Measured date
							RH. RAD	LH. RAD		
	Ex.) HGA-1	2K	For 05 advanced study		SC47-007	2003	OK	OK	Harness OK	
1	HAM MMP	QC	MP	A	205645	2003	0.286	0.508	OK	OCT 15
2	HAM MMP	QC	MP	A	205670	2003	0.124	0.100	OK	
3	HAM MMP	QC	MP	A	205631	2003	0.144	0.178	OK	
4	HAM MMP	QC	MP	A	205635	2003	0.180	0.050	OK	
5	HAM MMP	QC	MP	A	205666	2003	0.109	0.167	OK	
6	HAM MMP	QC	MP	ED	200132	2003	0.320	0.840	OK	
7	HAM MMP	QC	MP	A	205685	2003	0.182	0.157	OK	
8	HAM MMP	QC	MP	A	205689	2003	0.098	0.051	OK	
9	HAM MMP	QC	MP	A	205700	2003	0.129	0.169	OK	
10	HAM MMP	QC	MP	ED	200117	2003	0.404	0.128	OK	
21	HAM MMP	QC	MP	A	205759	2003	0.216	0.068	OK	
22	HAM MMP	QC	MP	A	205159	2003	0.174	0.066	OK	
23	HAM MMP	QC	MP	A	205738	2003	0.072	0.186	OK	
24	HAM MMP	QC	MP	A	205764	2003	0.420	0.280	OK	
25	HAM MMP	QC	MP	A	205770	2003	0.379	0.382	OK	
26	HAM MMP	QC	MP	A	205761	2003	0.310	0.398	OK	
27	HAM MMP	QC	MP	A	205805	2003	0.393	0.265	OK	
28	HAM MMP	QC	MP	A	205814	2003	0.260	0.258	OK	
29	HAM MMP	QC	MP	A	205820	2003	0.299	0.213	OK	
30	HAM MMP	QC	MP	A	205810	2003	0.276	0.263	OK	

- It has been verified by checking of a total of 53 healthy vehicles of HAM, Mss, AH and HGA that there is no such leakage current as can lead to radiator problem.

* All measurements, though they varied between 0.006V and 0.84V, were below 12V that is a voltage the radiator carries in case of leak.

Summary 5-10. Blocking of Radiator

- **The main cause of radiator blocking is electric leak to the radiator resulted from such irregularity in manufacture/maintenance as incorrect installation/removal of wire harness, but this is considered to be an extremely rare occurrence.**

① Both of the two vehicles whose radiators were found blocked had no block in cylinder head and the cause of overheat was therefore attributed to radiator blocking.

② One of the above affected vehicles was found bearing traces of interference between the harness and the edge of radiator mounting SUS clip.
(The harness has a wire of the circuit that generates +12V when the main switch is turned on)
※ Buyback of US vehicle is now under negotiation.

③ The harness of the affected vehicle was out of its original position and an originally installed clip was removed. This caused a branch wire of harness to sag and interfere with the SUS clip.

④ The duplication test conducted by applying +12V to the radiator brought deposits on the inlet and outlet of the radiator. On analysis the deposits proved to be equivalent to the deposits found in the affected vehicle.

⑤ The duplication test conducted by using deteriorated coolant and by intentionally causing electrolytic corrosion due to potential difference between hose and metal portion of radiator did not bring deposits.

→ In view of the above results, it has been judged that electric leak to radiator due to incorrect wiring eventually resulted in blocking.

⑥ When vehicles assembled by Mss and healthy vehicles of AH and HG, 53 vehicles in total, were checked, no voltage leak was found.

※ Should leak occur, the leakage current is too small to give rider premonition and such leak may therefore continue without being noticed and can lead to radiator blocking and eventual overheating. In order to avoid allowing this to happen, more positive improvement in specification toughness is required.

- Viewed in this light, 04YM MCA will be provided with radiator ground wire for the purpose of preventing electrolytic corrosion and resultant corrosion product that can cause blocking of radiator.

GL1800(MCA)

6-1. Result of Confirmation of Alleged Symptoms

Test conducted to establish whether coolant expelled in case of overflow gets on the rear tire

Riding conditions	Move slowly like in parade		Ride in an overheated condition created forcedly (by cutting off cooling air)			
	Run at 20km/h		Run at 80km/h		Run at 120km/h	
	Straight	Slalom	Straight	Slalom	Straight	Slalom
Coolant got on tire?	No	No	No	Yes	Yes	Yes
Observation	Coolant was expelled 30mm outward of the tire side.	Tire tread did not get on the trail of expelled coolant even during left turn.	Coolant was expelled 30mm outward of the tire side as in the case of riding at 20km/h.	Tire got on the trail of expelled coolant during left turn.	Coolant was dispersed into mist by the head wind. Coolant got on the tire tread and side wall, though small in amount.	

A series of tests was conducted on an asphalt-paved road, and the rider did not feel the tires slipping on the road throughout the testing.

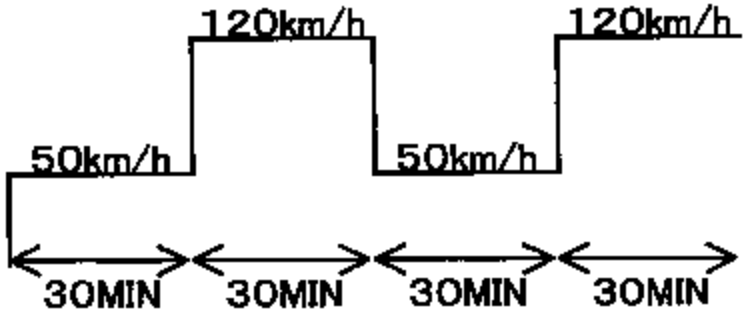
6-2. Results of Confirmation of Alleged Symptoms

- **The radiator drain tube is provided in such a location that the drained cooling water will not splash on the rider's leg or foot.**

6-3. Results of Confirmation of Alleged Symptoms

Engine durability with coolant passages in cylinder heads blocked

-1) Check for occurrence of the alleged symptom by durability test supposing ordinary riding (with passages A & B in both R and L cylinder heads blocked)



No problem has arisen during 15 hours of engine durability test in the riding mode shown at left.

-2) Check for occurrence of the alleged symptom by revving the engine at full throttle after intentional coolant expulsion (with passages A & B in both R and L cylinder heads blocked)

① Run the engine in parade mode so that coolant is expelled.

② Thereafter, do the EH high-speed durability test (for 100 hours).

【Result】Durability test did not result in engine stop, however, abrasion was found on the piston and neighboring parts in the engine. Further running of the engine would have resulted in unusual engine noise.

7-1. Proposal of Market Action to Take

- Affected vehicle may develop a symptom that the temperature gauge goes into the red zone, and continuous riding at low speeds with the temperature gauge in red zone can result in coolant expulsion as the ultimate symptom.
- Frequent complaints were made on this issue and the defect rate of cylinder heads due to blocking of water jacket (manufacturing defect) is high.
- None of the ultimate symptoms including coolant expulsion can occur before the temperature gauge goes into the red zone, and the issue is, on this ground, judged to come under problems that can affect marketability.

We propose to take a voluntary market action.

7-2. Proposal of Market Action to Take

《Complaint response system intended for customers who complained of coolant temperature problem》

For all complained customers' vehicles

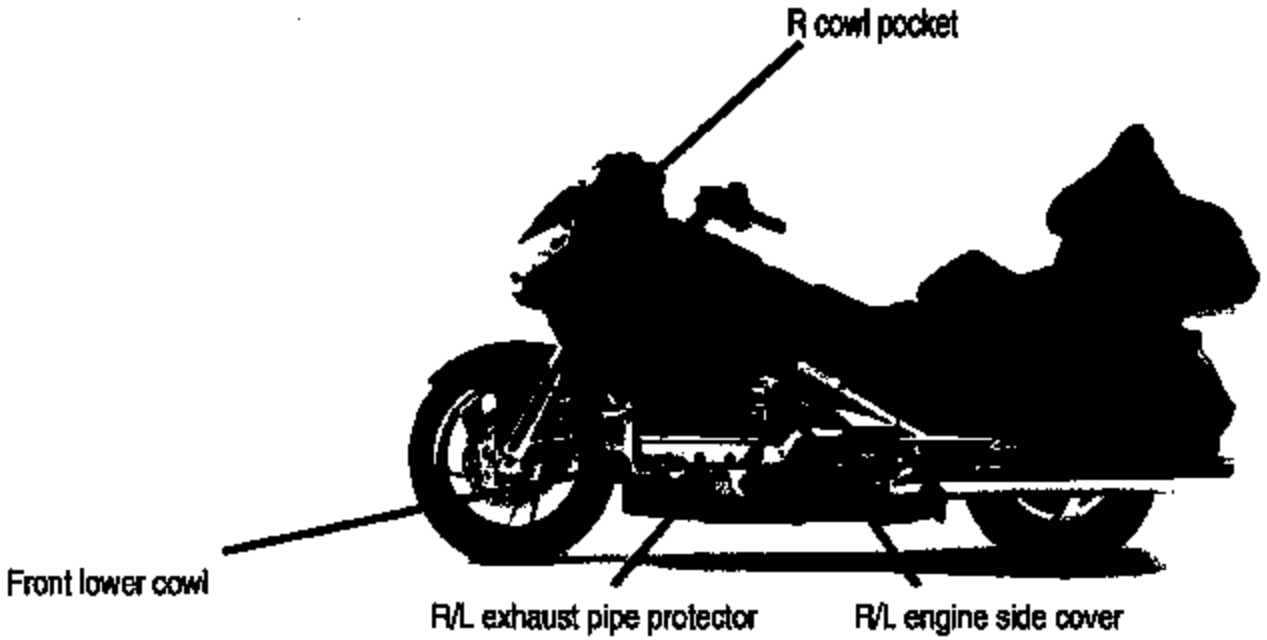
For all vehicles inspected and found containing defective part(s)

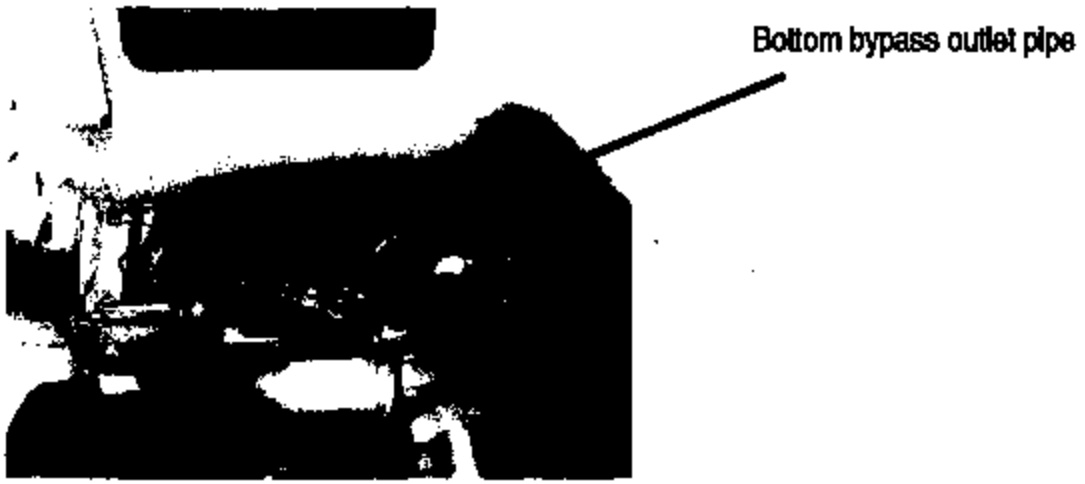
- **Replacement of temperature gauge with accuracy-increased one**
- **Replacement of '01YM cylinder heads with '02YM cylinder heads**
- **Replacement of cylinder head found defective with non-defective one**
- **Replacement of radiator found defective with non-defective one**
- **Repair of harness found causing electric leak**

Advise customer how to ride his or her vehicle to avoid allowing the temperature gauge to climb to the red zone.

To the customer who is not satisfied with the above-mentioned complaint response, make an offer to use the A/S Action, which has been proposed to AH, on his or her vehicle.

8-1. Method of Checking Completed Vehicle for Blocking of Water Jacket





8-2. Method of Checking Completed Vehicle for Blocking of Water Jacket

- Check method

1. Method to check the passage B for blocking
   Check whether the cooling system can be completely drained.
   If the passage B is blocked, radiator coolant remains in the passage B even after draining the coolant.

   How to judge : Using a syringe, try to suck out coolant from the passage B, and

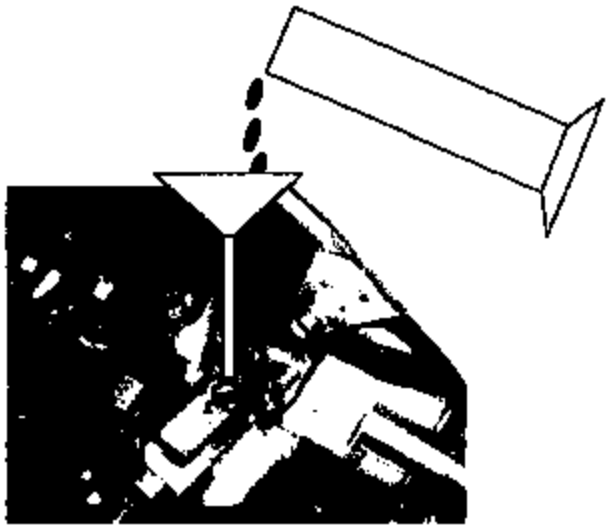
   - If coolant is not sucked out, there is no block in the passage B.
   - If coolant is sucked out, there is a block in the passage B.

2. Method to check the passage A for blocking
   Pour coolant into the cylinder head water jacket from the radiator hose.
   If the passage A is blocked, air pocket is formed and thereby the amount of coolant that can be poured into the cylinder head water jacket is reduced.

   If not blocked, about 600cc of coolant is required to fill up
   If blocked, about 500cc of coolant is required to fill up

   How to judge : Pour a fixed amount (600cc) of coolant into the cylinder head water jacket, and

   - If coolant does not overflow, there is no block in the passage A.
   - If coolant overflows, there is a block in the passage A.



8-3. Change of Temperature Gauge Red Zone Beginning Temperature

1. Change of red zone beginning temperature

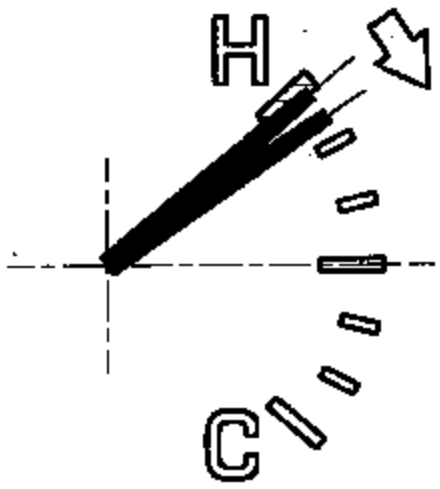
126°C

A : 122ºC ('01YM and '02YM)

B : 126ºC ('03YM)

※ Temperature accuracy increase for '03YM (under consideration)

2. Effect



Downward shift of pointer by 6 degrees

At 122ºC

Delay effect equivalent to two pointers

When riding continuously at 15km/h in LOW gear
Delay effect of about 3 minutes

※ '02YM is excluded from accuracy increase

8-4. Change of Temperature Gauge Red Zone Beginning Temperature

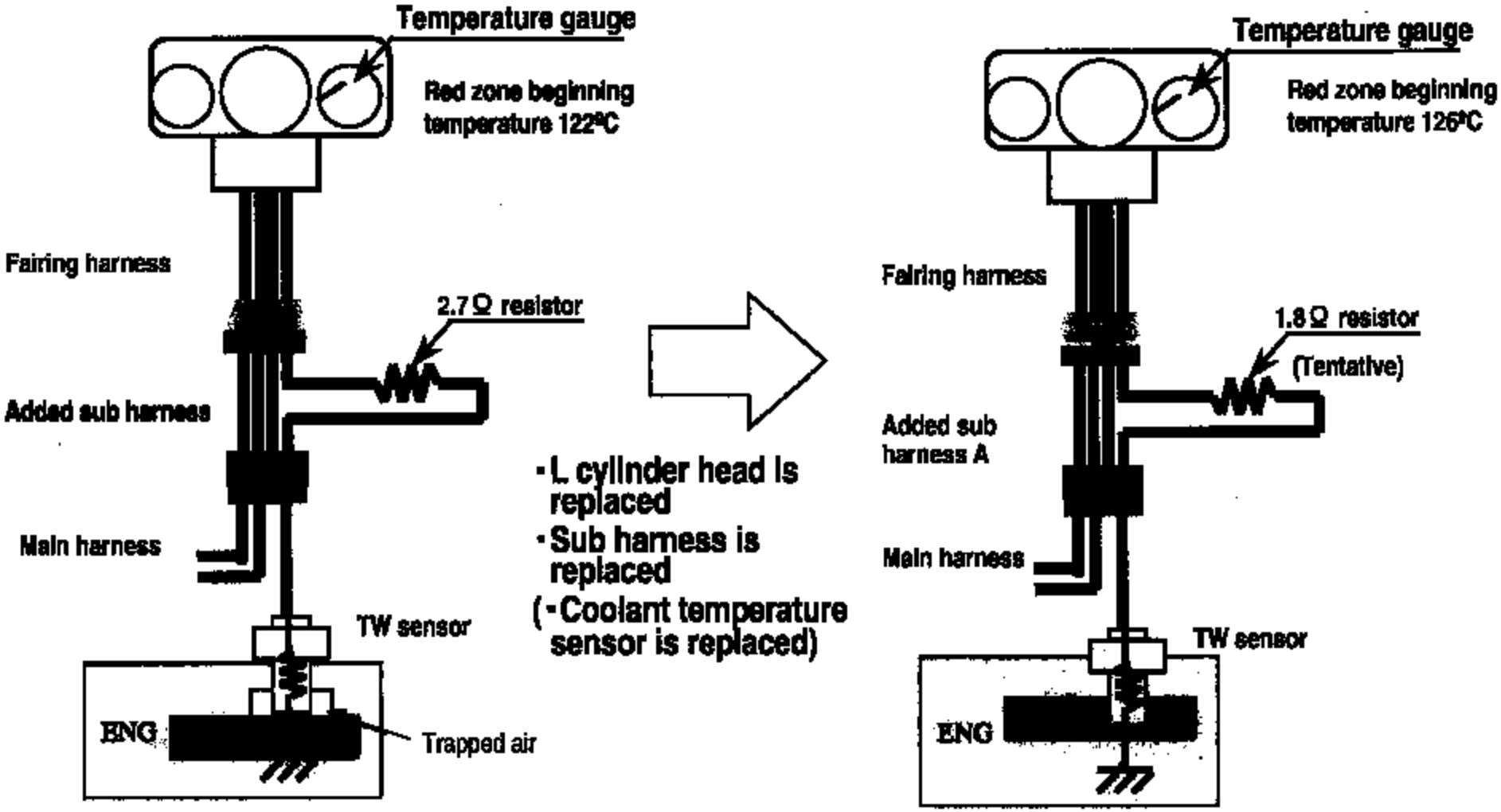
3. Remedial technique (by model)

	Temperature measured by TW sensor Air temperature → Coolant temperature	Red zone beginning temperature 122°C → 126°C	Tolerance grade up	Cost of remedial work
For '01YM, from the beginning of mass production	• Replacement of L cylinder head • Removal of sub harness with resistor	Addition of sub harness with resistor A type : for '01YM B type : for '02YM	Accuracy increase of coolant temperature sensor under consideration (Screening of parts)	Cost of parts : ¥68,000 Labor cost : Cost of about 10-hour labor
For '01YM, from the middle of mass production	• Replacement of L cylinder head • Replacement of fairing harness			Cost of parts : ¥80,000 Labor cost : Cost of about 12-hour labor
For '02YM	———			Cost of parts : ¥10,000 Labor cost : Cost of about 4.3-hour labor ※ Cost of 3-hour labor is reduced if cylinder head is replaced
For '03YM	———	———		Cost of parts : ¥6,000 Labor cost : Cost of about 3.3-hour labor ※ Cost of 3-hour labor is reduced if cylinder head is replaced

8-5. Change of Temperature Gauge Red Zone Beginning Temperature

【A】For '01YM, from the beginning

Cost of parts : ¥68,000 (L cylinder head, sub harness, (coolant temperature sensor))
Labor cost : Cost of about 10-hour labor

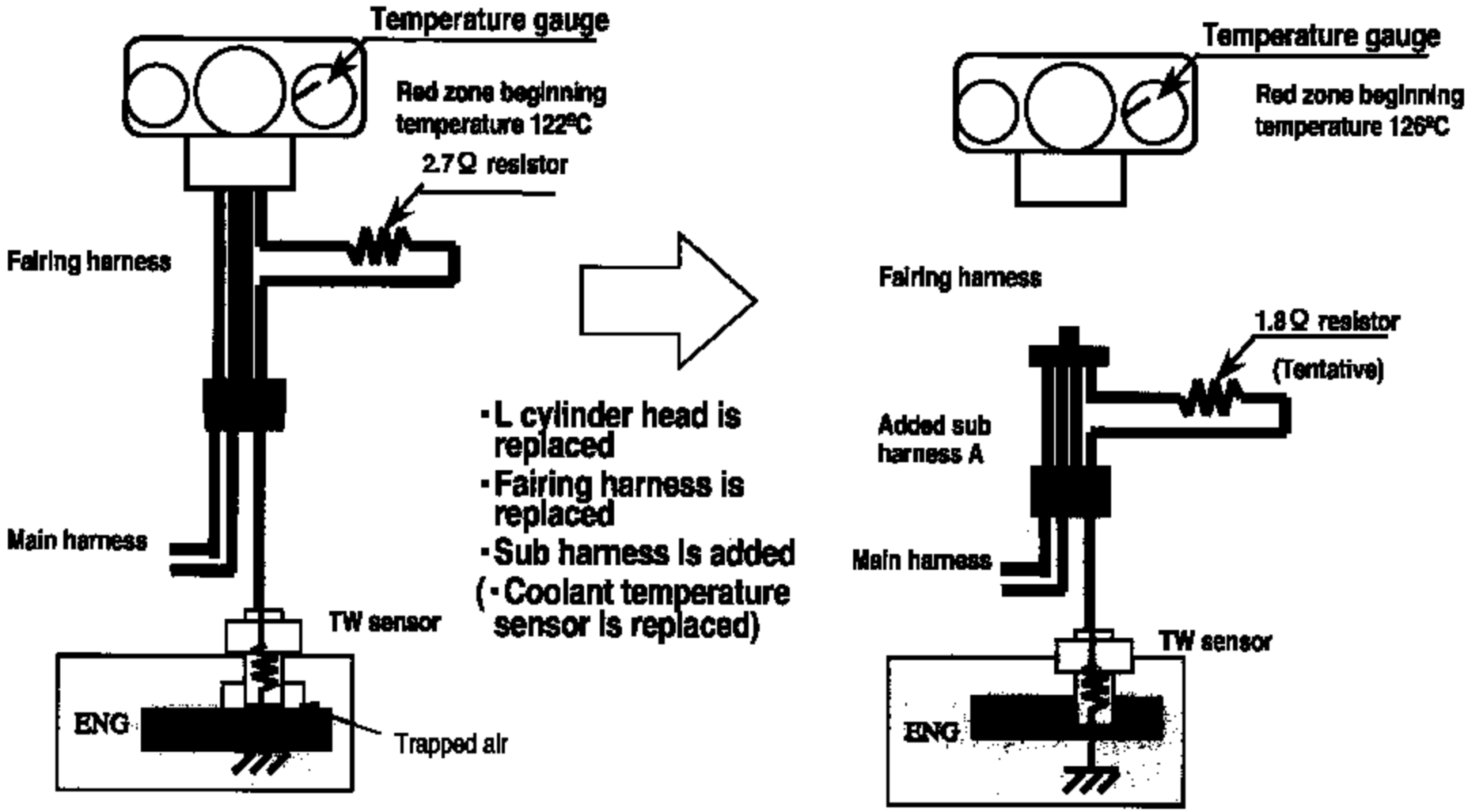


8-6. Change of Temperature Gauge Red Zone Beginning Temperature

【B】For '01YM, from the middle

Cost of parts : ¥80,000 (L cylinder head, sub harness, fairing harness, (coolant temperature sensor))

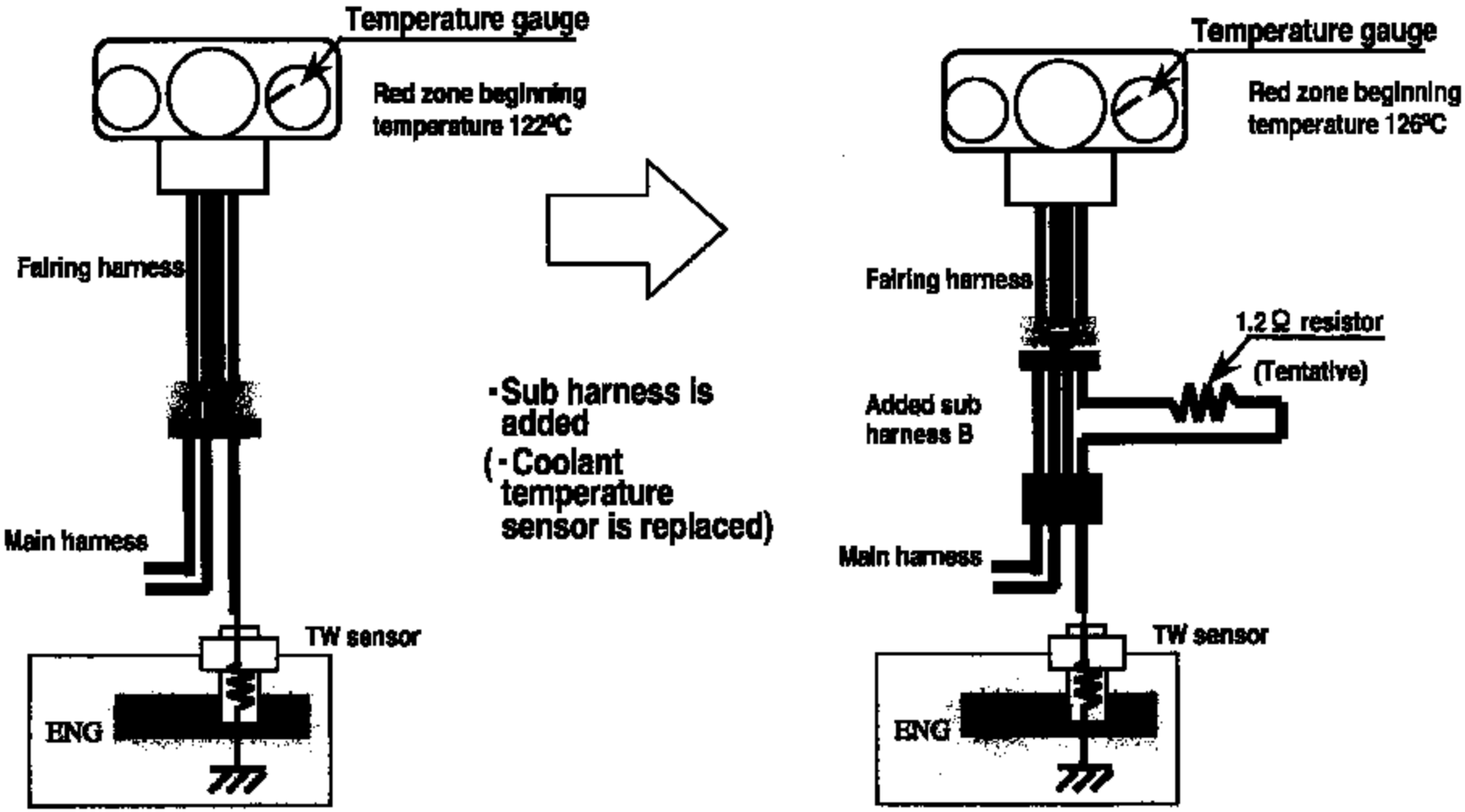
Labor cost : Cost of about 12-hour labor



8-7. Change of Temperature Gauge Red Zone Beginning Temperature

【C】 For '02YM

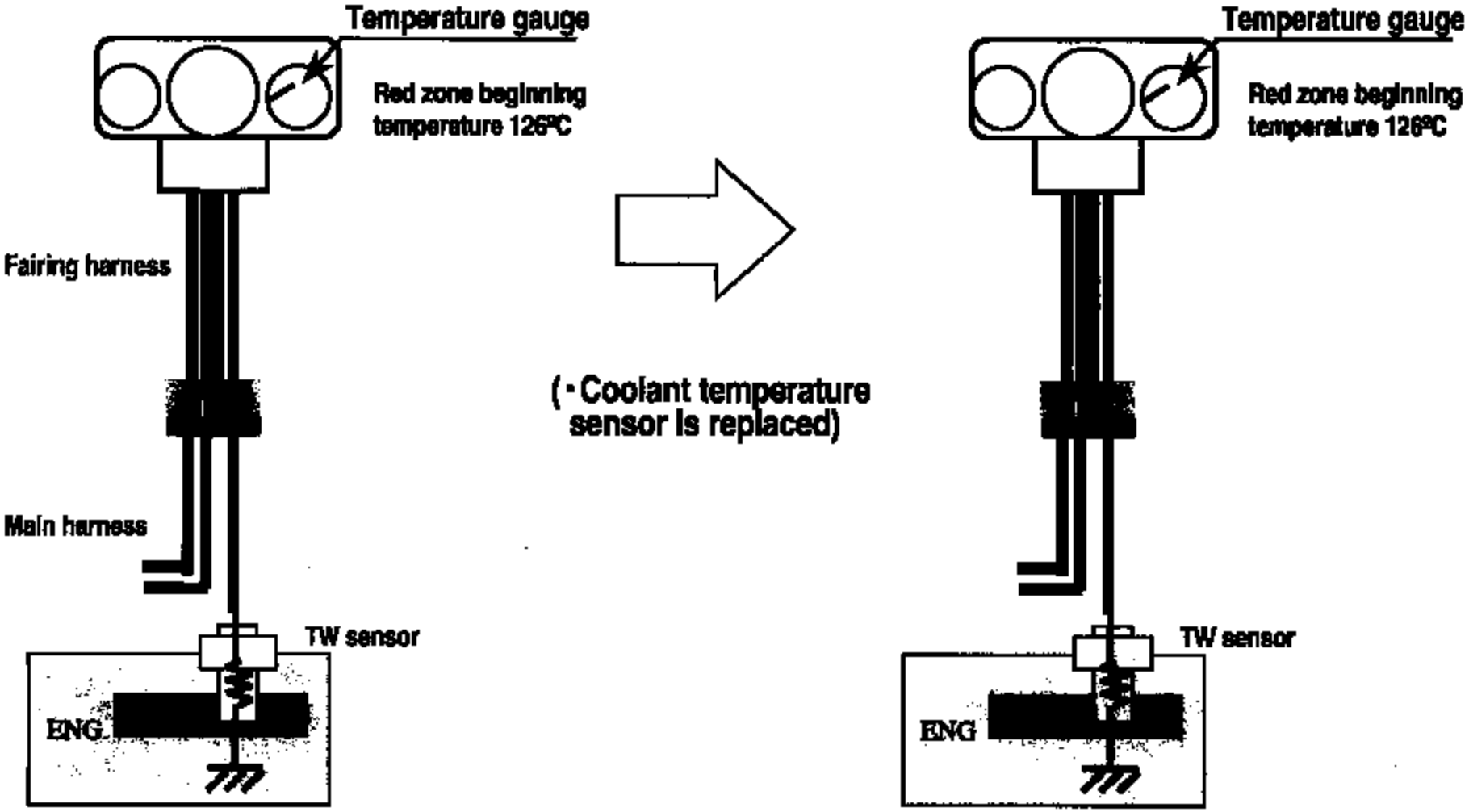
Cost of parts : ¥10,000 (Sub harness, (coolant temperature sensor))
Labor cost : Cost of about 4.3-hour labor
※ Cost of 3.0-hour labor is reduced If cylinder head is replaced



8-8. Change of Temperature Gauge Red Zone Beginning Temperature

【D】 For '03YM

Cost of parts : ¥6,000 ((Coolant temperature sensor))
Labor cost : Cost of about 3.3-hour labor
※ Cost of 3.0-hour labor is reduced if cylinder head is replaced



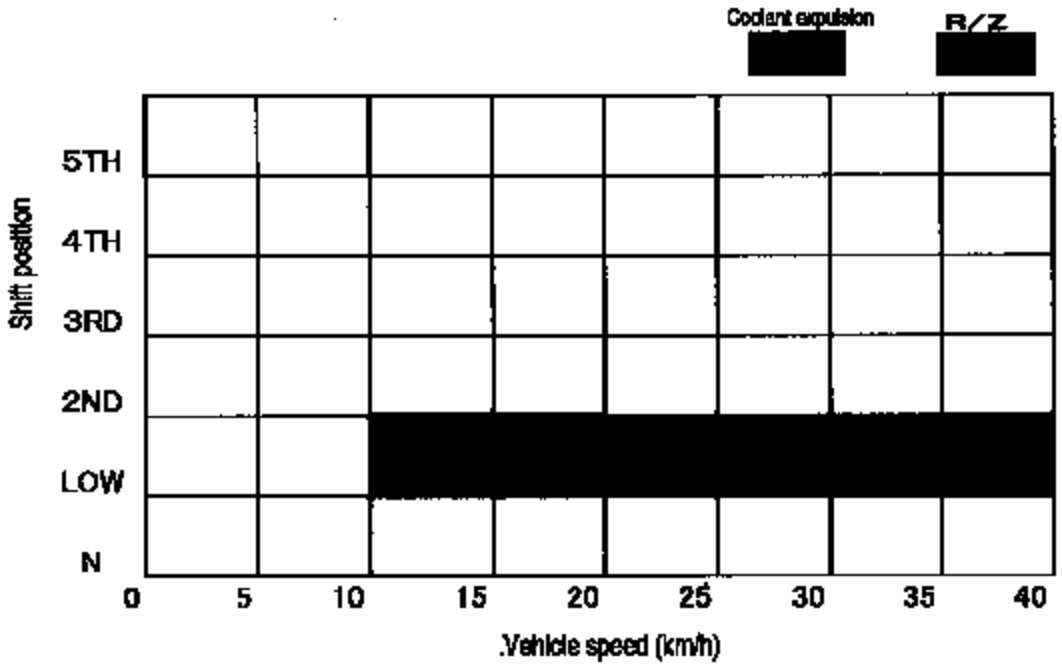
8-9. Method of Market Action

《Advice to customer on how to ride his or her vehicle to avoid allowing the temperature gauge to climb to the red zone》

Contents of letter to customer (Draft)

- When you are continuously riding your vehicle at low speeds as if you were in a slow-moving parade, the coolant temperature is apt to rise and the pointer of your vehicle's temperature gauge may climb to the red zone.
- Should this occur, pull safely to the side of the road, stop with the engine running at idle and wait until the temperature goes down.
- In order to avoid allowing the temperature gauge to climb to the red zone, shift to the 2nd or higher gear and continue riding at a little higher speed.

Steady running on a level road * Entering the following zone should be avoided when riding in parade mode.

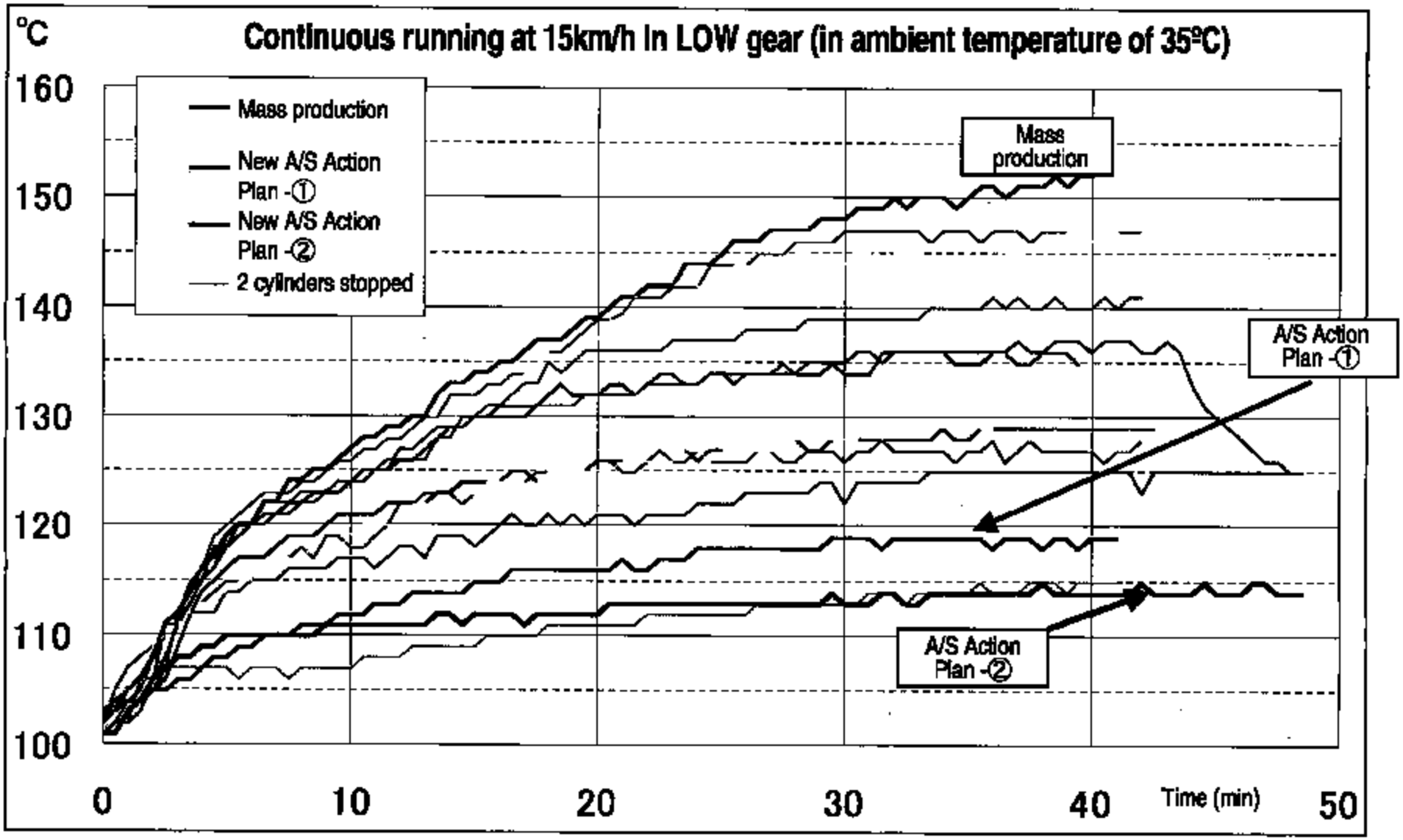


Reason

- **When in this zone, the amount of heat generated by the engine exceeds the cooling capacity of the cooling system that utilizes incoming air and fan for cooling the engine.**

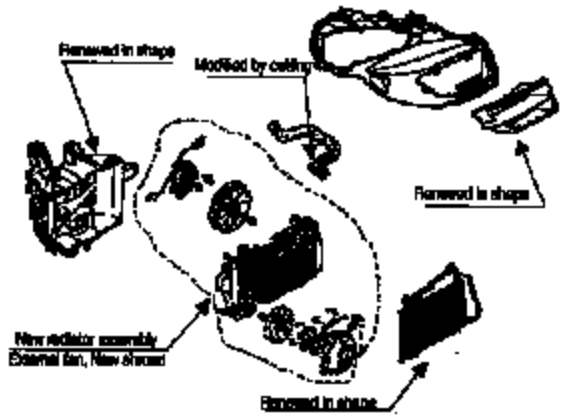
8-10. A/S Specification (Proposal)

8-11. Proposal of Market Action to Take



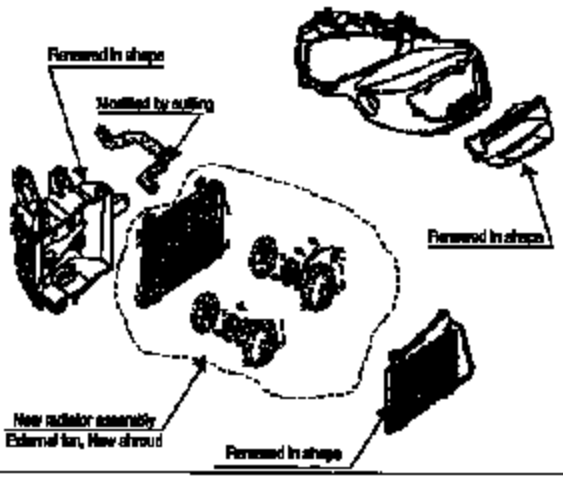
8-12. Proposal of Market Action to Take

A/S Action Plan –1. (A total of 4 internal/external fans that discharge hot air in the rearward direction)



Parts	Contents	Cost (on a 1000 units basis)	Cost (on a 10000 units basis)	Lead time	Estimated labor cost
RAD ASSY,R	Radiator: Size of MCA's, New stay Fan: MCF (Internal), MBW (External) Shroud: Renewed in shape	$106 (including air guide)	$59 (including air guide)	60 days including layout/drawing preparation and verification by testing	(Replacement of radiator assembly + Modification of hose + Replacement of louver) × R/L =4.0hrs × $50/hr
RAD ASSY,L		$106 (including air guide)	$59 (including air guide)		
AIR GUIDE,R	Renewed in shape because of radiator position change				
AIR GUIDE,L					
GRILLE,R,RAD.	Renewed in shape because of change to external fan	$25	$25		
GRILEE,L RAD		$25	$25		
HOSE,R,RR,RAD.	Modified by cutting existing hose				
HOSE,L,RR,RAD.					
LOUVER,R,SIDE COWL	Renewed in shape (of louver) because of change to external fan	$36	$36		
LOUVER,L,SIDE COWL		$36			
SUB HARNESS	Sub harness with a resistor for setting red zone beginning temperature at 126°C	$9	$9		
SUB HARNESS	Sub harness required because of addition of 2 fans	$10	$10		
TOTAL		$357	$263		$200

A/S Action Plan –2 (A total of 4 R/L external fans that discharge hot air in the rearward direction)



Parts	Contents	Cost (on a 1000-unit basis)	Cost (on a 10000-unit basis)	Lead time	Estimated labor cost
RAD ASSY,R	Radiator: Size of MCA's, New stay Fan: MBW (External), 2 fans Shroud: Renewed in shape	$111 (including air guide)	$60 (including air guide)	60 days including layout/drawing preparation and verification by testing	(Replacement of radiator assembly + Modification of hose + Replacement of louver) × R/L =4.0hrs × $50/hr
RAD ASSY,L		$111 (including air guide)	$60 (including air guide)		
AIR GUIDE,R	Renewed in shape because of radiator position change				
AIR GUIDE,L					
GRILLE,R,RAD.	Renewed in shape because of change to external fan	$25	$25		
GRILEE,L RAD		$25	$25		
HOSE,R,RR,RAD.	Modified by cutting existing hose				
HOSE,L,RR,RAD.					
LOUVER,R,SIDE COWL	Renewed in shape (of louver) because of change to external fan	$36	$36		
LOUVER,L,SIDE COWL		$36	$36		
SUB HARNESS	Sub harness required because of addition of 2 fans	$10	$10		
SUB HARNESS	Sub harness with a resistor for setting red zone beginning temperature at 126°C	$9	$9		
TOTAL		$367	$285		$200

GL1800 (MCA) Proposal of Market Action to Take

《Complaint response system intended for customers who complained of coolant temperature problem》

For all complained customers' vehicles

For all vehicles inspected and found containing defective part(s)

- **Replacement of temperature gauge with accuracy-increased one**
- **Replacement of '01YM cylinder heads with '02YM cylinder heads**
- **Replacement of cylinder head found defective with non-defective one**
- **Replacement of radiator found defective with non-defective one**
- **Repair of harness found causing electric leak**

Advise customer how to ride his or her vehicle to avoid allowing the temperature gauge to climb to the red zone.

To the customer who is not satisfied with the above-mentioned complaint response, make an offer to use the A/S Action, which has been proposed to AH, on his or her vehicle.

GL1800 (MCA) 9. Estimate of Cost of Market Action (World Total)

[redacted]

- The following shows rough estimate of cost of parts and labor cost.
- The number of cylinder heads expected to be required for replacement is based on the total number of complaints received by Tech Line × 10 + α.

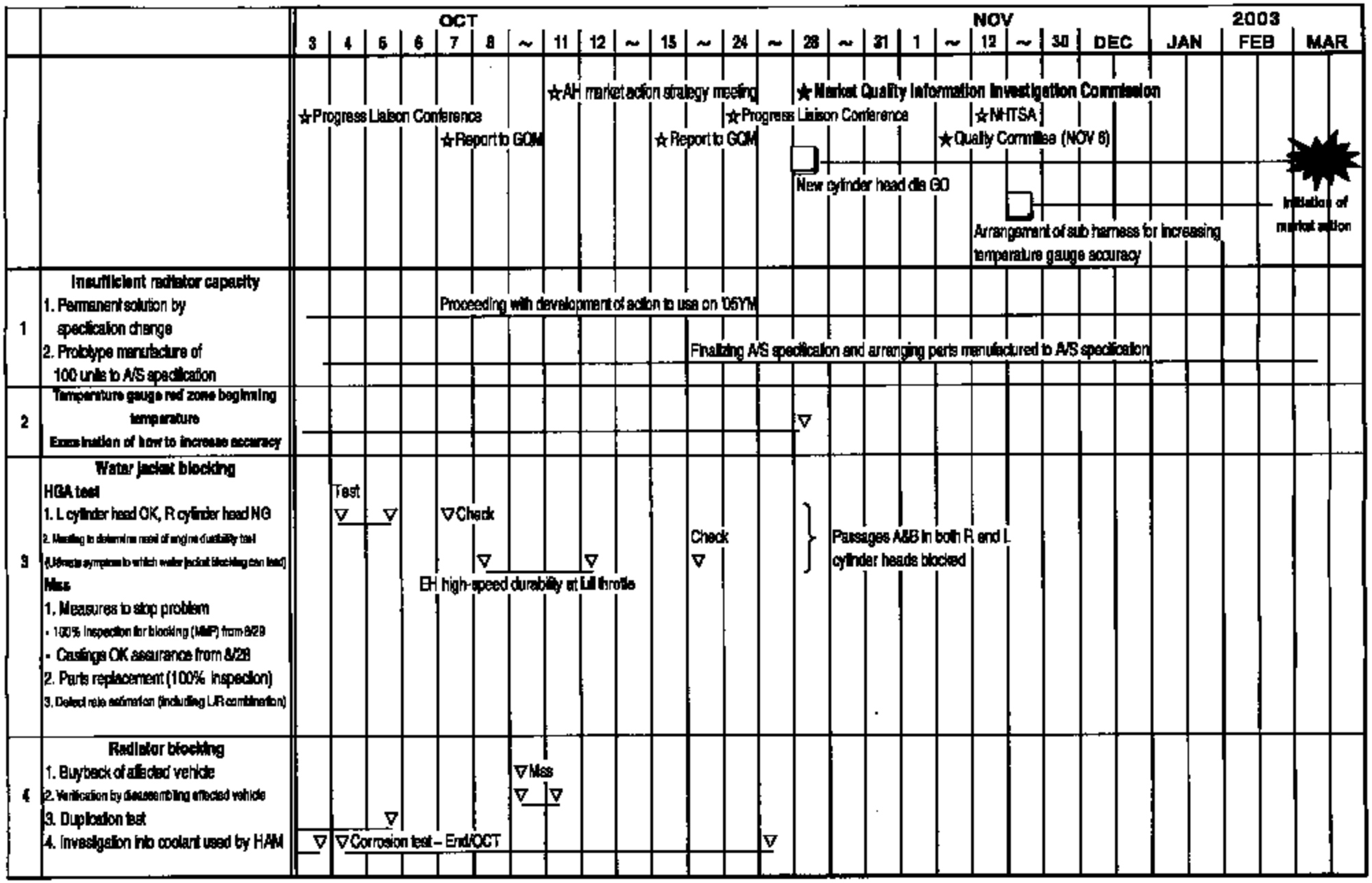
	Classification	Number of vehicles produced	Estimated number of affected vehicles (T/L number × 10)	Major work contents	Cost of parts Cylinder head assy ¥99,800 Sensor ¥8,000	Labor cost (Engine : ¥42,[illegible]) (Sensor : ¥[illegible])
①	'01 model	13914	3100	• Inspection of R cylinder head for blocking • Replacement of L cylinder head • Replacement of sensor	¥303,800,000	¥154,451,000
②	'02 model	18080	600	• Inspection of R/L cylinder heads for blocking • Replacement of sensor	¥58,800,000	¥29,894,000
③	'03 model (as of the end of AUG 2002)	7240	300	• Inspection of R/L cylinder heads for blocking • Replacement of sensor	¥29,400,000	¥14,947,000
	TTL	39234 vehicles	4000 vehicles		¥392,000,000	¥199,292,000

- Costs such as W/H modification cost and parts delivery cost are not included
- Replacement is on a cylinder head assembly basis.

TOTAL ¥591,292,000

GL1800 (MCA)

10. Future Activity



Die Fabrication

Cylinder head die

Investment required to ensure the earliest release of improved cylinder heads; 4,000 L cylinder heads and 3,200 R cylinder heads, and the timing for release

Plan for the earliest release	Investment : ¥62,200,000	March : 8,940 cylinder heads for 4,470 vehicles

End of Report

Supplementary Data

Option 1 : Casting sub-contracted, Machining sub-contracted

Top priority is given to user's convenience

Plan to Meet Increase in Production of MCA Cylinder Heads

Mas GDC-M

Prepared on OCT 25, 2002

Whether done in house or sub-contracted to meet increase in production

	Casting	Machining	Leak test
Done in house	●	●	●
Sub-contracted	●	●	●

Whether investment is required or not

	Casting	Machining	Leak test
Done in house	No	No	No
Sub-contracted	Yes	Yes	Yes

The following quantity is available by the end of March
L cylinder head : 4,000
R cylinder head : 3,200

R/L Head

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	Total
Casting	Use of surplus capacity	360	390									750
	Holiday work			120 (120×Once)								120
	Sub-contractor				1,000	2,500	2,500	2,500	2,500	2,500		13,500
	TTL	360	390	120	1,000	2,500	2,500	2,500	2,500	2,500		14,370
Machining	Machine-M						600	360	240			1,200
	Sakurai SS				870	1,000	1,900	2,000	2,000	2,000	2,000	11,770
	TTL				870	1,000	2,500	2,360	2,240	2,000	2,000	12,970
Parts assembling					870	1,000	2,500	2,360	2,240	2,000	2,000	12,970
Quantity available					870	1,870	4,370	6,730	8,970	10,970	12,970	12,970

Option 2 : Casting sub-contracted, Machining sub-contracted

Plan to Meet Increase in Production of MCA Cylinder Heads

M^{ss}GDC-M
Prepared on OCT 25, 2002

Whether done in house or sub-contracted to meet increase in production

	Casting	Machining	Leak test
Done in house	●	●	●
Sub-contracted		●	●

Whether investment is required or not

	Casting	Machining	Leak test
Done in house	No	No	No
Sub-contracted	No	Yes	Yes

R/L Set

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	Total
Casting	Use of surplus capacity	360	390										750
	Holiday work			120 (120×Once)	120 (120×Once)	120 (120×Once)	240 (120×Twice)	120 (120×Once)	120 (120×Once)	120 (120×Once)	120 (120×Once)		1,080
	Sub-contractor												0
	TTL	360	390	120	120	120	240	120	120	120	120		1,830
Machining	Machine-M						120	240	120	120	0	120	720
	Sakurai SS				870	120					120		1,110
	TTL				870	120	120	240	120	120	120	120	1,830
Parts assembling					870	120	120	240	120	120	120	120	1,830

Quantity available				870	990	1,110	1,350	1,470	1,590	1,710	1,830	**1,830**

●GDC—M Coolant Passage Block in Cylinder Head of GLX

Unit cost of cylinder head (yen/piece)

Option 2
(Depreciation on a 10,000-piece basis)

Casting

Processing cost	4,100
Depreciation cost	3,720
TTL	7,820

Machining

Processing cost	5,200
Depreciation cost	2,380
TTL	7,580

¥15,400/piece

8-1. Method of Market Action

《How to discriminate defective (blocked) cylinder heads from non-defective ones》

① Judge from coolant supply volume

If supply volume is 2510cc or less

⇩

There is a possibility of coolant passage block

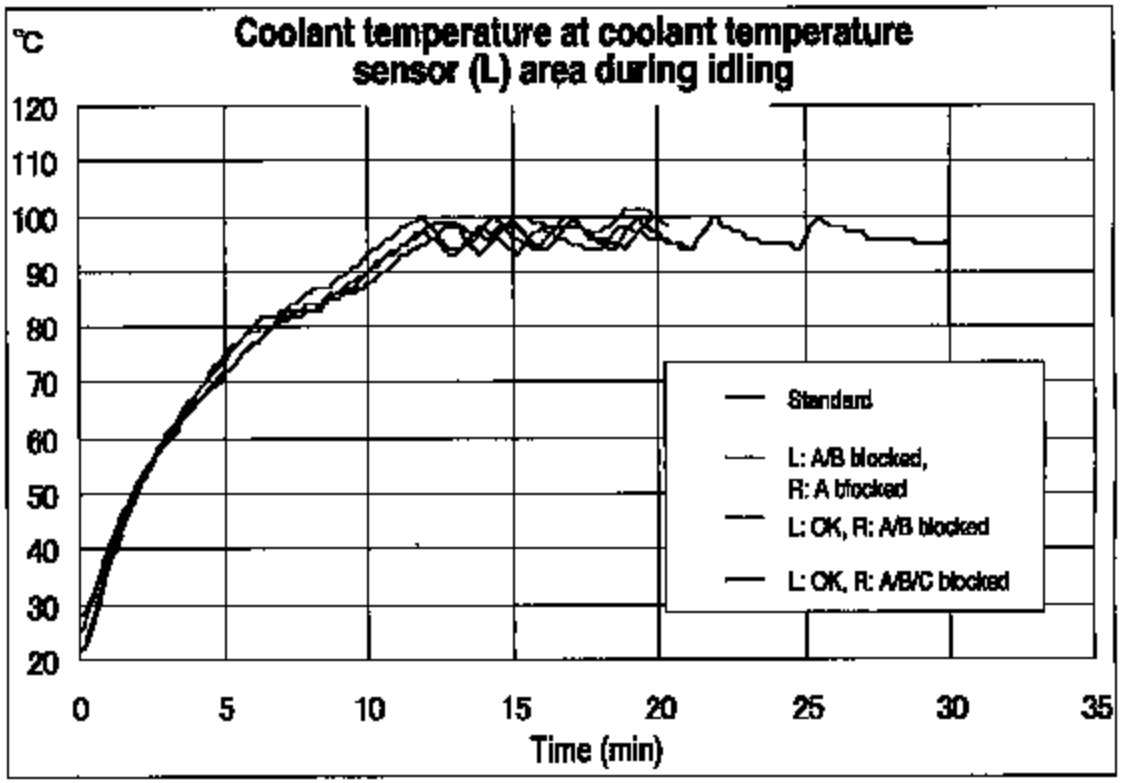
		Drain volume	Supply volume
Standard	L : Non-defective R : Non-defective	2750cc	2510cc
Duplication test -①	L : Non-defective R : Passages A/B blocked		2240cc
Duplication test -②	L : Non-defective R : Passages A/B/C blocked		2170cc

② Judge with the engine idling

From the number of times the fan comes on

⇩

It is impossible to judge whether cylinder head is defective



8-2. Method of Market Action

1. Increase in accuracy of temperature gauge (red zone beginning temperature)

《How to increase accuracy of temperature gauge》

126 $^{+4.5}_{-0}$ °C ⬅

A : 122±4.5°C ('01YM & '02YM)

B : 126±4.5°C ('03YM)

2. Technique : Master resistor method (See the next page for details)

Combination of "replacement with coolant temperature sensor set for assurance of just 126°C" and "addition of resistor to temperature gauge for adjustment of red zone indication by pointer"

3. Cost (Approximate estimate)

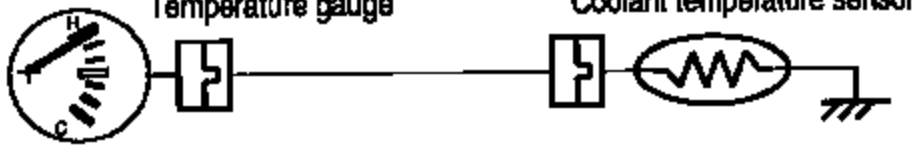
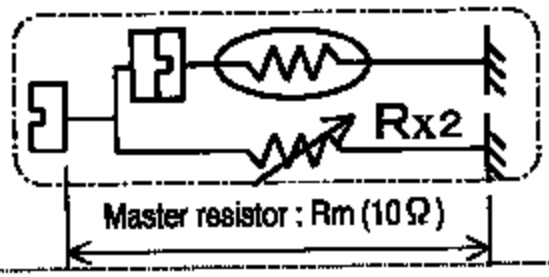
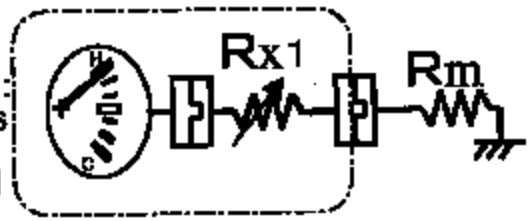
Parts / Items	Cost	Remarks
① Sub harness on gauge side (with resistor Rx1)	¥5,000	10 types of resistors selectable in increments of 0.3Ω
③ Sub harness on TW sensor side	¥5,000	2 types (One for '01YM/'02YM and another for '03YM)
④ TW sensor	¥500	Identification is needed to make parts readily distinguishable from mass-produced ones
Labor cost (Cost of about 1-hour labor)		On the premise that cylinder head and TW sensor are replaced as a set
② Sub harness with master resistor	¥3,000	Provided with Rm (10Ω) which is supplied as a jig

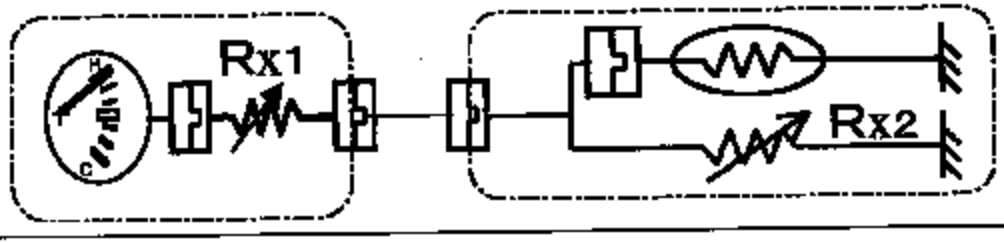
8-3. Method of Market Action

2. Explanation : Adjustment capacity when master resistor method is employed

《How to increase accuracy of temperature gauge》

* Concept and implementation of master resistor method : In order to simplify explanation, specification difference according to model year is omitted, and it is made a premise that '01YM cylinder head is superseded by '02YM cylinder head.

<table>
<tr><th></th><th>Description of components</th><th>Remarks</th></tr>
<tr><td>General circuit</td><td> 
</td><td>Accuracy = 126±4.5°C (Practical value)
Accuracy of coolant temperature sensor × Accuracy of temperature gauge</td></tr>
<tr><td rowspan="2">When master resistor method is employed</td><td>① Manufacture of just 126°C sensor : Sensor set that indicates master resistance value just at 126°C is manufactured : Adjustment by Rx2
 
</td><td>· Just 126°C sensor is manufactured by a Japanese maker and the existing sensor of actual vehicle is replaced by the new sensor.
· Adjustment to let temperature gauge pointer indicate beginning of red zone at 126°C is made with the master resistor connected to the actual vehicle.</td></tr>
<tr><td>② Adjustment to let temperature gauge pointer indicate beginning of red zone at 126°C : Adjusting resistor (sub harness) is added optionally so that the pointer indicates beginning of red zone according to master resistance value : Adjustment by Rx1
 

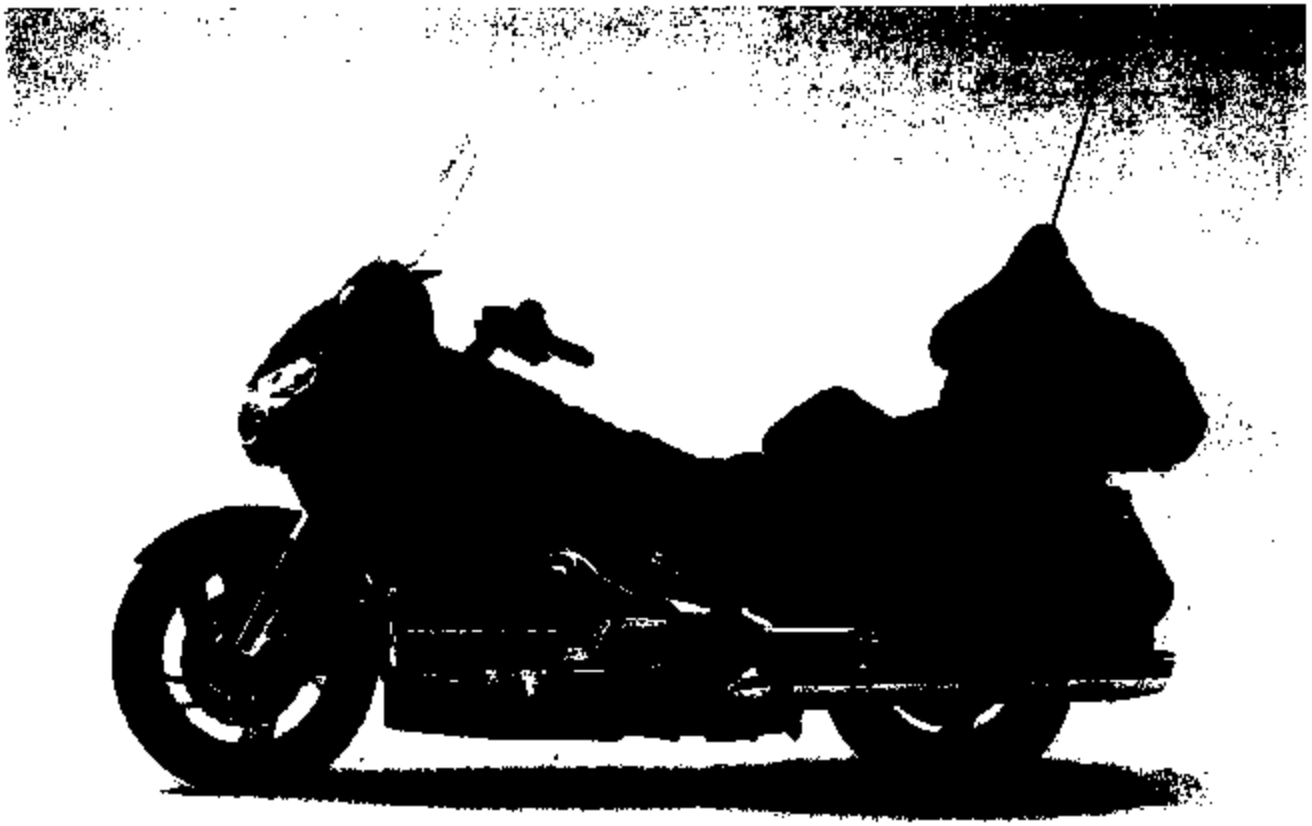
* Master resistor (Rm=10Ω) is regarded as a jig for adjustment</td><td>* It is not easy to let actual vehicle duplicate 126°C; therefore, combination of ① and ② shown at left, which can ensure compatibility in functional assurance given by each of them, is adopted. (Concept of master resistor method)</td></tr>
<tr><td>When installed to completed vehicle</td><td> 
</td><td>Accuracy = 126+4.5/-0°C
Total accuracy of new coolant temperature sensor × Accuracy of adjusted temperature gauge</td></tr>
</table>

承認	作成者
神田	伊堂

GL1800(MCA)　冷却系不具合

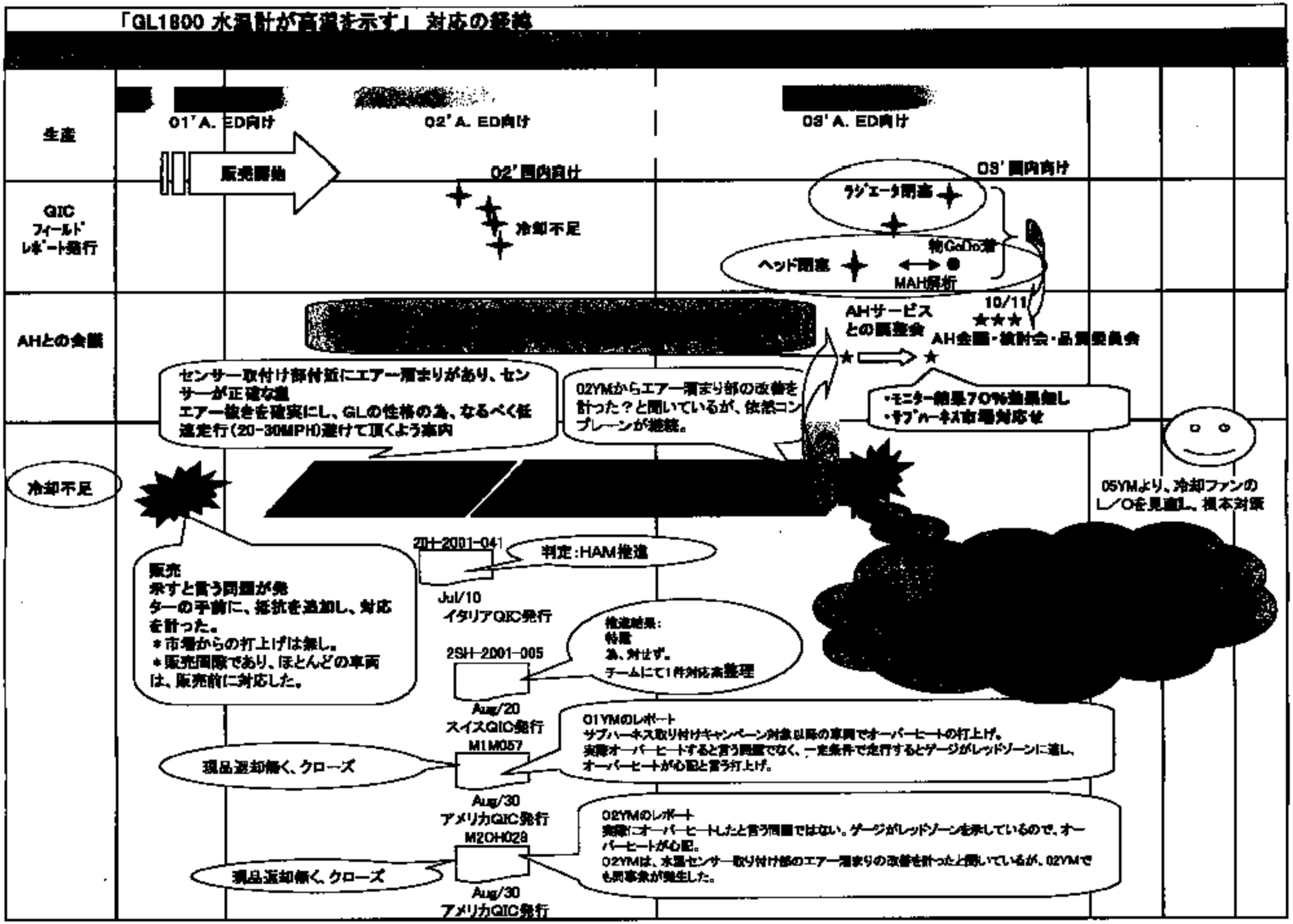
市場品質検討会資料

1. 市場発生状況
2. 不具合全体概要
3. 低速時の冷却不足
4. ヘッドW／J閉塞
5. ラジエーター閉塞
6. 不具合事象確認結果
7. 市場措置提案
8. 市場対応方法
9. 措置費用概算
10. 今後の展開



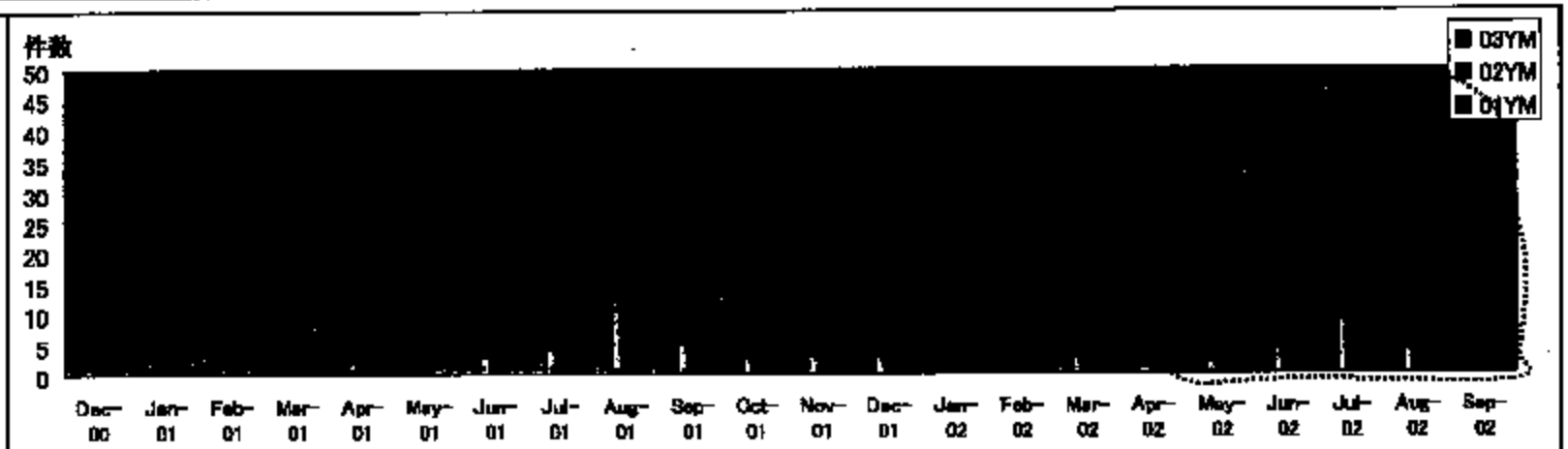
2002/10/28

1-1.市場発生状況


「GL1800 水温計が高温を示す」 対応の経緯
生産
01' A. ED向け
02' A. ED向け
03' A. ED向け
販売開始
02' 国内向け
03' 国内向け
QIC
フィールド
レポート発行
冷却不足
ラジエータ閉塞
ヘッド閉塞
MAH解析
AHとの会議
AHサービス
との調整会
10/11
AH全国・検討会・品質委員会
センサー取付け部付近にエアー溜まりがあり、センサーが正確な温
エアー抜きを確実にし、GLの性格の為、なるべく低速走行(20-30MPH)避けて頂くよう案内
02YMからエアー溜まり部の改善を計った？と聞いているが、依然コンプレーンが継続。
・モニター結果70%効果無し
・サブハーネス市場対応せ
05YMより、冷却ファンのレベルを見直し、根本対策
冷却不足
販売
示すと言う問題が発
ターの予前に、抵抗を追加し、対応を計った。
＊市場からの打上げは無し。
＊販売国際であり、ほとんどの車両は、販売前に対応した。
2H-2001-041
判定:HAM推進
Jul/10
イタリアQIC発行
2SH-2001-005
推進結果:
特異
為、対せず。
チームにて1件対応案整理
Aug/20
スイスQIC発行
M1M057
現品返却無く、クローズ
01YMのレポート
サブハーネス取り付けキャンペーン対象以降の車両でオーバーヒートの打上げ。
実際オーバーヒートすると言う問題でなく、一定条件で走行するとゲージがレッドゾーンに達し、オーバーヒートが心配と言う打上げ。
Aug/30
アメリカQIC発行
M2OH029
現品返却無く、クローズ
02YMのレポート
実際にオーバーヒートしたと言う問題ではない。ゲージがレッドゾーンを示しているので、オーバーヒートが心配。
02YMは、水温センサー取り付け部のエアー溜まりの改善を計ったと聞いているが、02YMでも同事象が発生した。
Aug/30
アメリカQIC発行

GL1800(MCA)　1-2.市場発生状況

テックライン情報
・01'＝ 60
・02'＝ 107
・03'＝ 5
TTL　172件



QIC・品情連
(車両登録日)

×:オーバーヒート
□:ヘッドW／J開塞
△:RADツマリ

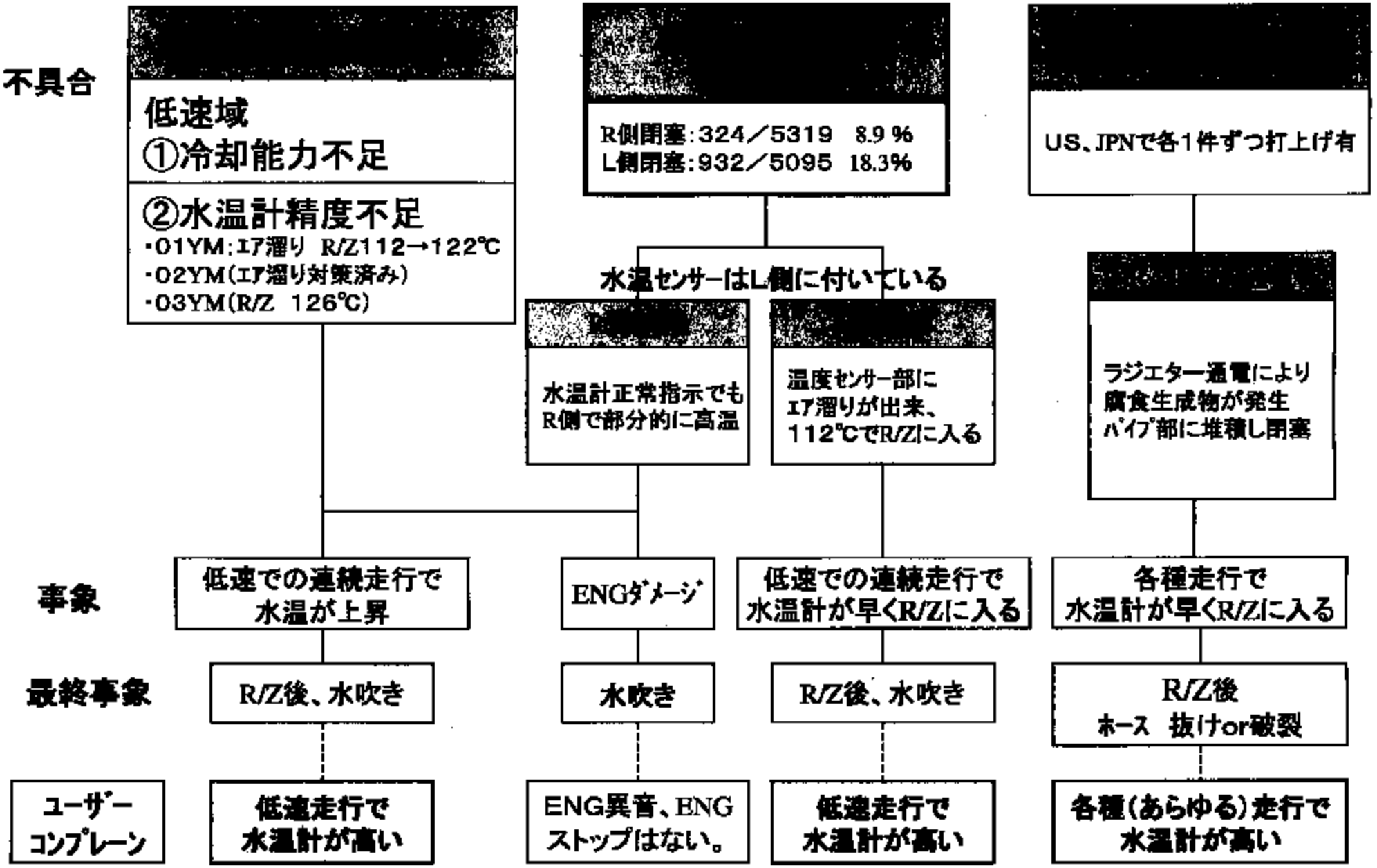
YM	01	02	03
発生率	0. 43%	0. 59%	0. 07%
生産台数	13914台	[illegible]	

TOTAL　39234台

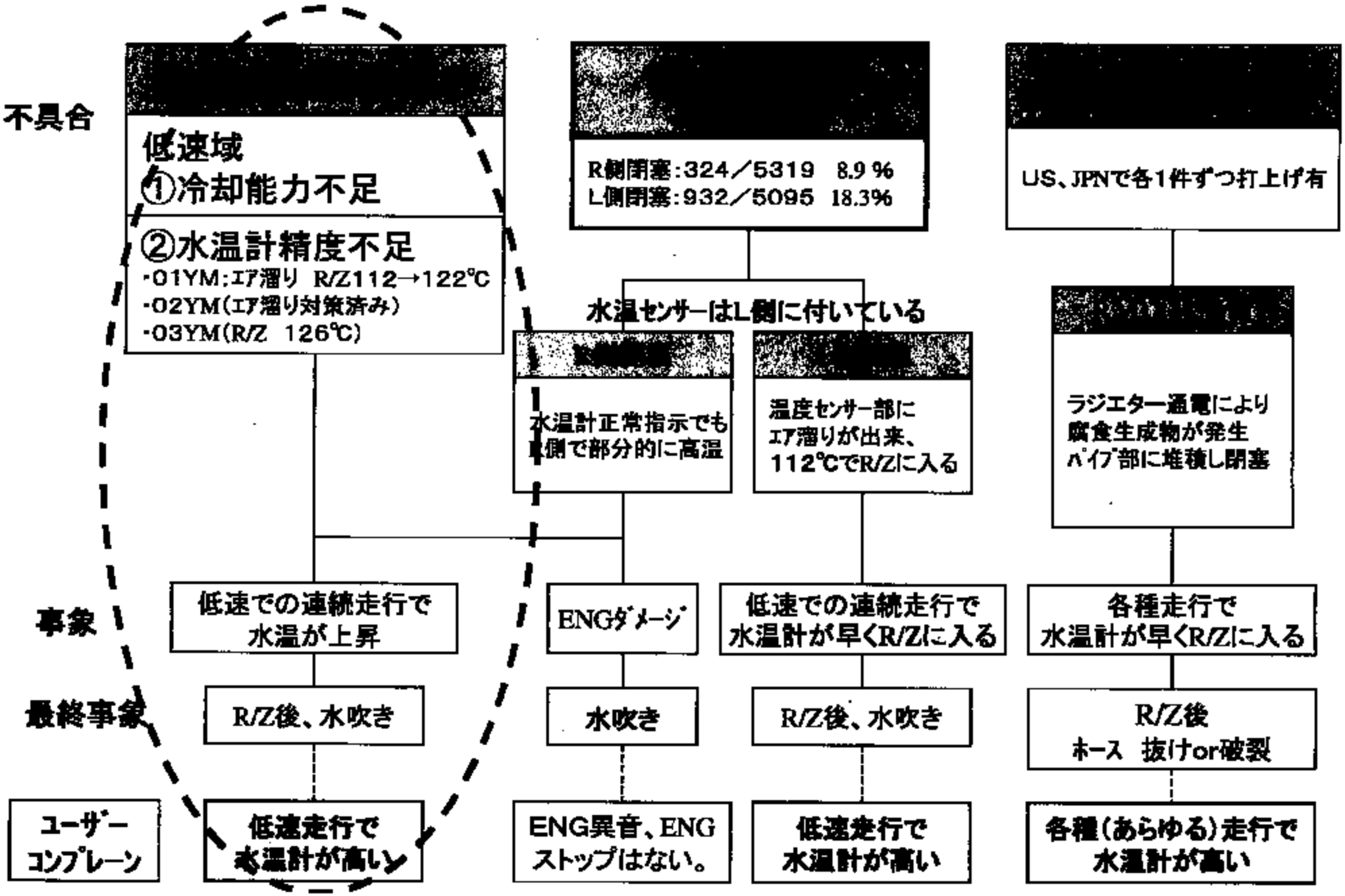
言えること
・01年度、02年度共に夏場の訴え件数が多い。
・YM別発生率は03YMが少ない。。

GL1800(MCA)

2. 不具合全体概要

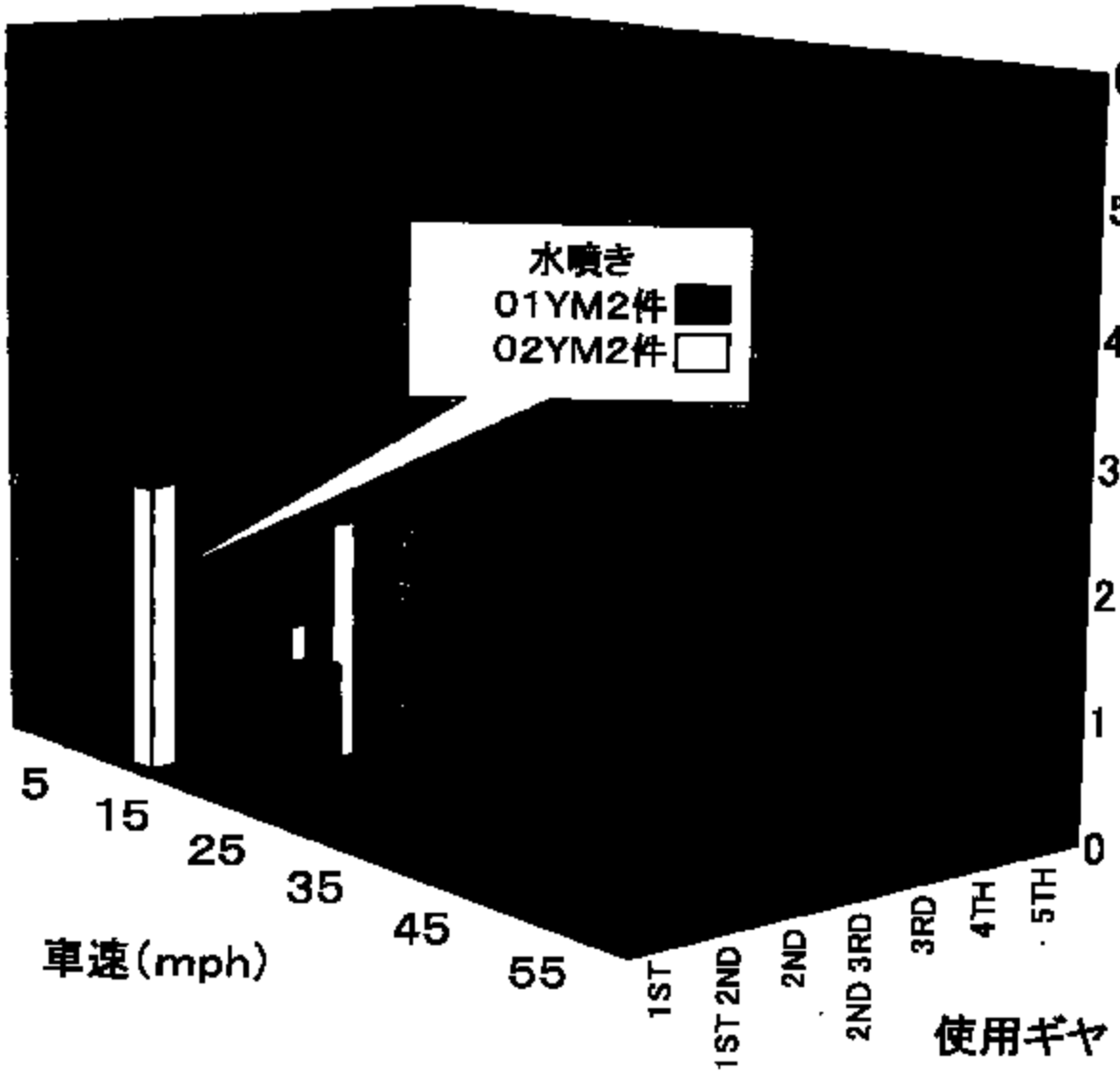


GL1800(MCA)　3-1.低速時の冷却不足



GL1800(MCA)　3-2.市場発生状況

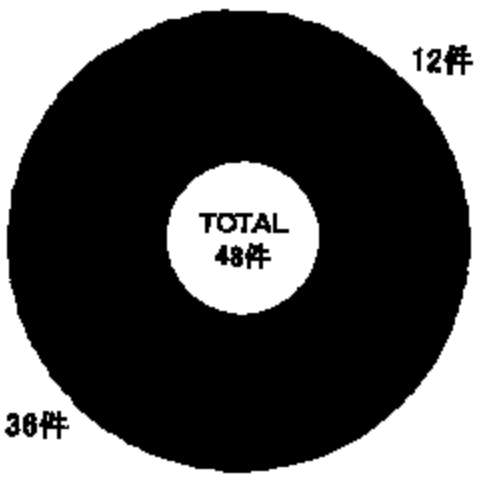
《ユーザーインタビュー結果》



・1～2速、10～20mphの低速走行での発生が集中している。

・件数は少ないものの、3～5速、中速～高速での発生もある。

Model Year 別アンケート件数

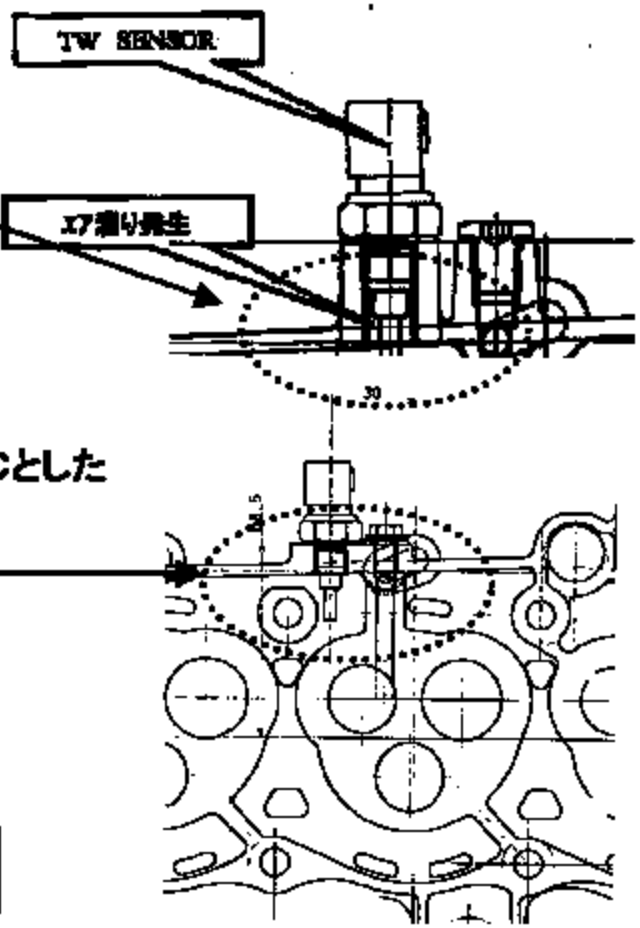


GL1800(MCA)　3-3.低速時の冷却不足

01 'YM　R/Z入口温度122℃設定

・水温センサーエアー溜まりにより水温計の指示が高く表示

・サブハーネス及びハーネスに補正抵抗(2.7Ω)を追加対応



02 'YM　R/Z入口温度122℃設定

但し日本仕様については渋滞を考慮し、R/Z入口温度を126℃とした

・ヘッドセンサー部を変更し、エアー溜まりを無くした。

03 'YM　R/Z入口温度126℃設定

[redacted]

対応としてR/Z入口温度126℃仕様のサブハーネスを用意しモニターを行なった。

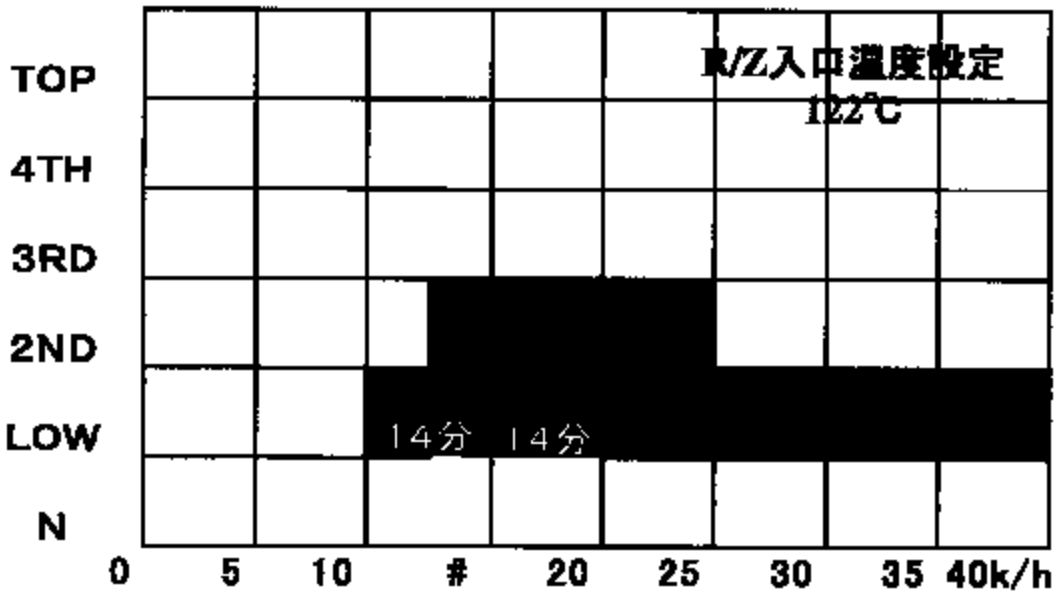
結果:30%の効果は確認されたが126℃用のサブハーネスはAHとしては市場対応を断念

04 'YM　03 '仕様継続

GL1800(MCA)　3-4.低速時の冷却不足

《シリンダーヘッド良品の時の冷却性能ーR/Z入口温度変更時の効果》

条件:外気35℃連続走行　平坦路ギヤ固定　水温100℃スタート

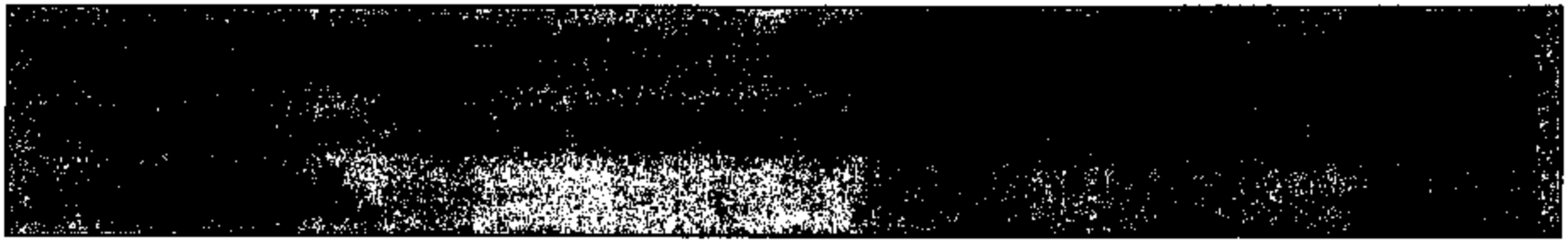


＊R/Z入口温度を126℃すると

R／Z

水沸き

GL1800(MCA)　3-5.低速時の冷却不足

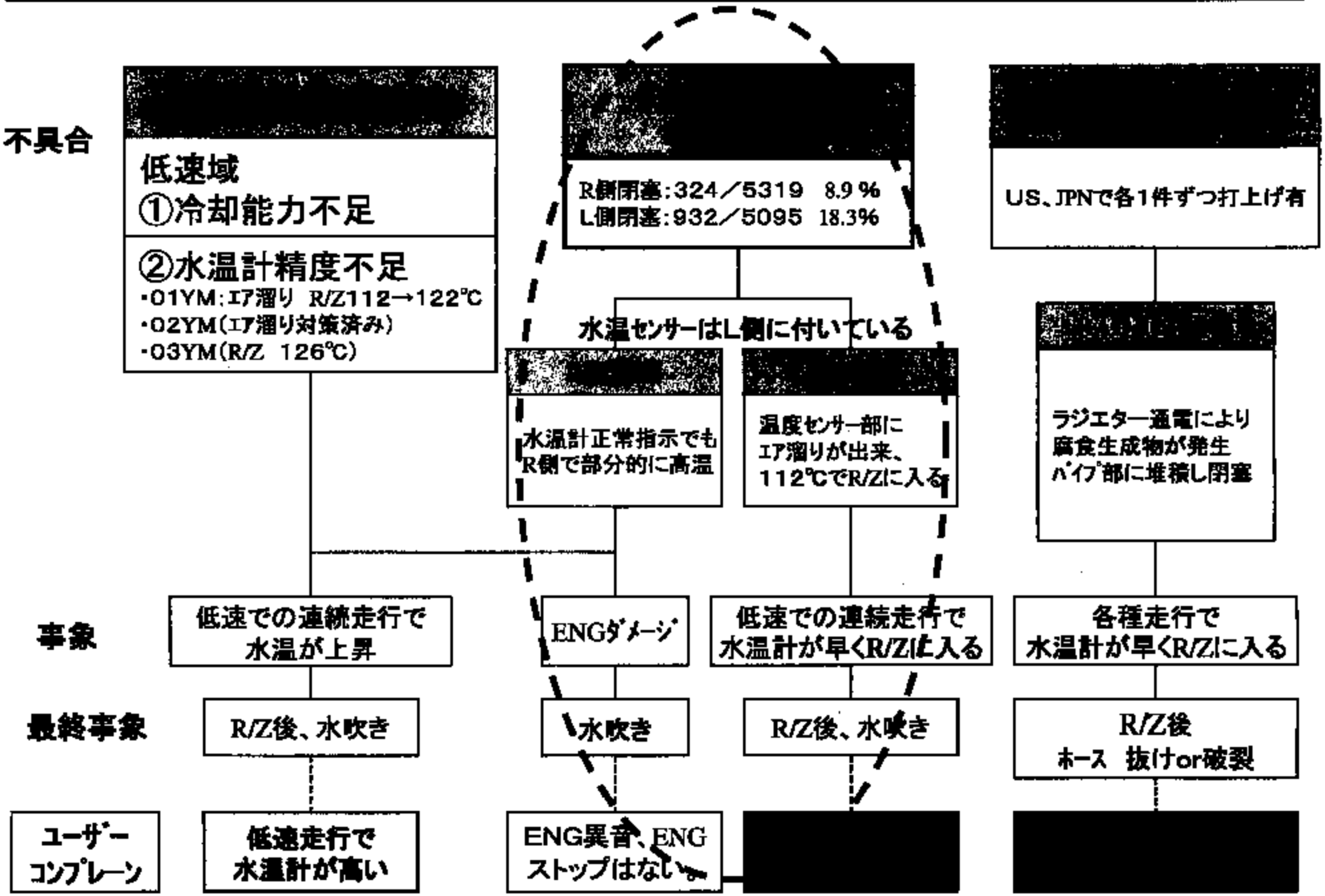


《05以降の冷却系仕様(JBP)》

下記諸元にて目標達成可能と判断する。

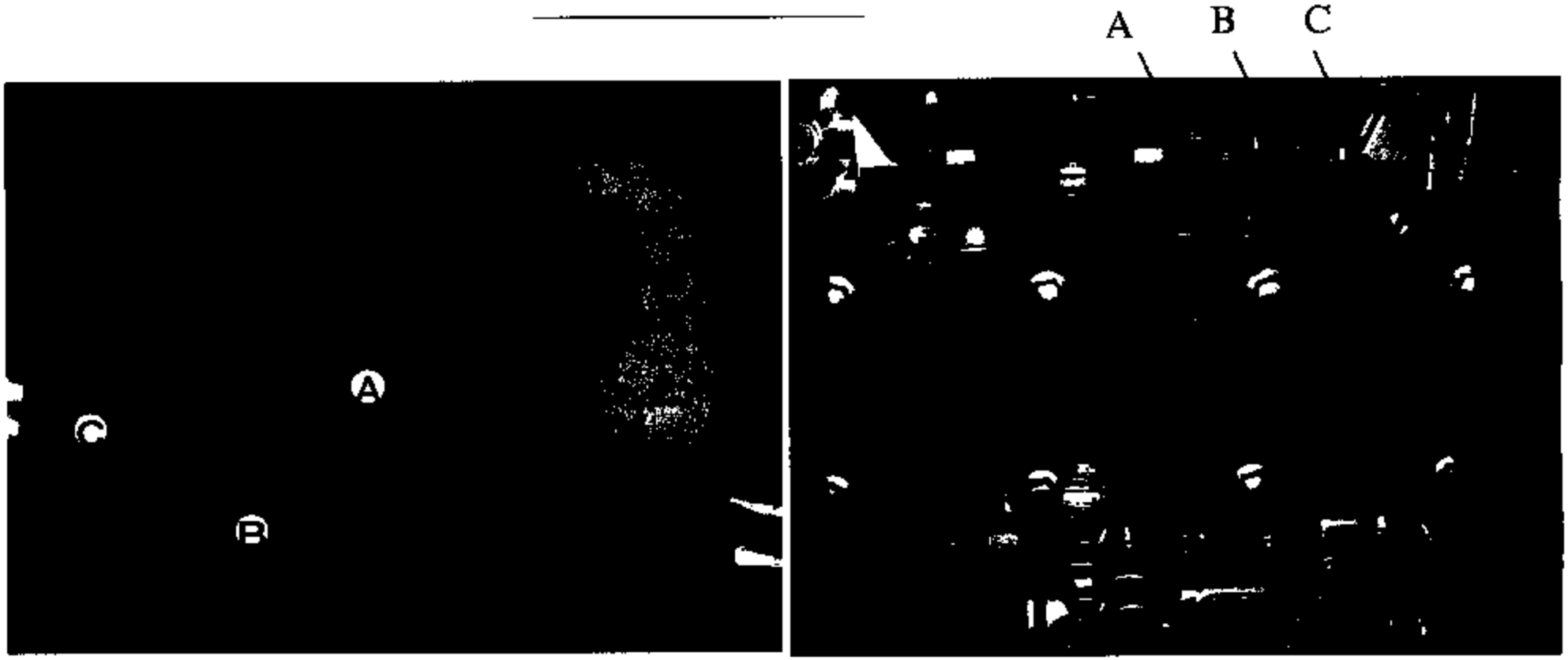
		JBP	MCAA (01`~04`)	ﾍﾞｰｽ比
RAD放熱量		32.2kw	26.4kw	1.22倍
FAN	ﾌﾛｰ	外引	内引	風量 2.7倍
	径	φ210	φ157	
ﾓｰﾀｰ回転数		3700rpm	3350rpm	

GL1800(MCA)　4-1 ヘッドW/J 閉塞



4-2 ヘッドW/J 閉塞

●W/J中子折れにより水路が閉塞したｼﾘﾝﾀﾞｰﾍｯﾄﾞが市場に流出した。（01YM後の対象ﾛｯﾄ/号機が特定できず。）



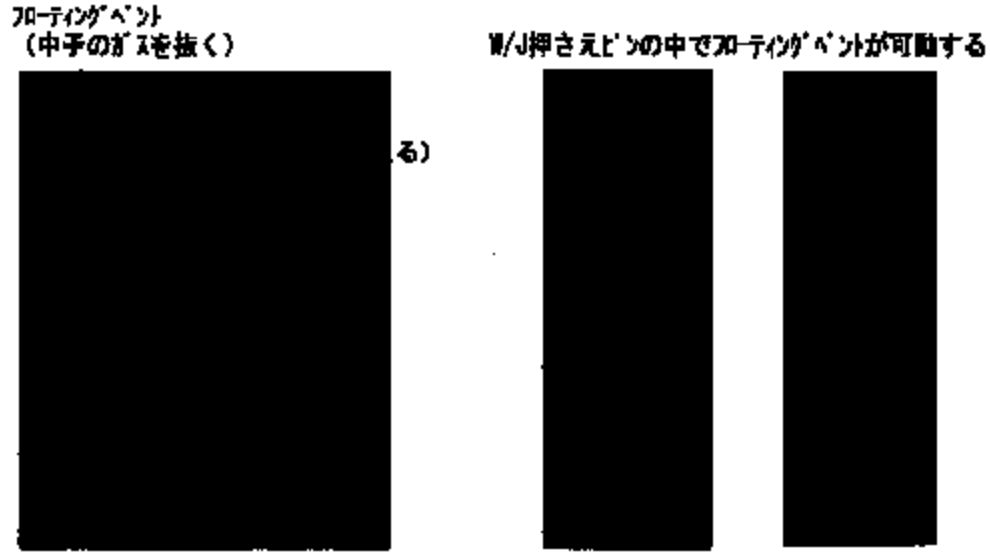
GL1800(MCA)　4-3.ヘッドW/J閉塞

・フローティングの不具合によるW／J折れのメカニズム

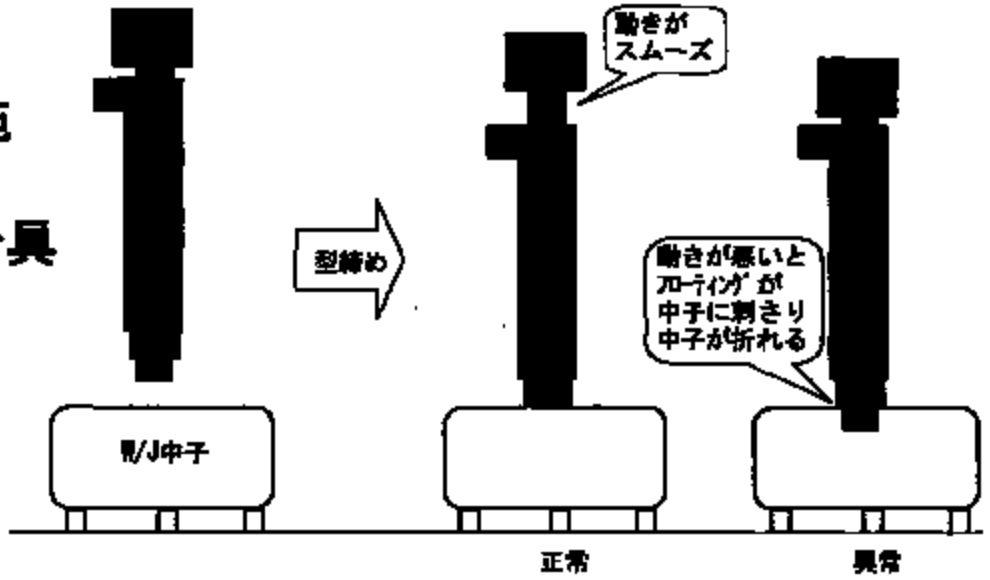
フローティングベット初ロット(01'YM～)より変化点なし

⇩

不良品特定できない



・作業標準表　9月12日から実施
　旧:不具合発生時冶具点検
　　⇒　新:毎ショット型開き時冶具点検



GL1800(MCA)　4-4.ヘッドW/J閉塞

【結論】

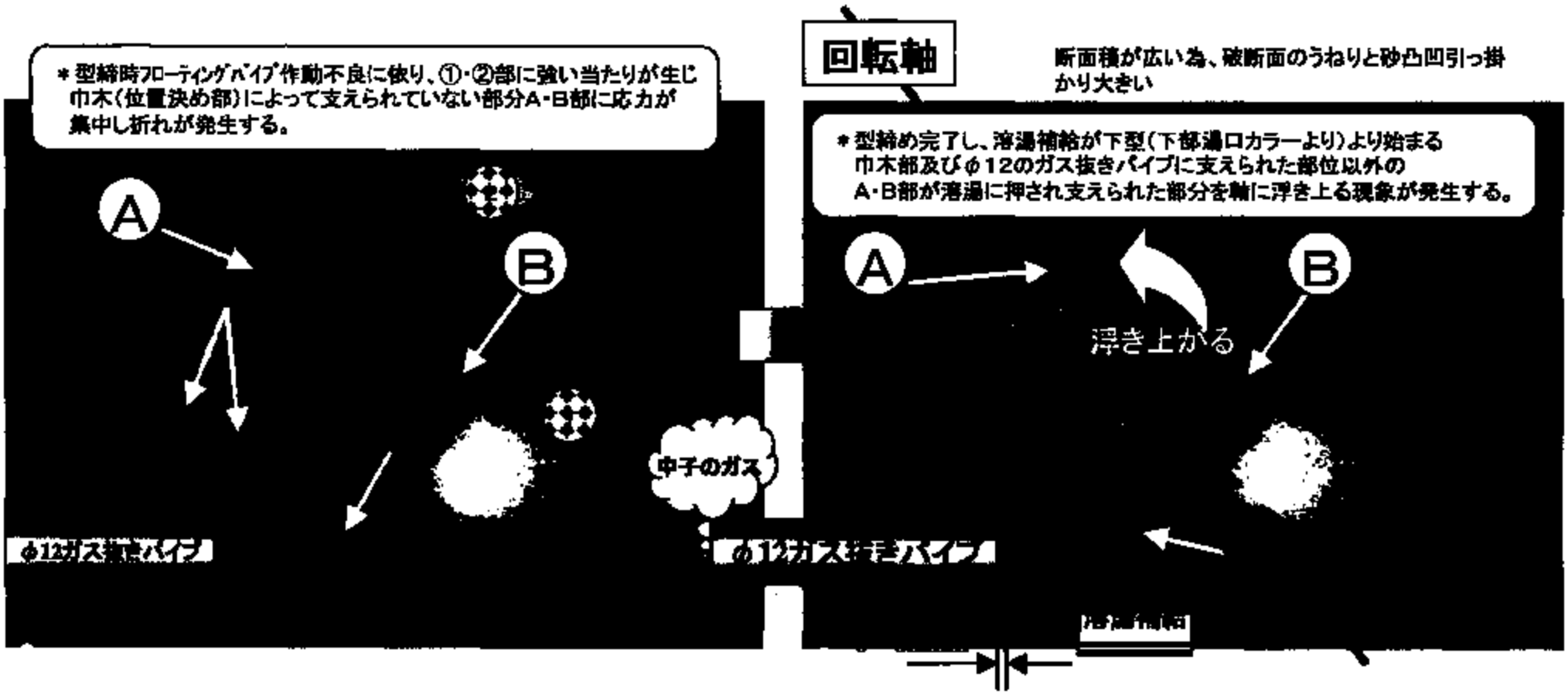
市場に流出した製品にC部閉塞はないと断定する。

C折れが発生しない理由

1.中子はA・B・C全部折れているが、幅木(金型との位置決め部)と、C部の引掛り(断面積大)を基点に斜め上方向に浮き上がる
2. ガス抜きパイプは、C部に対し開き防止効果がある

(アルミ差込は、0.5mm以上の隙間がないと発生しない)

(ガス抜きと中子のクリアランス設定は0~0.2mmである)



GL1800(MCA)　4-5.ヘッドW/J閉塞

推定不良件数& 不良率

[redacted] 閉塞無し

□ 閉塞有り

・台数は'02 8月末の生産台数 43,701台を母数として計算

[redacted]

A

B

L側ヘッド	R側ヘッド (8.9%)				
台数 \ 不良率	無し	A	B	AB
無し	[redacted]	4.2% / 1,835	1.7% / 743	0.1% / 44
A	1.6% / 699	0.07% / 31	0.03% / 13	0.002% / 1
B	14.8% / 6,468	0.6% / 262	0.3% / 131	0.02% / 9
AB	2.7% / 1,180	0.1% / 44	0.05% / 22	0.003% / 1

(18.3%)

[redacted]

単品検査個数
・R側＝ 5,544 個
・L側＝ 5,318 個

TTL　10,862 個

結果

[redacted]

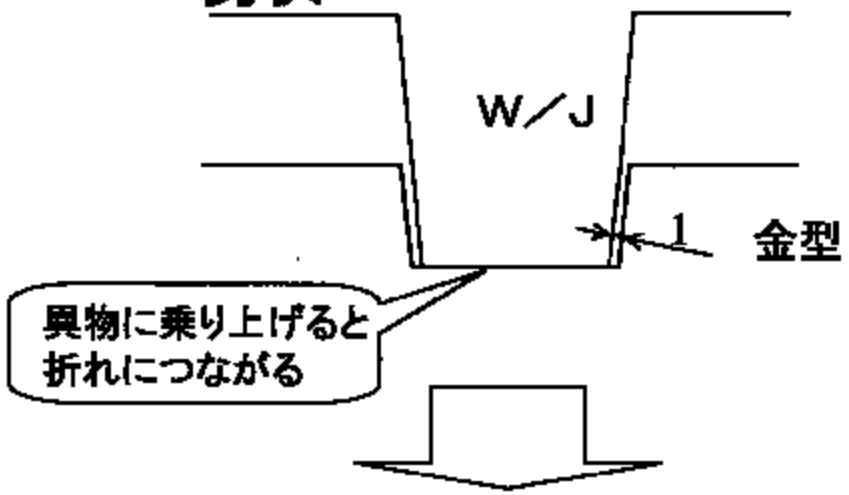
GL1800(MCA)　4-6.ヘッドW/J閉塞

・折れた中子が幅木から離脱する様にした。

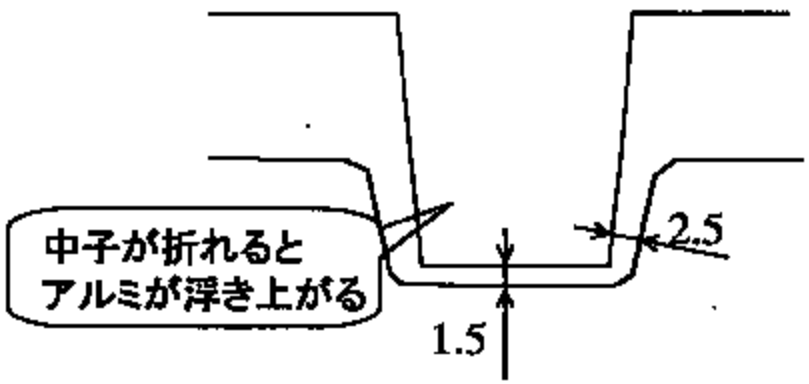
・折れ部にある足2箇所(a)がバリ等の異物に乗り上げないようにした。

8月29日より流出防止実施

現状



対策



GL1800(MCA)　4-7.ヘッドW/J閉塞

W/J 閉塞、RAD 閉塞した場合の不具合発生走行条件

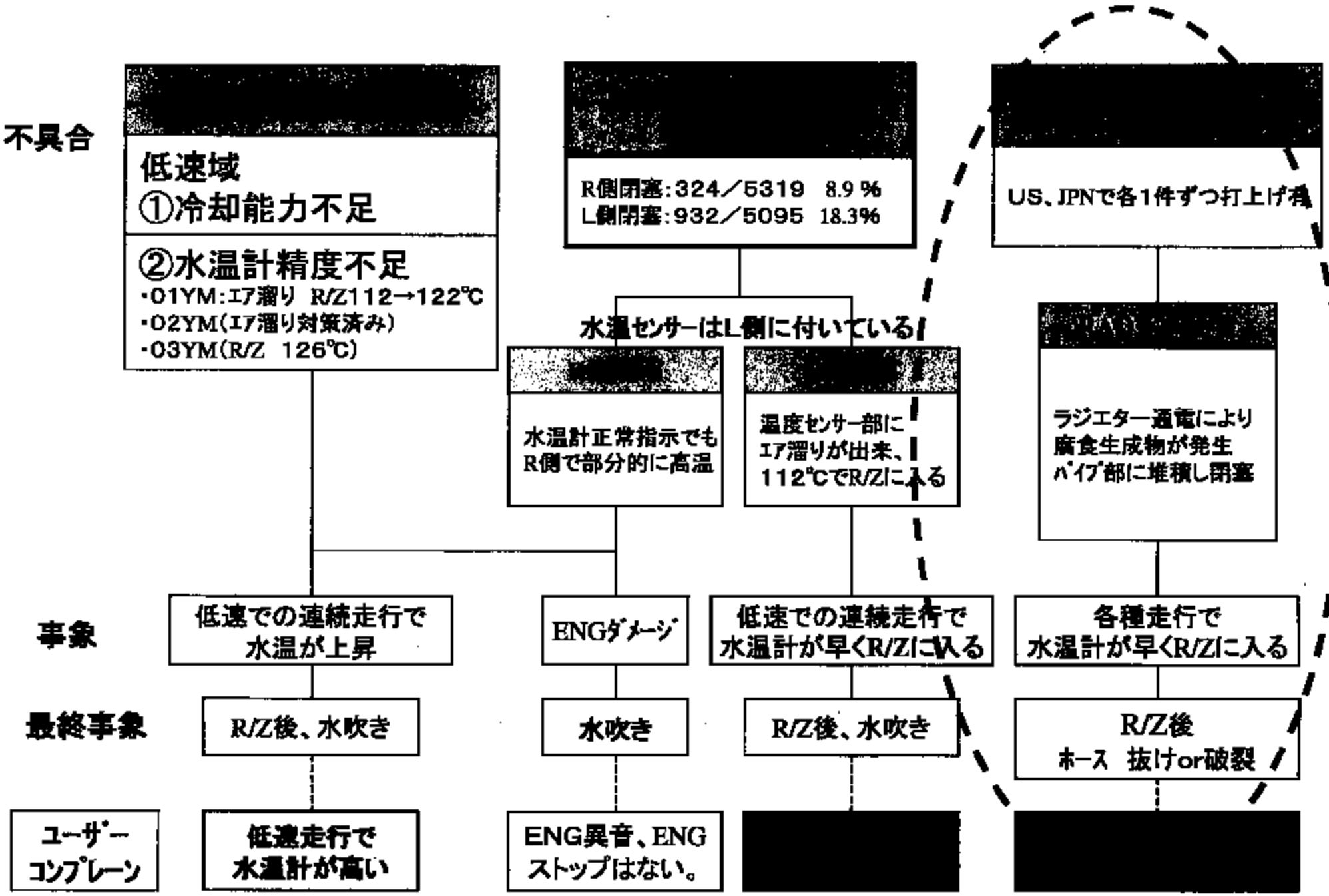
・LHﾍｯﾄﾞは水温センサーがあり、A部閉塞によるエアー溜まりで、パレードモード以外でもR/Zへ入りやすい。
・RHﾍｯﾄﾞは水温センサーが無い為、事象としてすぐに現れないというネガがある。

R/Z ： 122℃以上
△ ： 115℃以上(R/Zの一つ手前の目盛)

	L			R			低速走行		定常走行				走行後ソーク(ENG STOP)	走行後アイドル放置
	A	B	C	A	B	C	パレード 15k/h～20k/hのLowギヤ連続走行	渋滞走行 (通常のGO-STOP)	50k/h	100k/h	150k/h	Vmax		
ヘッド正常	○			○			R/Z	○	○	○	○	△	○	△
W/J閉塞	×	○	○	○	○	○	R/Z	R/Z	R/Z	○	△	R/Z	○	R/Z
	×	×	○	○	○	○	R/Z	R/Z	R/Z	△	△	R/Z	○	R/Z
	○	×	○	○	○	○	R/Z	○	○	○	○	○	○	○
	○	○	○	○	×	○	R/Z	○	○	○	○	○	○	○
	○	○	○	×	○	○	R/Z	○	○	○	○	○	○	○
	○	○	○	×	×	○	R/Z	○	○	○	○	○	○	○

	L RAD	R RAD								
RAD異物	×	×	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z	R/Z
	×	○	R/Z	○	○	○	R/Z	R/Z	○	○
	○	×	R/Z	○	○	○	○	R/Z	○	○

GL1800(MCA)　5-1.ﾗｼﾞｴｰﾀｰ閉塞



GL1800(MCA)　5-2.ﾗｼﾞｴｰﾀｰ閉塞

ラジエター内異物によるオーバーヒートの概要(発生2件)

	1件目(日本)	2件目(USA)
発生日	2002年　7月23日	2002年　9月9日
登録日	2002年　2月22日(02'YM)	2001年　9月9日(02'YM)
走行距離	2566km	8000mile(12800km)
Frm　No	SC47－1000157	1HFSC47092A101134
訴え事象	オーバーヒート 走行していると水温計が振りきれる	20分間ﾊｲｳｪｲｽﾋﾟｰﾄﾞで走行すると 水温計がﾚｯﾄﾞｿﾞｰﾝに入る
確認結果	左ﾗｼﾞｴﾀｰに異物が詰まっていた	赤外線温度計でﾗｼﾞｴﾀｰを測ると 左:38℃　右:92℃ ﾗｼﾞｴﾀｰを外すと異物が詰まっていた
過去のﾒﾝﾃ歴	ｸｰﾗﾝﾄのメンテ歴なし	ﾒﾝﾃ歴なし

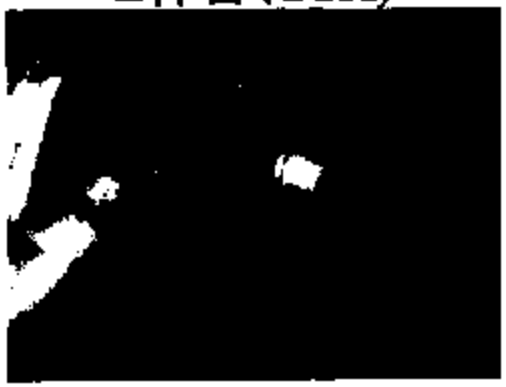
GL1800(MCA)

5-3.ラジエーター閉塞

現品の状態

2件目(USA)

2件目(USA)



1件目(日本)

1件目(日本)

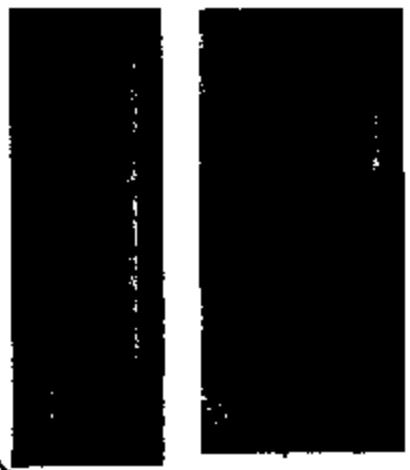
GL1800(MCA)　5-4.ラジエーター閉塞

《ラジエター現品の調査結果》

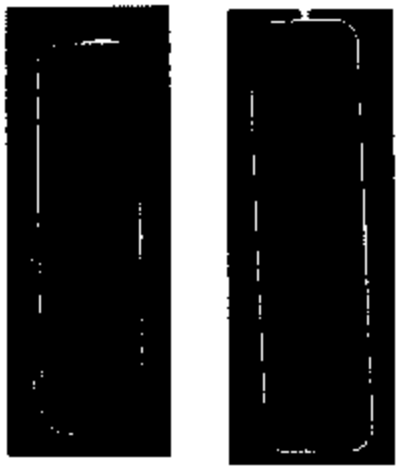
発生:02年7月23日(日本)、走行2566km

アウトレット側

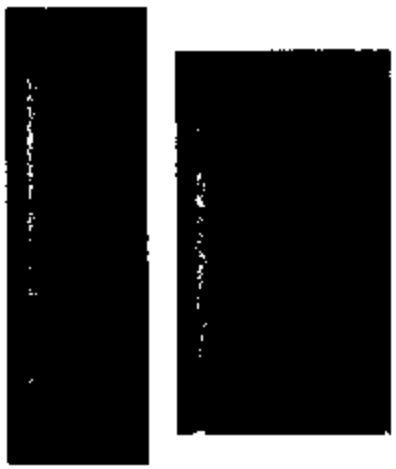
洗浄後



インレット側



洗浄後



特徴

①インレット、アウトレットともにパイプ近傍が異物堆積、腐食が激しい。

②パイプ部は内面だけでなく、ホースと接触している外面も腐食している

腐食の原因はラジエター、ENG間の電気の負荷によるものと推定する。

ラジエターパイプの様子

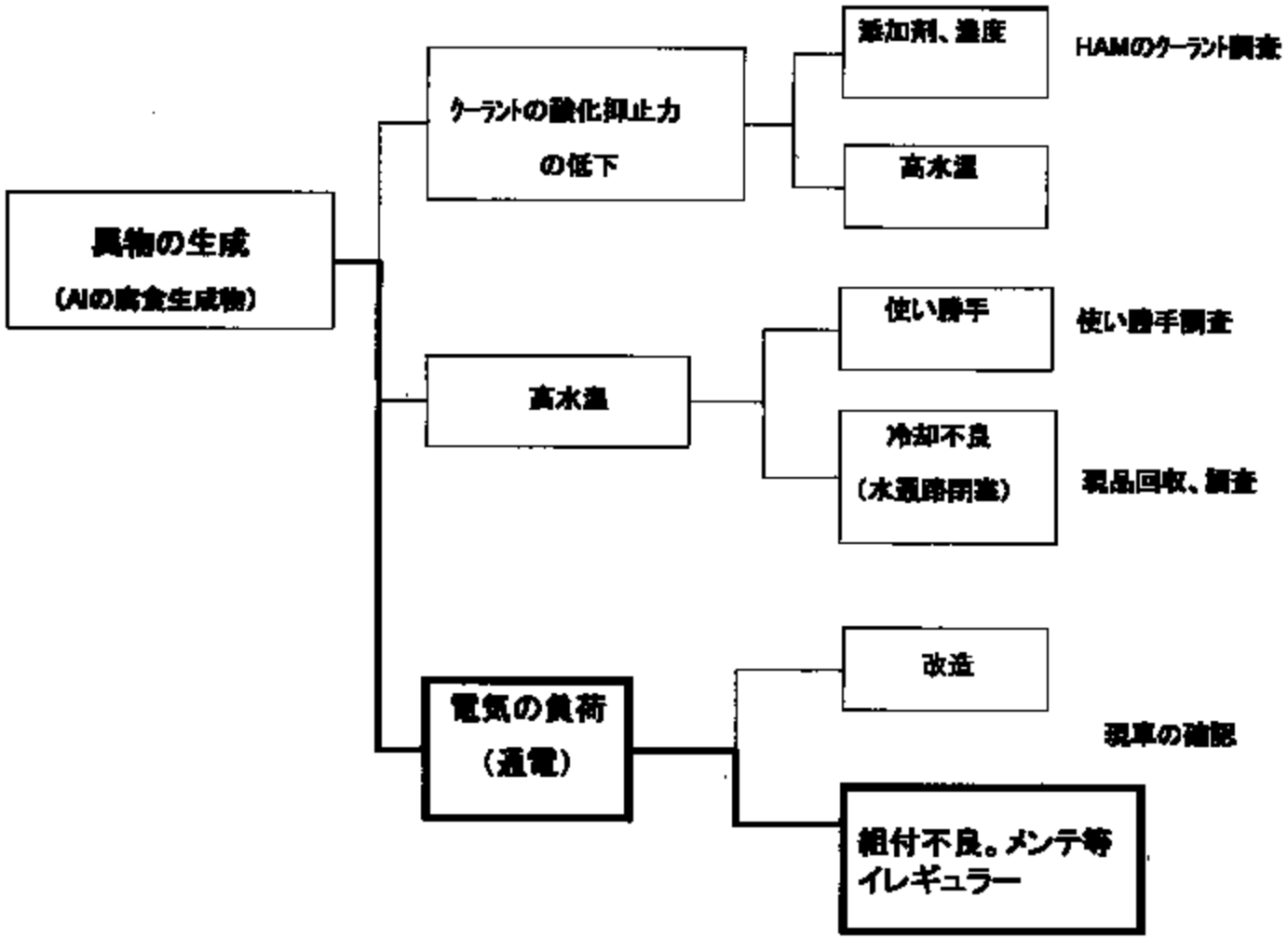
GL1800(MCA) 5-5.ﾗｼﾞｴｰﾀｰ閉塞 大阪ﾕｰｻﾞｰ車確認

ﾊｰﾈｽ損傷部位確認

ﾃｰﾋﾟﾝｸﾞ剥離及びｺｰﾄﾞ被覆傷付きあり

RAD上部、前方のSUSｸﾘｯﾌﾟ端面にｴｯｼﾞあり。

GL1800(MCA)　5-6.ラジエーター閉塞



5-7.ラジエーター閉塞

RAD内異物の実車再現テスト結果

PART-1 テスト条件

・ヘッド:R側AB閉塞、L側OK　・モード:LOW15km/hの連続(風量調節)

①0～300km　クーラントに濁りが発生

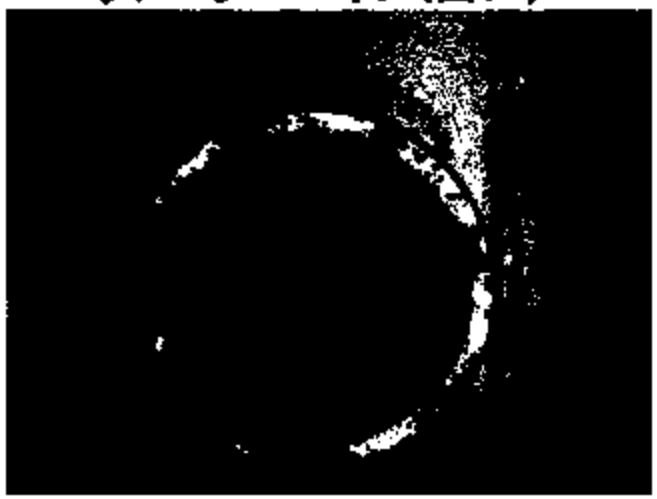
②300～600km　進展無し

③600～900km　進展無し

PART-2　(PART-1 ＋ 電気負荷12V)

①0～300km　ラジエターパイプ、及びホースの内側に、ゲル状の異物が発生

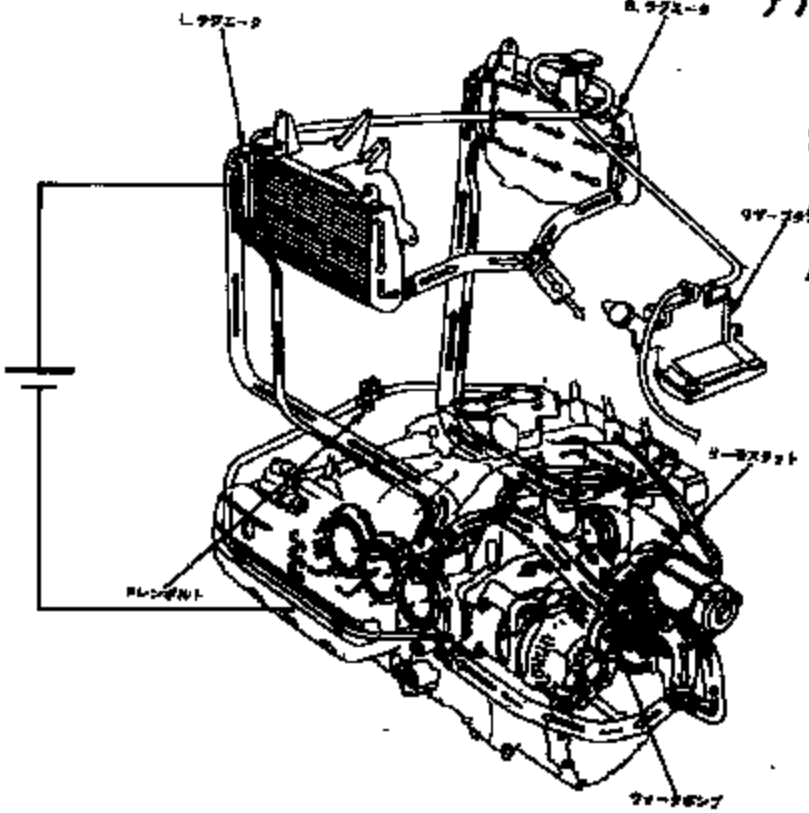
ラジエターパイプ(出口)



エア抜きパイプ

電気腐蝕メカニズム　5-8.ラジエーター閉塞

ラジエターが何等かの原因で電荷され、
クーラントを電解液として、ラジエターとエンジン間の電気分解が発生。



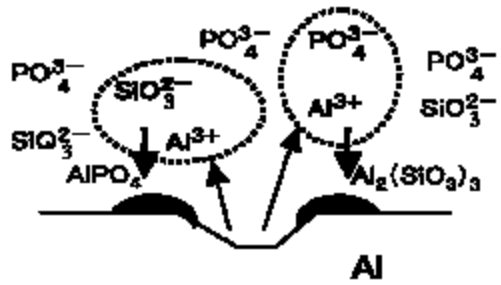
（＋）電極側のラジエターは酸化反応を起こし、クーラント中のシリケートやリン酸イオンと反応し、ケイ酸アルミやリン酸アルミなどの生成物がアルミラジエター表面に析出。

→この腐蝕生成物により、ラジエターの閉塞が発生。

$2Al^{3+}+6e^{-}+3SiO^{2-}_{3} \longrightarrow Al_2(SiO_3)_3$

$Al^{3+}+3e^{-}+PO^{3-}_{4} \longrightarrow AlPO_4$

$Al^{3+}+3e^{-}+3OH^{-} \longrightarrow Al(OH)_3$



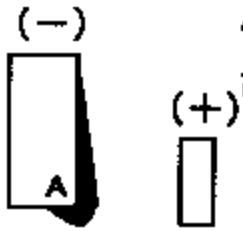
パイプ、特に先端部が著しく腐蝕する理由は、

・電位差が大きいENGに最も近い部位であること

・電流密度が高いこと

が考えられる。

＜参考＞メッキの場合



電極に近く、また電流密度が高い、A部のメッキが厚くなる。

リークチェック結果

5-9.ラジエーター閉塞

HAM MMP RAD 電流測定

NO	事業所別NO.	塗装	車両区分	TYPE	FRM. NO	YM(WANT)	確認結果 RH. RAD	確認結果 LH. RAD	その他, 気付いた点	測定日
	例)HGA-1	2K	05先行検討用		SC47-007	2003	OK	OK	ハーネスズレ無し	
1	HAM MMP	QC	MP	A	205645	2003	0.266	0.509	OK	10月15日
2	HAM MMP	QC	MP	A	205670	2003	0.124	0.100	OK	
3	HAM MMP	QC	MP	A	205631	2003	0.144	0.178	OK	
4	HAM MMP	QC	MP	A	205635	2003	0.160	0.050	OK	
5	HAM MMP	QC	MP	A	205666	2003	0.109	0.167	OK	
6	HAM MMP	QC	MP	ED	200132	2003	0.320	0.840	OK	
7	HAM MMP	QC	MP	A	205685	2003	0.182	0.157	OK	
8	HAM MMP	QC	MP	A	205689	2003	0.098	0.051	OK	
9	HAM MMP	QC	MP	A	205700	2003	0.128	0.169	OK	
10	HAM MMP	QC	MP	ED	200117	2003	0.404	0.126	OK	
20	HAM MMP	QC	MP	A	205749	2003	0.169	0.077	OK	10月17日
21	HAM MMP	QC	MP	A	205753	2003	0.215	0.086	OK	
22	HAM MMP	QC	MP	A	205159	2003	0.174	0.065	OK	
23	HAM MMP	QC	MP	A	205738	2003	0.072	0.186	OK	
24	HAM MMP	QC	MP	A	205764	2003	0.420	0.260	OK	
25	HAM MMP	QC	MP	A	205770	2003	0.378	0.382	OK	
26	HAM MMP	QC	MP	A	205761	2003	0.310	0.388	OK	
27	HAM MMP	QC	MP	A	205805	2003	0.393	0.255	OK	
28	HAM MMP	QC	MP	A	205814	2003	0.260	0.256	OK	
29	HAM MMP	QC	MP	A	205820	2003	0.238	0.213	OK	
30	HAM MMP	QC	MP	A	205810	2003	0.278	0.263	OK	

・HAM, M-SS, AH, HGAの健康車確認53台において不具合発生に至るリーク電流は確認されなかった。

＊0.006～0. 84Vとバラツキはあるがリーク時発生する+12Vは確認されなかった。

サマリー　5-10.ラジエーター閉塞

・RAD閉塞の主原因はワイヤーハーネス組付け不良/取外し等、製造・整備不良イレギュラーに伴い発生したRAD通電によるものであり、発生率は極めて低いと推定する。

①RAD閉塞発生車2台共にシリンダー閉塞は無く、オーバーヒートの原因はRAD閉塞に特定された。

②上記不具合車の1台にハーネスとRAD取付けSUSクリップのエッジ干渉痕が確認された。

（ハーネス側はメインSW-ONで＋12Vが発生する回路の電線）　※US車両は買上げ交渉中

③不具合車はハーネスが正規の位置からズレた状態で且つ正規のクリップが取外されていた。

結果、ハーネスの枝線がSUSクリップに干渉可能な取付け状態であった。

④RADに+12Vを付加した再現テストでRAD出入り口の堆積物が発生し解析結果、市場にて発生した堆積物と同等な事が確認された。

⑤クーラントの劣化、ホースとRAD金属電位差電蝕による再現は発生しなかった

→以上からワイヤリング不良によるRAD通電～閉塞と判断する

⑥SS組立て車両/AH, HG健康車の確認をした53台に電圧リークは無かった。

※・但しリークした時の電流の低さから予知予測が困難であり、リークを続けた結果発生する

RAD閉塞～オーバーヒートは避ける必要があり、より積極的な仕様タフネスの向上を必要とする

・以上からMCA04YMはRADのアース接地を行い、電蝕による閉塞物の発生を防止する

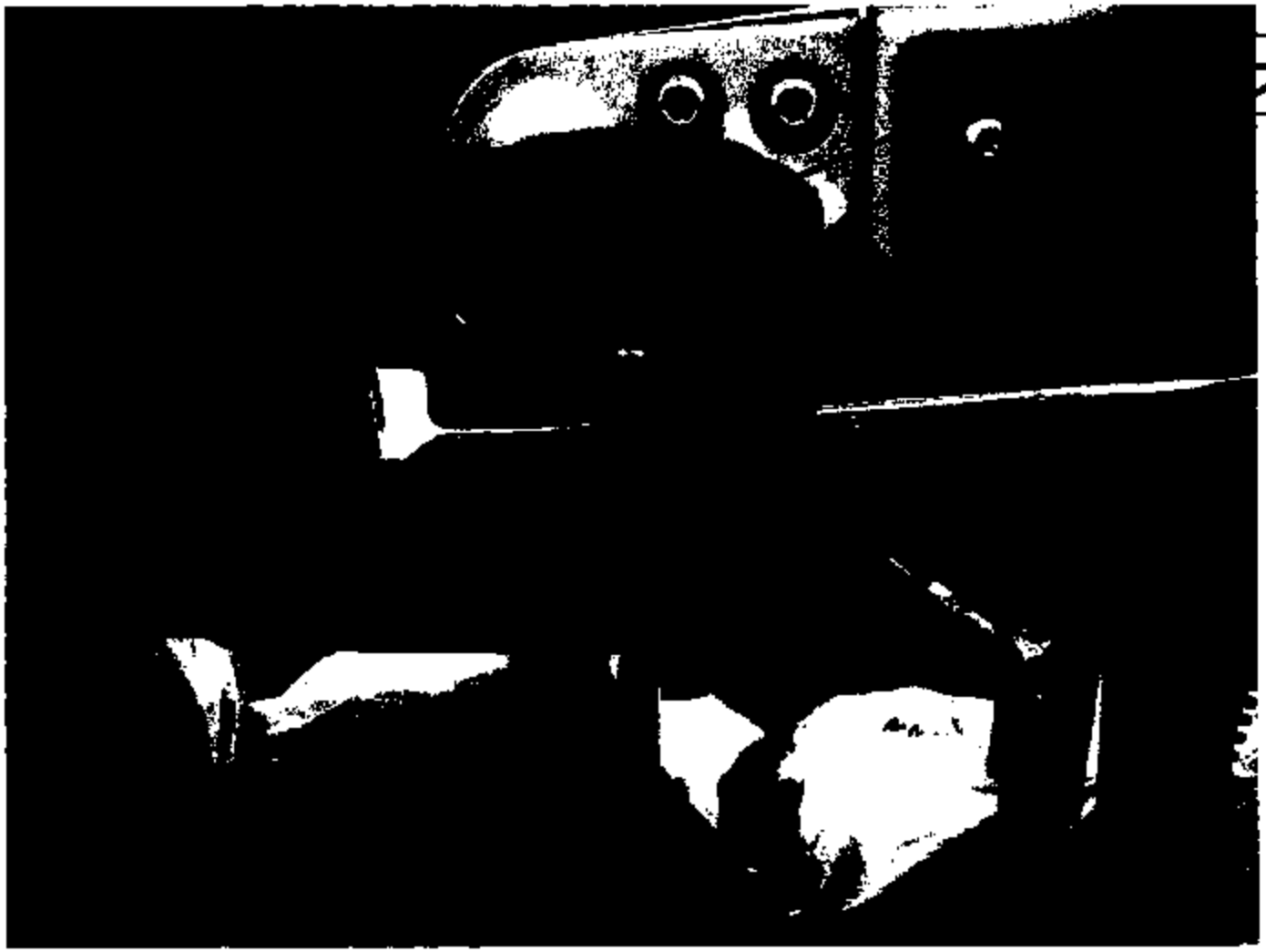
GL1800(MCA)　6-1不具合事象確認結果

冷却水オーバーフロー吐出時のRrタイヤへの被水状況

走行条件	パレード走行		強制的(冷却風CUT)なオーバーヒートでの確認			
	20km/h走行		80km/h走行		120km/h走行	
	直進	スラローム	直進	スラローム	直進	スラローム
水付着タイヤに有無	無	無	無	有	有	有
状況	タイヤサイドから30mm外側に吐出。	路面上の吐出航跡に左ターンでもタイヤ接地面は乗らない。	20km/h同様にサイドから約30mm外側に吐出。	路面上の吐出航跡に左ターンでタイヤが乗る。	吐出水は走行風によりミスト状となり拡散。 タイヤトレッド，サイドウォールが量は少ないが被水する。	

尚、一連の実走確認を通して、アスファルト舗装路ではタイヤスリップを感じる事は無かった。

GL1800(MCA)　6-2不具合事象確認結果

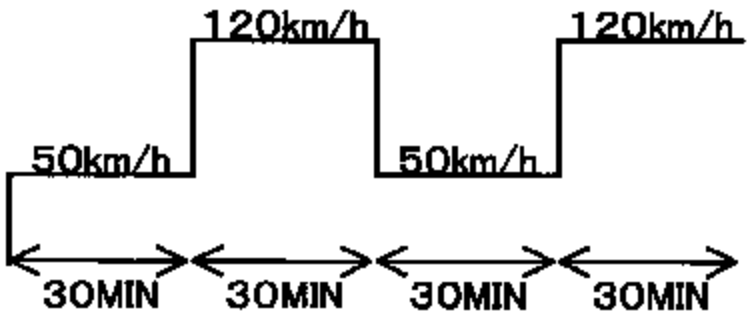


・ラジエタードレンチューブは、ライダーの足に冷却水が掛からない位置に設定されている。

GL1800(MCA)　6-3不具合事象確認結果

CYLヘッド水通路閉塞でのENG耐久性

～1)一般走行を想定した耐久テスト確認(RL共にAB閉塞)



左記走行モードでのENG単体耐久
15Hrにて問題なし。

～2)水吹き後、全開走行での事象確認(RL共にAB閉塞)

①パレード走行相当で水吹きさせる

②その後、EH高耐実施(目標100Hr)

【結果】 耐久終了結果、エンジンストップには至らないものの、エンジン内ピストン廻りに磨耗あり。更に回し続けると異音発生にいたるものと推定する。

GL1800(MCA)　7-1.市場措置提案

・事象としては水温計がR/Zに入る。又、水温計がR/Zに入りそのまま低速連続走行した場合、最終事象としては水沸きに至る。

・コンプレーンの多発、及びヘッドW/J閉塞(製造不良)の不良率が高い

・すべての最終事象は水温計がR/Z突入後の発生であり、商品性問題である。

積極市場措置を提案する　40

GL1800(MCA)　7-2.市場措置提案

《水温不具合打ち上げﾕｰｻﾞｰに対応する措置内容》

全ｺﾝﾌﾟﾚｰﾝﾕｰｻﾞｰ対象

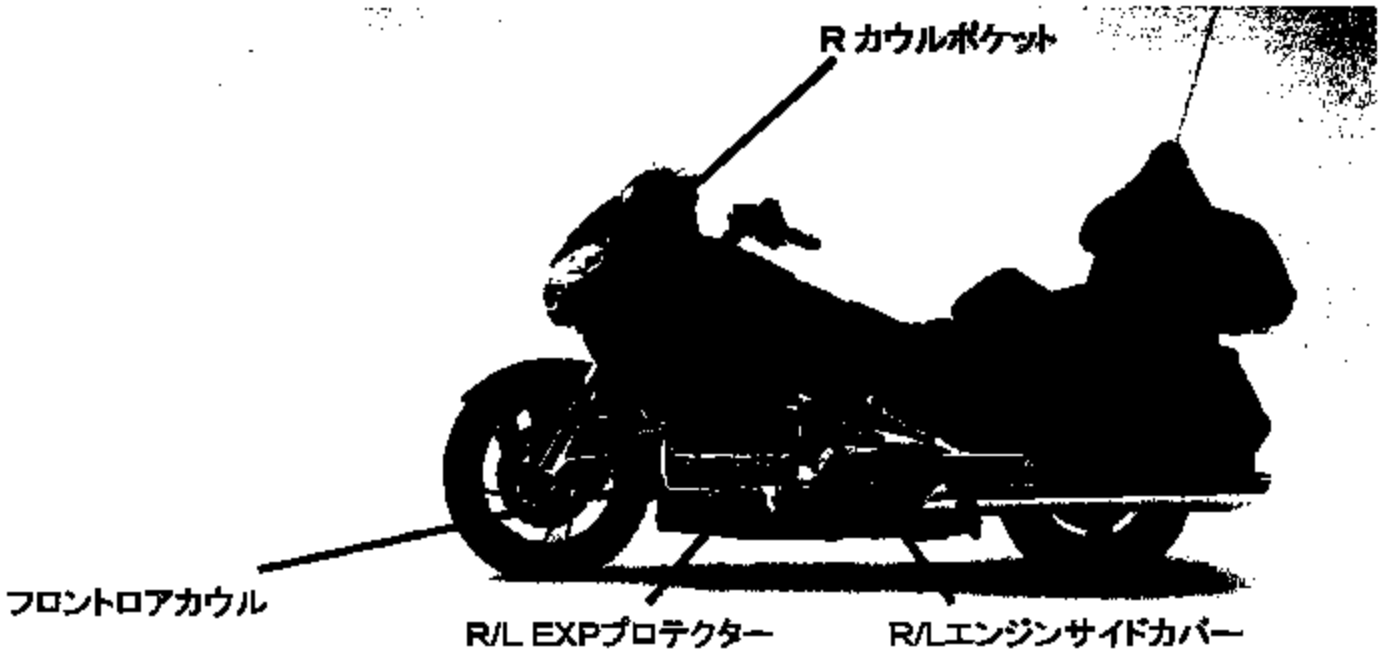
点検後不良品対象車

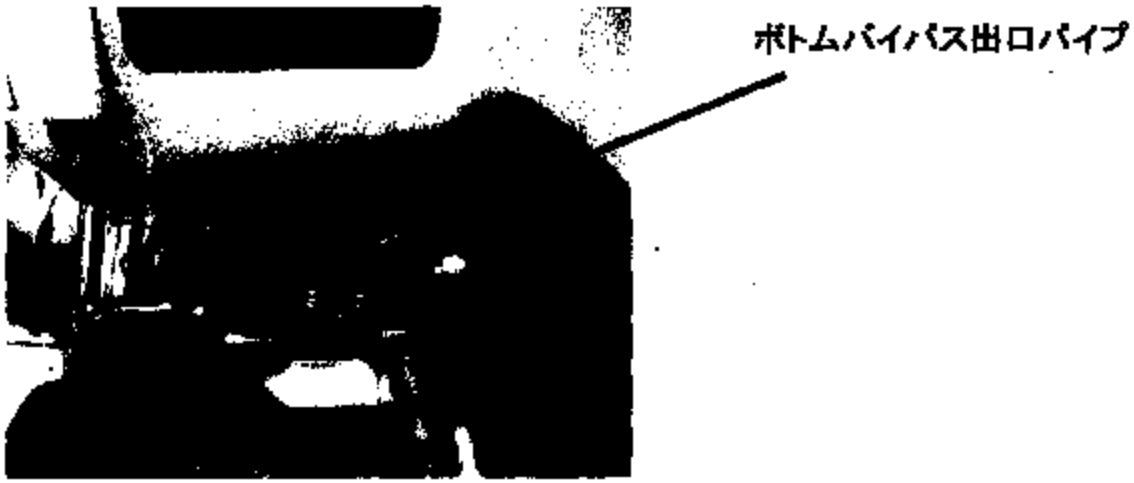
- 水温計精度up品の組替え
- 01 'YM⇒02' ヘッド組替え
- ヘッドW/J閉塞車⇒良品組替え
- ﾗｼﾞｴｰﾀｰ閉塞車⇒良品組替え
- ハーネスのリーク　⇒　修理

R/Z入り回避運転方法を案内する。

納得しないユーザー対してはAHに提案したA／S案を提案する。

GL1800(MCA)　8-1完成車でのW/J閉塞点検方法





GL1800(MCA)　8-2完成車でのW/J閉塞点検方法

- 点検方法

1. B部閉塞　B部が閉塞している場合、ラジエター液をドレンしても
B通路内にラジエター液溜りが発生する為、液溜りの有無を
確認する。

判定方法　:スポイトにてB通路内を吸引する。

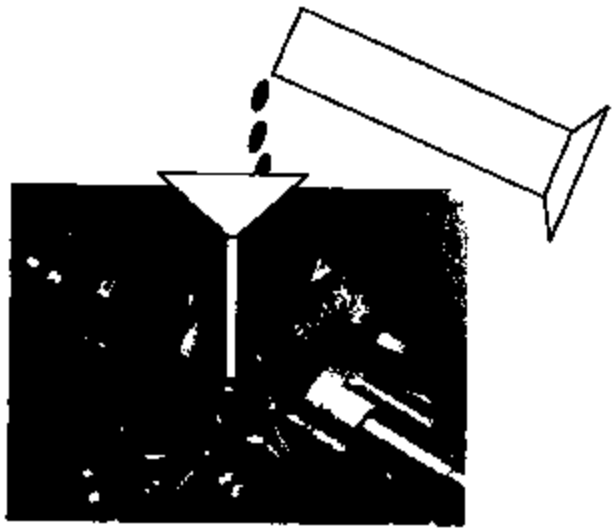
・ラジエター液が吸い出されない → 良品
・ラジエター液が吸い出される → 閉塞品

2. A部閉塞　ラジエターホースからシリンダーW/J内に一定量の水を注入する
A部が閉塞するとエア噛みが発生し注入量が減る。

良品 :(600)cc
閉塞 :(500)cc

判定方法　:一定量(600cc)注入した時に

・オーバーフロー無し → 良品
・オーバーフロー有り → 閉塞品



8-3 水温計R／Z入口指示の変更

1．変更内容： R／Z入口指度

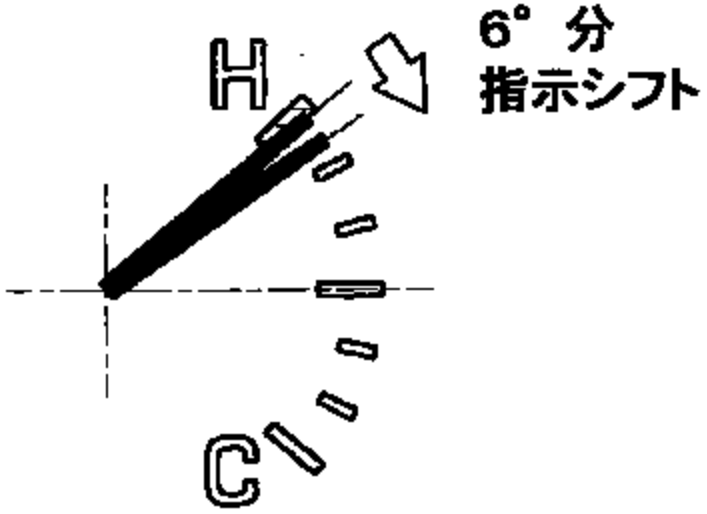
126 ℃ ⬅

A:122℃（'01&'02モデル）

B:126℃（'03モデル）

※'03モデルは温度精度UP(検討中)

2.効果



6° 分
指示シフト

122℃時

指針2本分の効果

Low 15km/h連続走行時
約3分の効果

※'02モデルの場合 精度UPは含まず

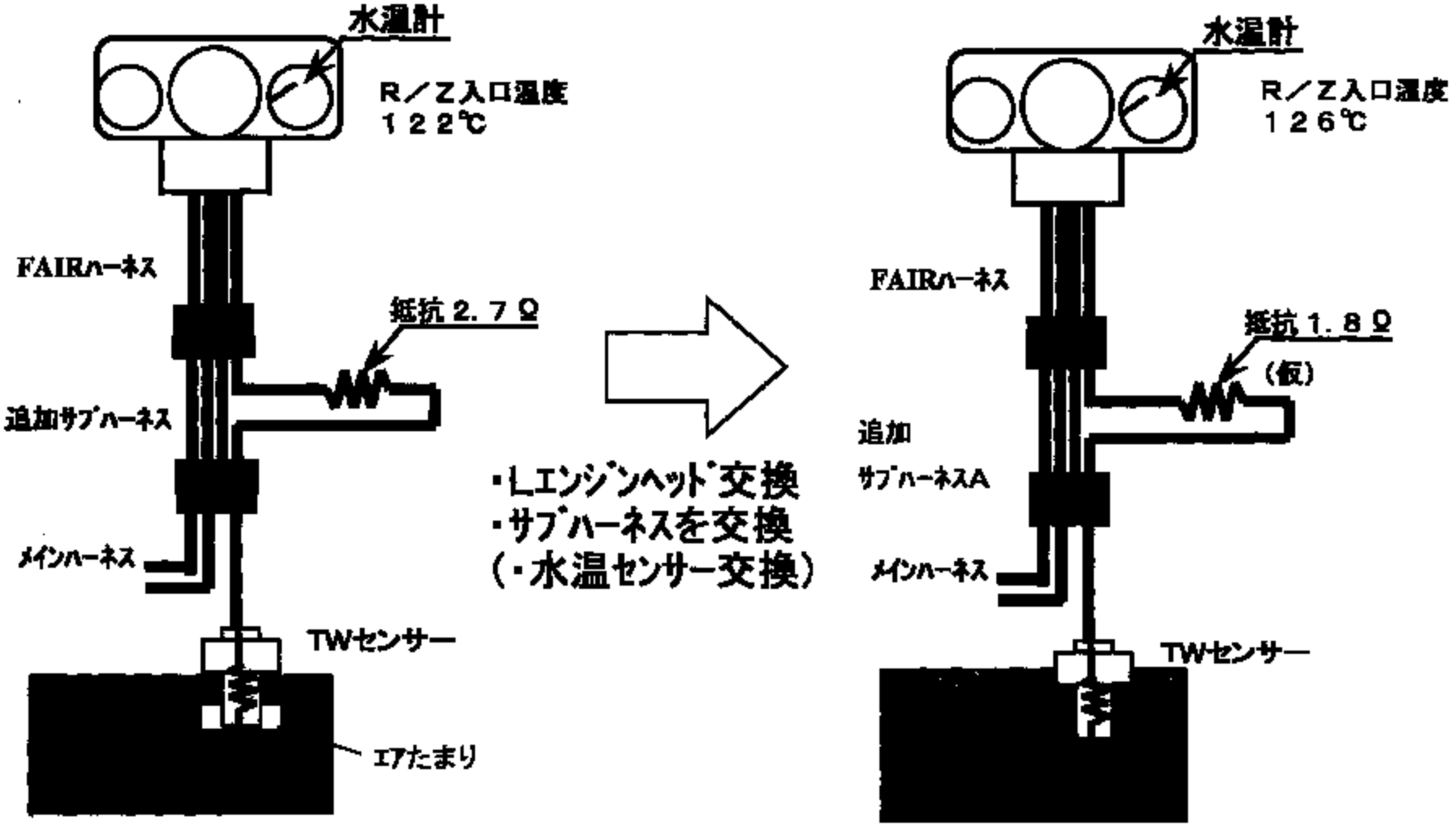
8-4 水温計R／Z入口指示の変更

3.対応手法 【モデル毎の対応】

	TWセンサー計測温度 空気→水	R/Z入口温度 122℃→126℃	公差精度UP	改修費用
'01モデル 量産初	・L側エンジンヘッド交換 ・抵抗入りサブハーネス撤去	抵抗入りサブコードを追加 A Type:'01用 B Type:'02用	水温センサー精度UP検討中（部品選別）	部品費:¥68,000 工賃:約10ｈ
途中～	・L側エンジンヘッド交換 ・FAIRハーネス交換			部品費:¥80,000 工賃:約12ｈ
'02モデル	―――			部品費:¥10,000 工賃:約4．3ｈ ※ヘッド組換時は-3h
'03モデル	―――	―――		部品費:¥6,000 工賃:約3．3ｈ ※ヘッド組換時は-3h

8-5 水温計R／Z入口指示の変更

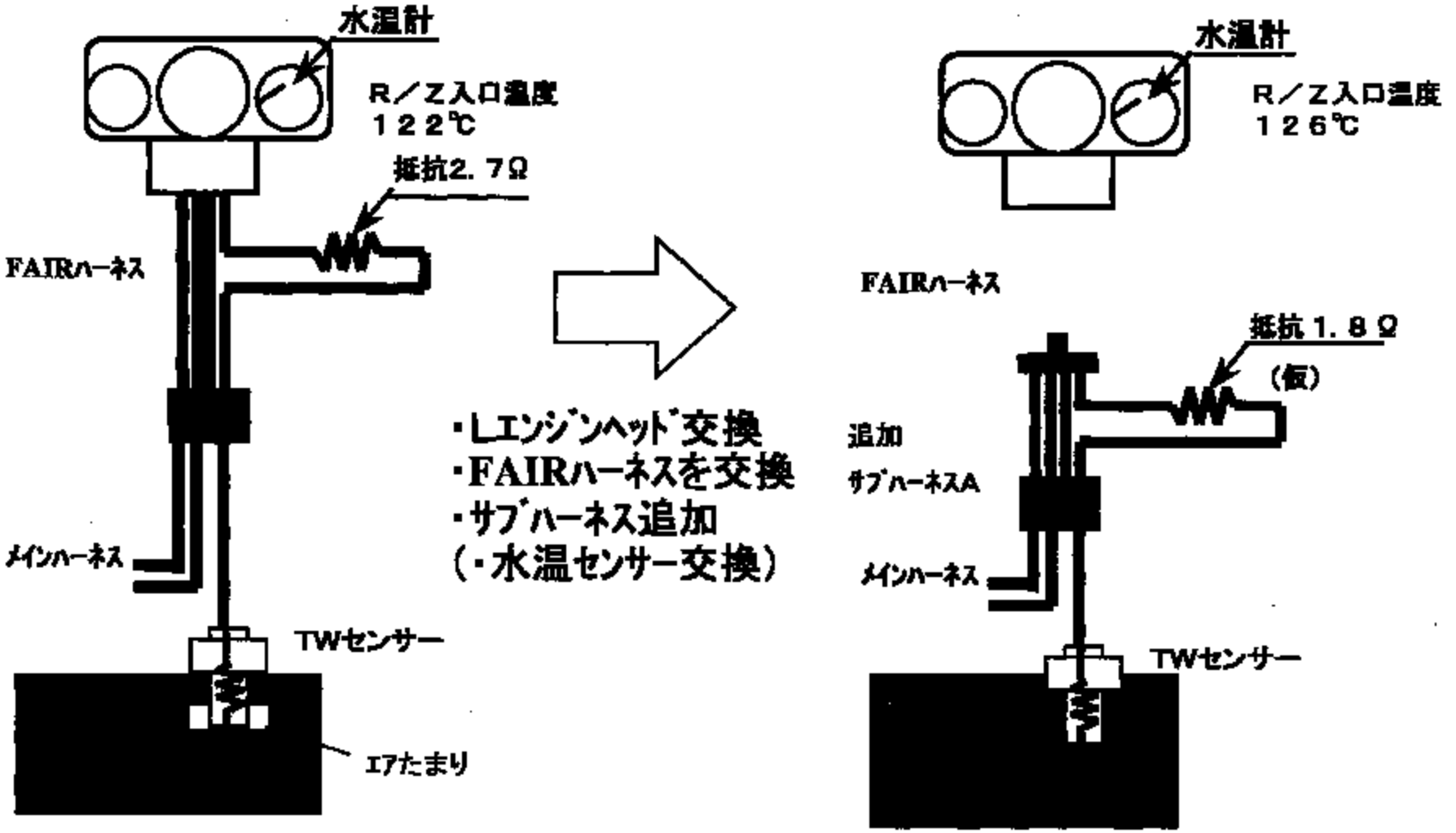
【 A】‘０１モデル初、　部品費 ： ￥68, 000(Lｴﾝｼﾞﾝﾍｯﾄﾞ、ｻﾌﾞﾊｰﾈｽ、(水温ｾﾝｻｰ))
工賃 ： 約10h 分



8-6 水温計R／Z入口指示の変更

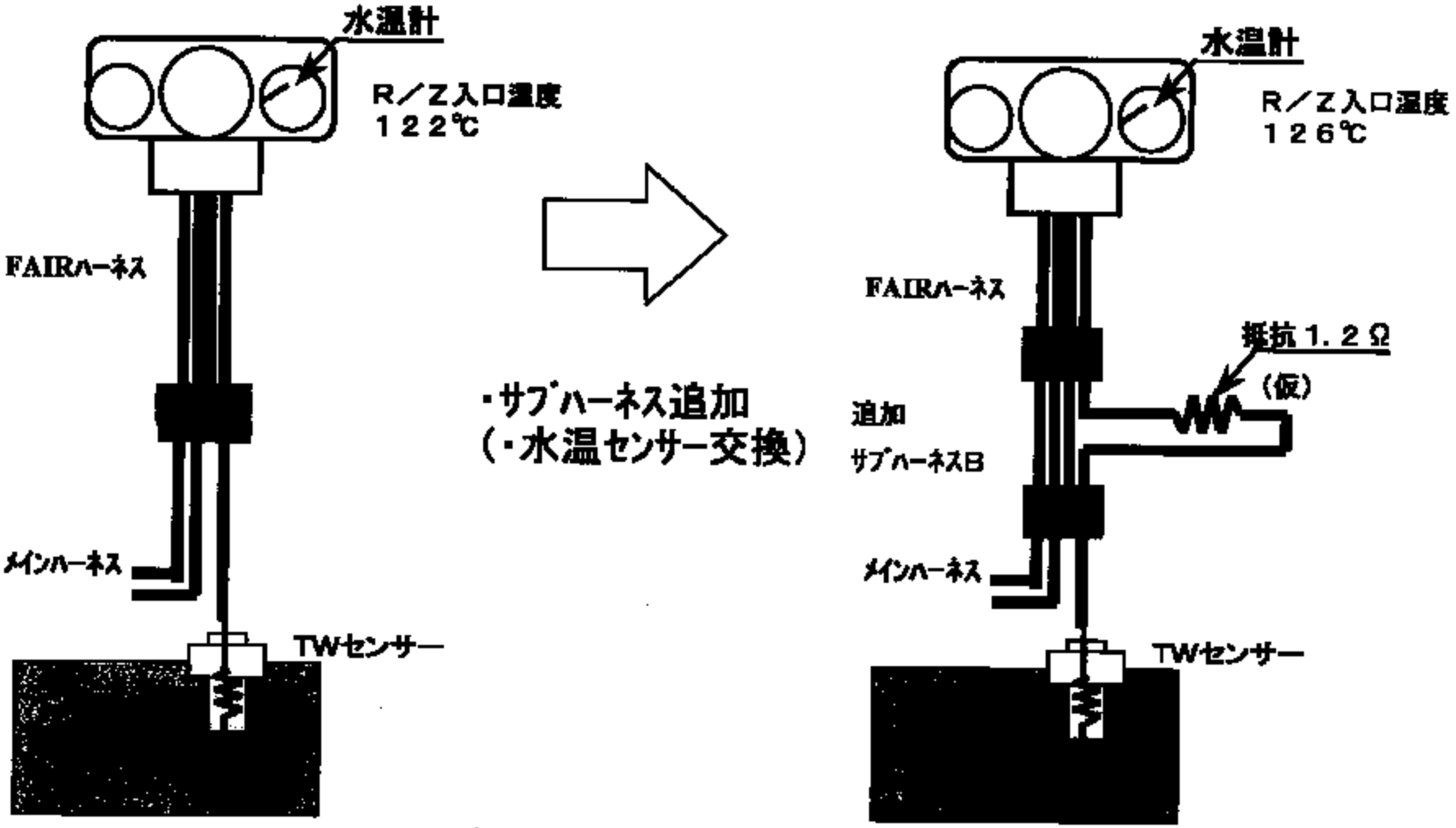
【 B】‘０１モデル途中～　部品費 ： ￥80，000（L側ｴﾝｼﾞﾝﾍｯﾄﾞ、ｻﾌﾞﾊｰﾈｽ、FAIRﾊｰﾈｽ（水温ｾﾝｻｰ））

工賃 ： 約12h 分



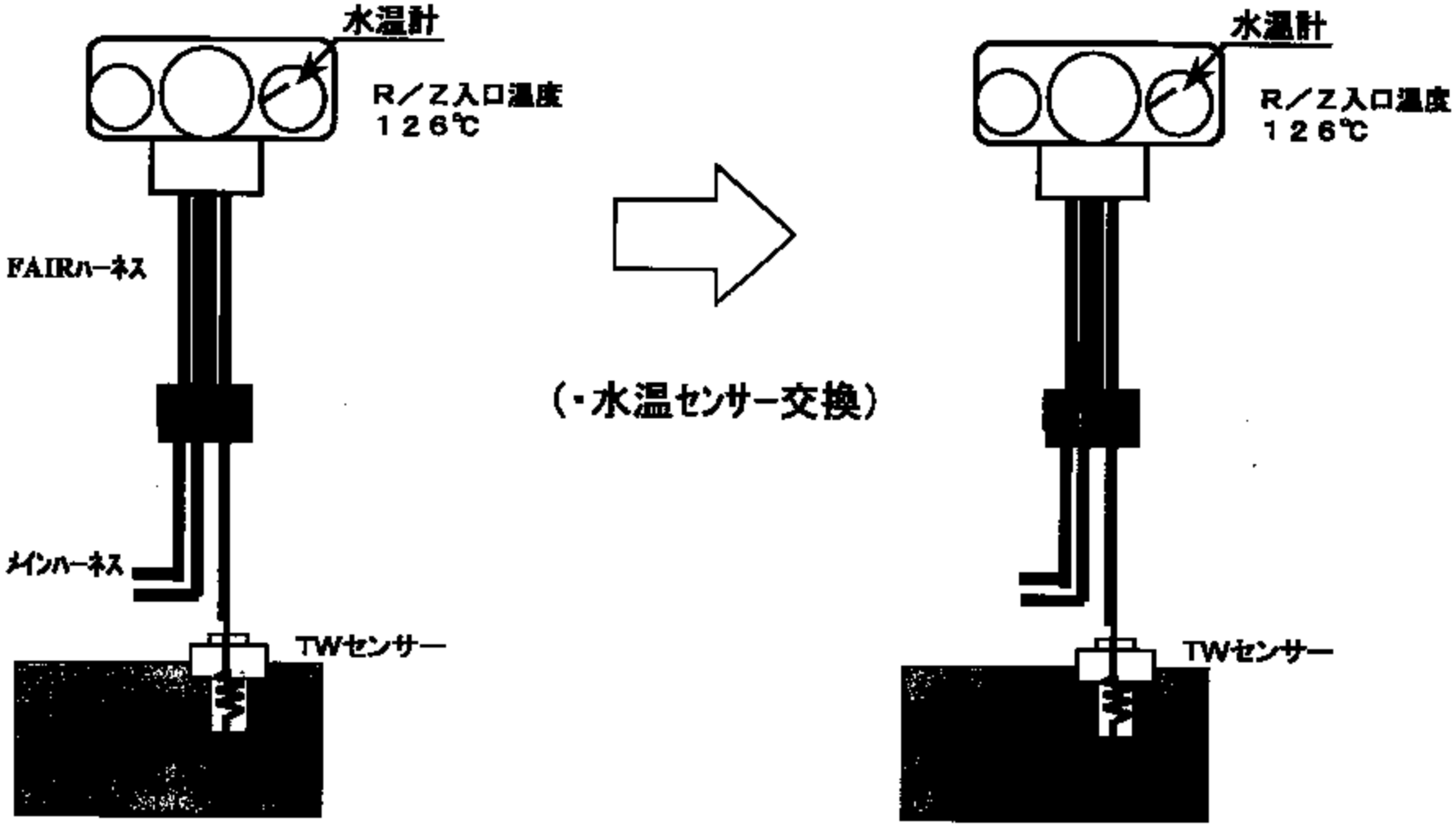
8-7 水温計R／Z入口指示の変更

【 C】‘０２モデル　部品費 ： ￥10，000（ｻﾌﾞﾊｰﾈｽ、（水温ｾﾝｻｰ））
工賃 ： 約4．3h 分 ※ﾍｯﾄﾞ組替え時は－3．0h



8-8 水温計R／Z入口指示の変更

【 D】‘０３モデル　　部品費 ： ￥6, 000((水温センサー))
工賃 ： 約3. 3h 分 ※ﾍｯﾄﾞ組替え時は－3. 0h



GL1800(MCA)　8-9.市場対応方法

《R/Zを回避できる運転方法》

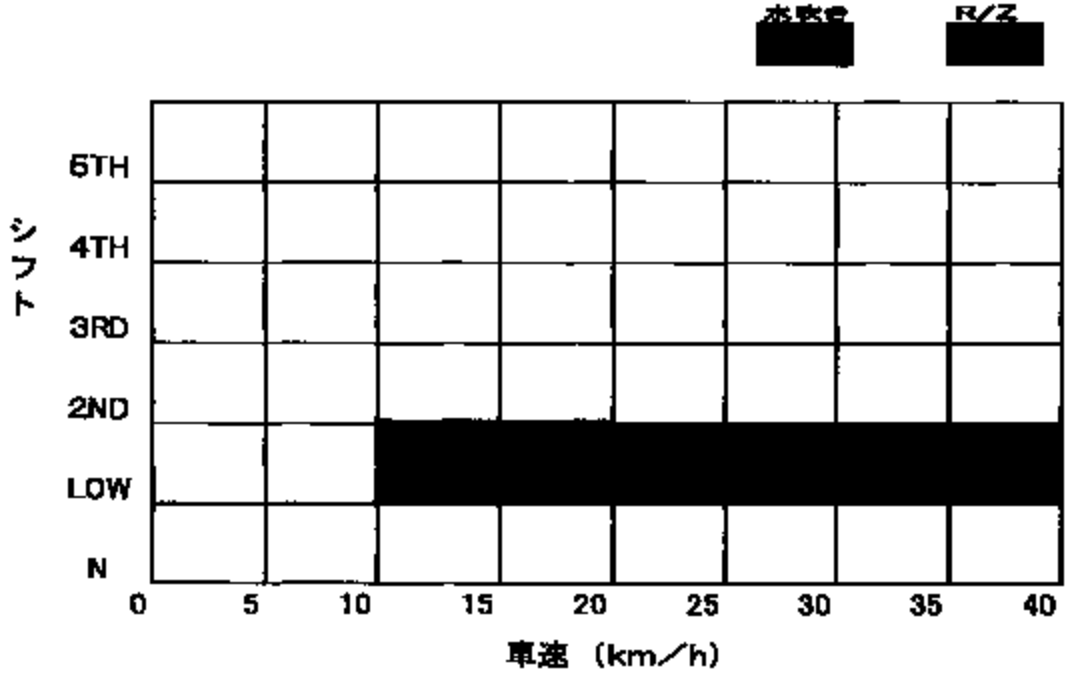
手紙の内容(案)

・パレードの様な　低速での連続走行をすると、水温が上がりやすく水温計がR/Zに入る場合があります。

・その場合は、安全を確保できる路肩に一旦止まりアイドリング状態で、水温が下がるのを待って下さい。

・水温計がR/Zに入らない為には、2nd以上のシフトポジションで多少、速度を上げて走行して下さい。

平坦路の一定速走行　＊ﾊﾟﾚｰﾄﾞ走行時は下記のｿﾞｰﾝを避ける

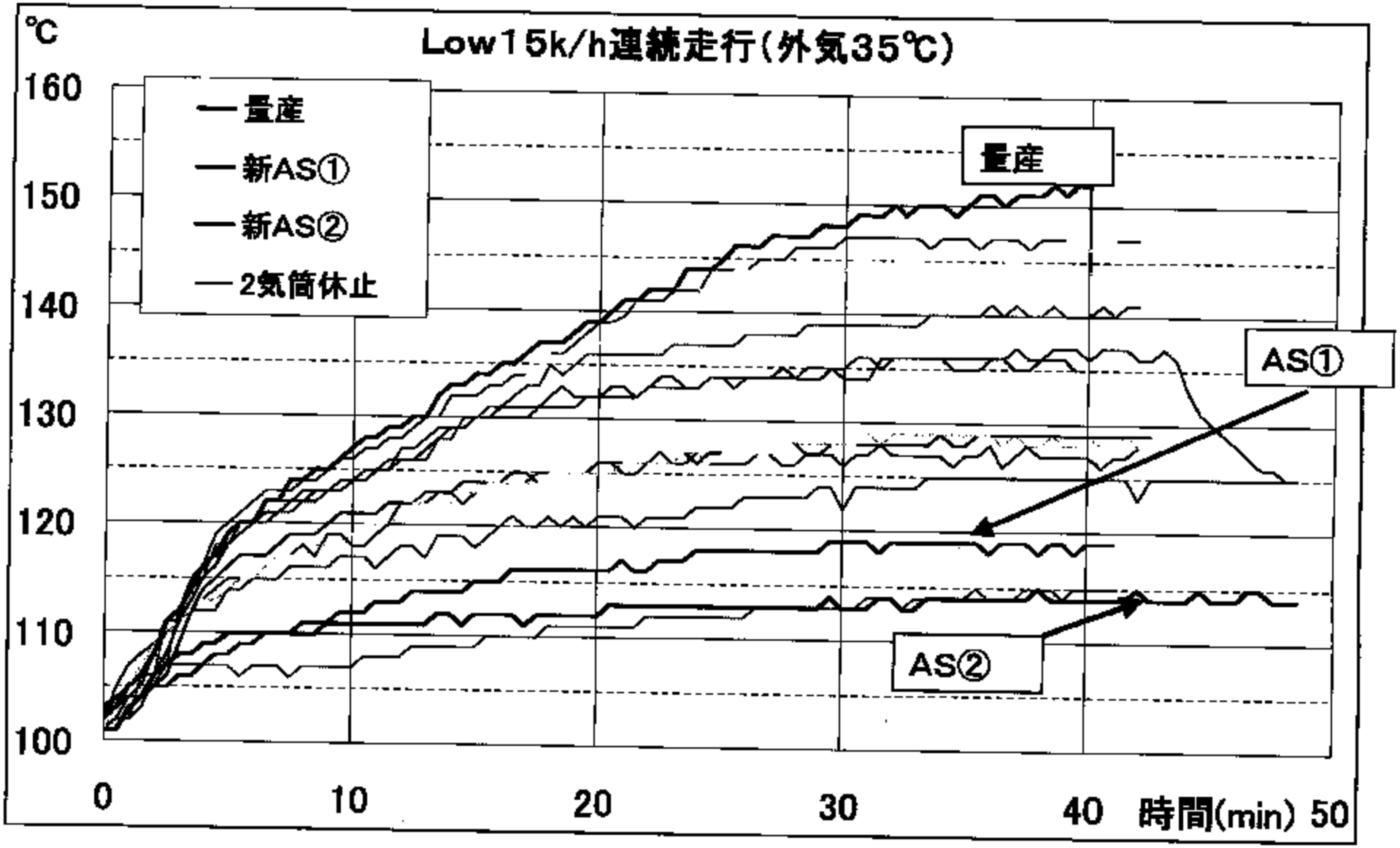


その理由

・左記ゾーンのみでENGの発生熱量が　走行風＋ファンによる冷却能力を上回る為

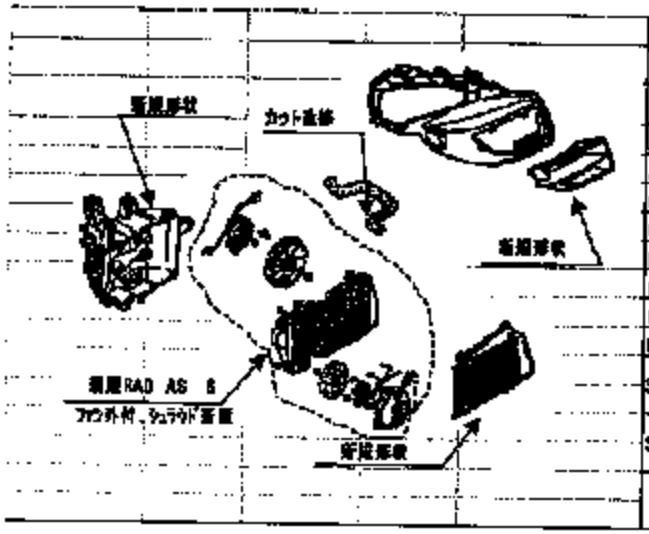
8-10 AS仕様(案)

GL1800(MCA)　8-11.市場措置提案



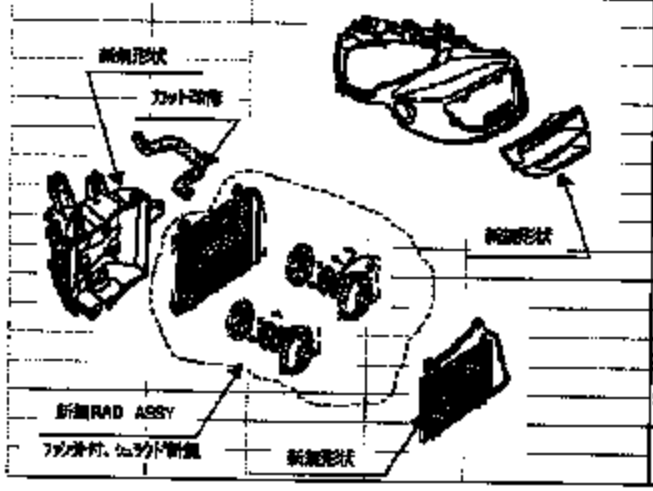
GL1800(MCA)　8-12.市場措置提案

A／S案1.（FAN:内外4ヶ/後方排気）



部品	内容	コスト(1000台前後)	コスト(1800台前後)	日程	工賃予測
RAD ASSY,R	RAD:サイズ'MCA、スター新規 FAN:MCF(内側)MBW(外側) シュラウド:新規形状	105$(AIR GUIDE込み)	59$(AIR GUIDE込み)	・L/O、作図手配 テスト確認含めて　60日	(RAD ASSY交換+ホース改修+LOUVER交換)=R/L =4.0hr×60/hr
RAD ASSY,L		105$(AIR GUIDE込み)	59$(AIR GUIDE込み)		
AIR GUIDE,R	RAD位置変更により、形状新規				
AIR GUIDE,L					
GRILLE,R,RAD	FAN外付により、 新規形状	$25	$25		
GRILLE,L,RAD		$25	$25		
HOSE,R,RR,RAD	実機ホースをカット使用				
HOSE,L,RR,RAD					
LOUVER,R,SIDE COWL	FAN外付により、 新規形状(ルーバー部形状変更)	$38	$38		
LOUVER,L,SIDE COWL		$38			
SUB HARNESS	水温計1.25℃設定用抵抗入り サブハーネス	$9	$9		
SUB HARNESS	FAN　2ヶ追加用サブハーネス	$10	$10		
TOTAL		$357	$263		$200

A／S案2.（FAN:R/L4ヶ外/後方排気）



部品	内容	コスト(1000台前後)	コスト(1800台前後)	日程	工賃予測
RAD ASSY,R	RAD:サイズ'MCA、スター新規 FAN:MBW(外側)2ヶ シュラウド:新規形状	111$(AIR GUIDE込み)	60$(AIR GUIDE込み)	・L/O、作図手配 テスト確認含めて　60日	(RAD ASSY交換+ホース改修+LOUVER交換)=R/L =4.0hr×60/hr
RAD ASSY,L		111$(AIR GUIDE込み)	60$(AIR GUIDE込み)		
AIR GUIDE,R	RAD位置変更により、形状新規				
AIR GUIDE,L					
GRILLE,R,RAD	FAN外付により、 新規形状	$25	$25		
GRILLE,L,RAD		$25	$25		
HOSE,R,RR,RAD	実機ホースをカット使用				
HOSE,L,RR,RAD					
LOUVER,R,SIDE COWL	FAN外付により、 新規形状(ルーバー部形状変更)	$38	$38		
LOUVER,L,SIDE COWL		$38	$38		
SUB HARNESS	FAN2ヶ追加用サブハーネス	$10	$10		
SUB HARNESS	水温計1.25℃設定用抵抗入り サブハーネス	$9	$9		
TOTAL		$367	$265		$200

GL1800(MCA)　市場措置提案

《水温不具合打ち上げユーザーに対応する措置内容》

全コンプレーンユーザー対象

点検後不良品対象車

- 水温計精度up品の組替え
- 01 'YM⇒02' ヘッド組替え
- ヘッドW/J閉塞車⇒良品組替え
- ラジエーター閉塞車⇒良品組替え
- ハーネスのリーク　⇒　修理

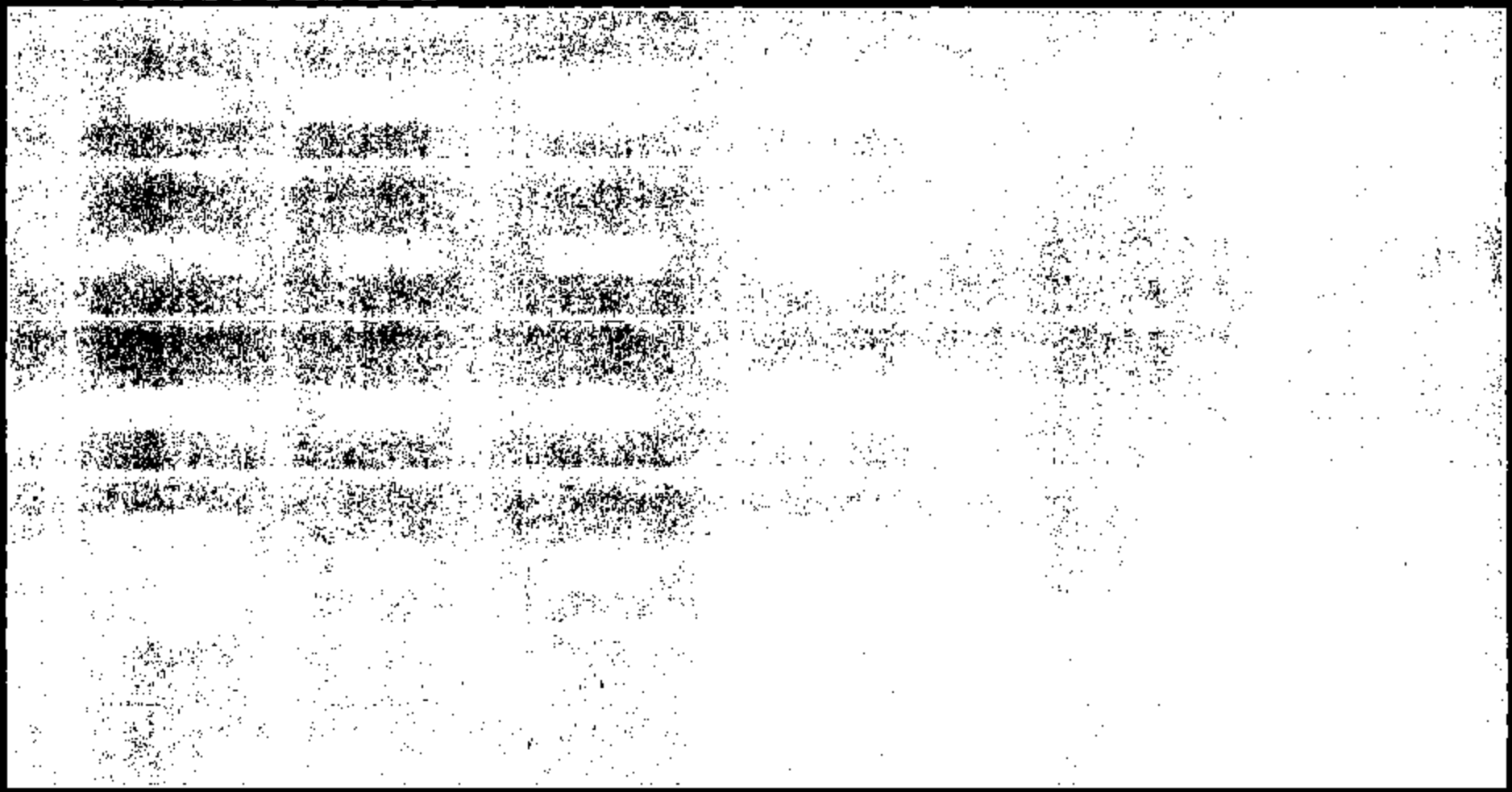
R/Z入り回避運転方法を案内する。

納得しないユーザー対してはAHに提案したA／S案を提案する。

GL1800(MCA)　9.措置費用概算(全世界)

●下記は部品代と工賃のみの概算である。

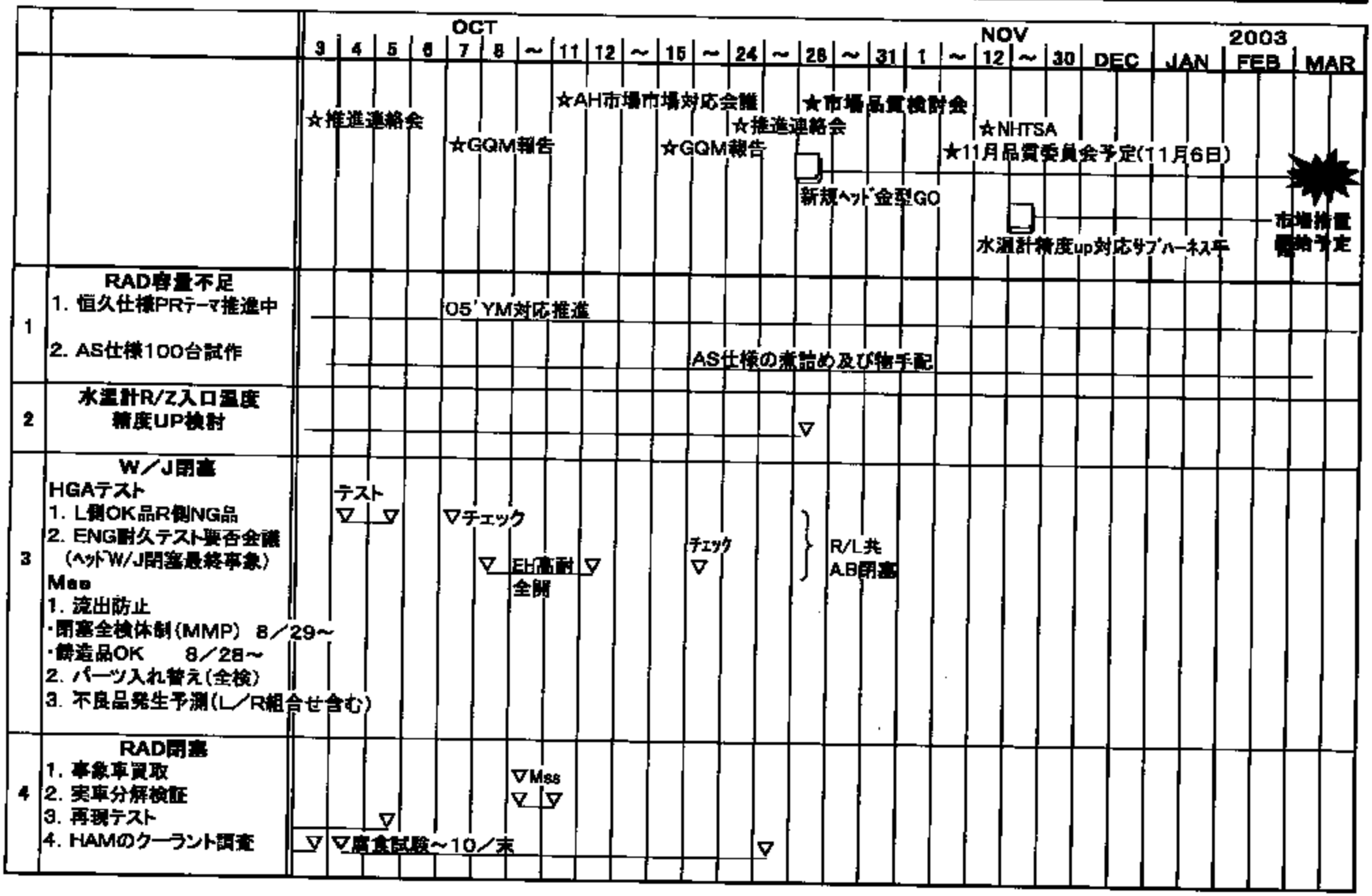
●ヘッド交換予測は総T/L受付数×10倍＋αとした。



・W/H 改修費用、部品発送費用・・等は含まれていない。　TOTAL　591,292千円

・ヘッドAssYでの交換を基本とする。

GL1800(MCA)　10.今後の展開



GL1800(MCA)　　金型製作

シリンダーヘッド金型

最短で対応シリンダーヘッドL:4,000個 R:3,200個を
払出しするための投資と日程

最短案	投資:62,200千円	3月 4,470台(8,940個)

報告終了

補足資料

1案:鋳造外作、加工外作
ユーザー重視

MCAシリンダーヘッド増量対応

Mee GDC-M
作成02-10-25

増量対応の内外作

	鋳造	加工	圧検
内作	●	●	●
外作	●	●	●

投資の有無

	鋳造	加工	圧検
内作	なし	なし	なし
外作	有り	有り	有り

[redacted]

R/Lヘッド

		10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	TTL
鋳造	負荷空き	360	390									750
	休置			120 (120×1個)								120
	外作				1,000	2,500	2,500	2,500	2,500	2,500		13,500
	TTL	360	390	120	1,000	2,500	2,500	2,500	2,500	2,500		14,370
加工	機械-M						600	360	240			1,200
	桜井製作所				870	1,000	1,900	2,000	2,000	2,000	2,000	11,770
	TT				870	1,000	2,500	2,360	2,240	2,000	2,000	12,970
部品ASSY					870	1,000	2,500	2,360	2,240	2,000	2,000	12,970

部品ASSY					870	1,870	[redacted]	6,730	8,970	10,970	12,970	12,970

●GDC－M　GLX シリンダーヘッド水路閉塞

02 10 25

MCAシリンダーヘッド増量対応

2案:鋳造外作、加工外作

Mss GDC-M
作成02-10-25

増量対応の内外作

	鋳造	加工	圧検
内作	●	●	●
外作		●	●

投資の有無

	鋳造	加工	圧検
内作	なし	なし	なし
外作	なし	有り	有り

R/Lセット

		10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	TTL
鋳造	負荷空き	360	390										750
	休置			120 (120×1回)	120 (120×1回)	120 (120×1回)	240 (120×2回)	120 (120×1回)	120 (120×1回)	120 (120×1回)	120 (120×1回)		1,080
	外作												0
	TTL	360	390	120	120	120	240	120	120	120	120		1,830
加工	増械-M						120	240	120	120	0	120	720
	桜井製作所				870	120					120		1,110
	TT				870	120	120	240	120	120	120	120	1,830
部品ASSY					870	120	120	240	120	120	120	120	1,830

部品ASSY					870	990	1,110	1,350	1,470	1,590	1,710	1,830	1,830

●GDC－M　GLX シリンダーヘッド水路閉塞

02. 10. 29

ヘッド単価（単位：円/個）

2案（償却10,000個設定）

鋳造

加工費	4,100
償却費	3,720
TTL	7,820

機械加工

加工費	5,200
償却費	2,380
TTL	7,580

15,400円/個

8-1.市場対応方法

《ヘッド閉塞判別方法》

①冷却水の給水量で判別

給水量　2510cc以下

▼

閉塞の可能性有り

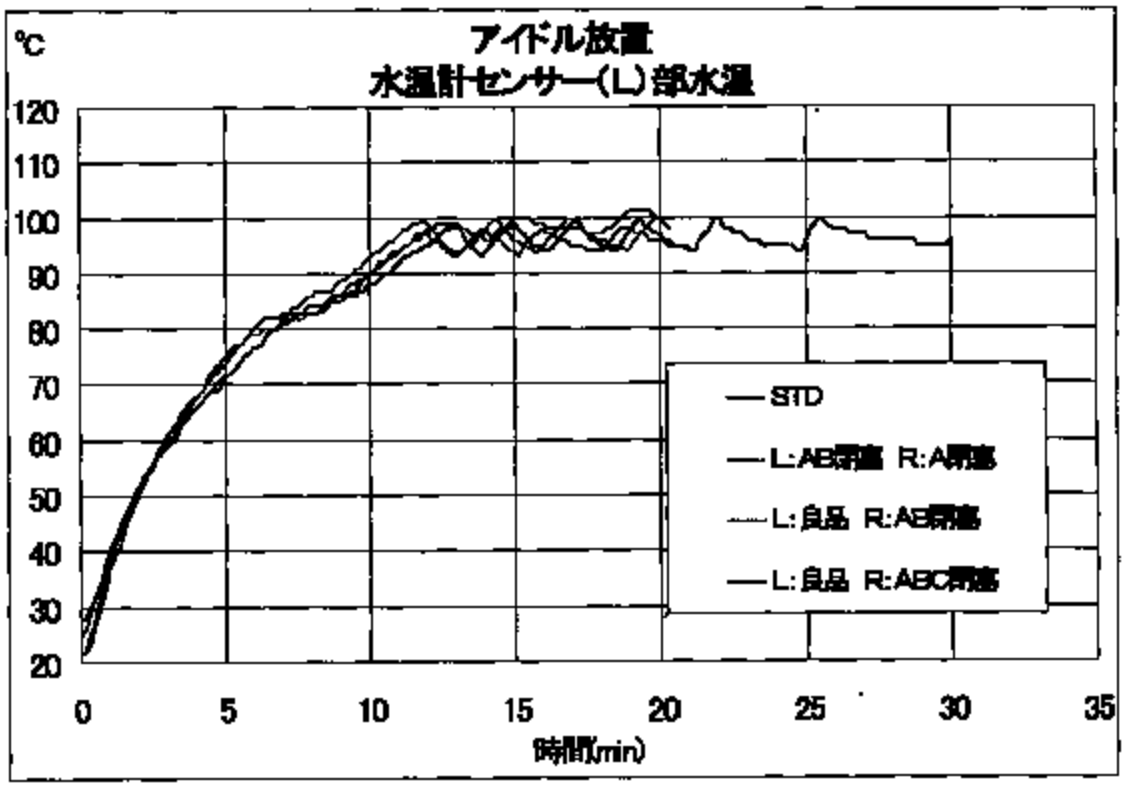
		排水量	給水量
標準状態	L:良品 R:良品	2750cc	2510cc
再現①	L:良品 R:AB閉塞		2240cc
再現②	L:良品 R:ABC閉塞		2170cc

②アイドル放置での判別

FANの作動回数

▼

判別不可能



GL1800(MCA)　8-2.市場対応方法

1.水温計(R／Z入口)の精度UP検討

《水温計精度up対応方法》

$126\ ^{+4.5}_{-0}$ ℃ ⬅

- A:122±4.5℃('01&'02モデル)
- B:126±4.5℃('03モデル)

2.手法:　マスター抵抗法(詳細は次ﾍﾟｰｼﾞ参照)

126℃保証水温センサーセットに組替え＋R/Z指示メーター補正抵抗追加投入の組合せにて対応

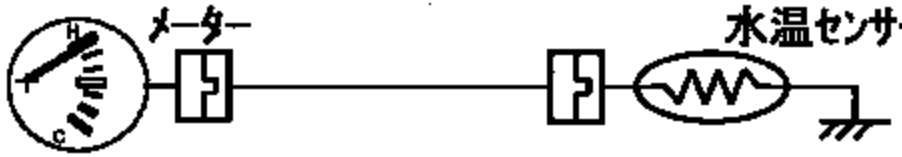
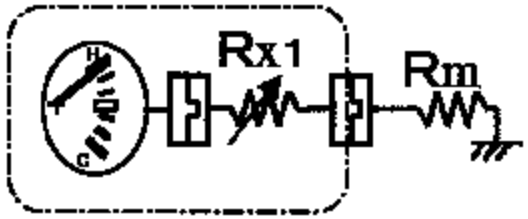
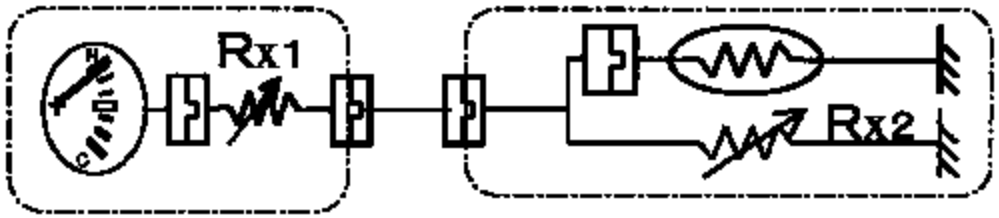
3.コスト(設計概算)

部　品／項　目	コスト	REMARKS
①メーター側サブハーネス(抵抗Rx1付き)	¥5,000	ex. 0.3Ω刻みで10種類の抵抗をセット
③TWセンサー側サブハーネス	¥5,000	2種類('01／02用・'03用)
④TWセンサー	¥500	量産品との識別必要
作業工賃　(約1時間)		ｼﾘﾝﾀﾞｰﾍｯﾄﾞ確認時TWセンサー同時組替え前提
②マスター抵抗サブハーネス	¥3,000	Rm(10Ω)抵抗入り　(治具として配布)

8-3.市場対応方法

2.解説:マスター抵抗法によるｱｼﾞｬｽﾄﾒﾝﾄ容量　《水温計精度up対応方法》

＊マスター抵抗法の概念と実装対応;説明の単純化の為、年式別仕様差の内容は省略、
01YMﾍｯﾄﾞは02YMﾍｯﾄﾞに組替えられ仕様統合される前提です。

	構成内容	備考
一般回路		精度=126±4.5℃(実力値) 水温センサ精度×メーター精度
マスター抵抗法による各部の見直し	①126℃ピッタリセンサ-作製:126℃でマスター抵抗値を示すセンサーセット作製:Rx2にてｱｼﾞｬｽﾄ 	・ピッタリセンサーはJPNメーカーにて作製し実機のセンサーと組替える ・メーターｱｼﾞｬｽﾄは実機にマスター抵抗を接続した状態でR/Z指針ｱｼﾞｬｽﾄを行う
	②メーターR/Z指針ｱｼﾞｬｽﾄ:R/Z入口をマスター抵抗値で指示するようｱｼﾞｬｽﾄ抵抗を選択挿入(ｻﾌﾞﾊｰﾈｽ):Rx1にてｱｼﾞｬｽﾄ  ＊ﾏｽﾀｰ抵抗(Rm=10Ω)は調整用治具扱い	＊実機にて126℃を再現させるのは容易でなく夫々の機能保証を取った形で組合わせた(マスター抵抗法の考え方)
完成機組込み状態		精度=126+4.5−0℃ 新水温センサトータル精度×R/Zｱｼﾞｬｽﾄメーター精度

MCA Trouble due to Broken Water Jacket Core

Durability test to determine the possibility of leading to the ultimate symptom and verification by disassembling engine after durability test

GMG	Chief	In charge
Ishii	Ishida	Sato

Original approved 2002/10/31

[Purpose] EH high-speed durability test has been conducted to establish whether the ultimate symptom (engine stop) will develop as a result of prolonged vehicle operation with the coolant being expelled due to overheating caused by blocked water jacket.

[Conclusion] During 100 hours of durability test, the vehicle developed no such trouble as to cause fatal damage to the engine. When the engine was disassembled, however, the engine was found presenting symptoms that were judged unacceptable for the engine to meet the durability requirements.

[Test specifications] Engine: Mass-produced by MCAF
Cylinder head: Coolant passages A & B blocked in both R and L cylinder heads
Coolant: Ultra radiator coolant of 50% concentration

[Test conditions] After 6.8 hours of vehicle operation in parade mode, EH high-speed durability test (4950rpm/min WOT) was conducted for 100 hours. (Vehicle operation in parade mode until coolant overflow reached saturation took 6.8 hours, and 1.3 liters of coolant (total capacity 3.2 liters) was overflowed during the 6.8 hour-period and 0.2 liters of coolant was overflowed during the following 100-hour period)

Temperature of each portion during EH durability test

	Temp. during durability test	Normal operating temp.
Plug seat temperature	196-204°C(#1)	133-160°C
Oil temperature (Drain)	84-160	119-128
Coolant temperature (Head outlet)	102-116	91-95
Coolant temperature (W/J Inlet)	65-77	-
Head coolant temp. sensor (R)	112-163	-
Head coolant temp. sensor (L)	127-161	-

Water jacket block locations (L cylinder head)

[Test results]

①Symptoms found

No	Part name	Symptom and problem	Possible cause	Judgment
1	Final drive gear	Pitching	Deterioration of lubricity of oil due to rise in oil temperature during operation	NG
2	#3 piston	Contact of top land	Rise in temperature of the top of piston due to loss of coolant in cylinder head water jacket	NG

No	Part name	Symptom and problem	Possible cause	Judgment
3	Connecting rod metal (#1~#6)	Strong contact	Deterioration of lubricity of oil due to rise in oil temperature during operation	NG
4	Crank journal metal (#1~#4)	Strong contact	Deterioration of lubricity of oil due to rise in oil temperature during operation	NG
5	Crank journal (#1~#4)	Strong contact #4 crank journal	Deterioration of lubricity of oil due to rise in oil temperature during operation	NG
6	Crank pin (#1~#6)	Strong contact #6 crank pin	Deterioration of lubricity of oil due to rise in oil temperature during operation	NG
7	Tappet clearance	Change in tappet clearance was +0.05mm max, though it ought to be within ±0.04mm according to the Maintenance Schedule requirement for 24,000km	Increase in tappet clearance due to sticking of carbon	NG

②Durability test data (Change with the lapse of time)

Temperature measuring points

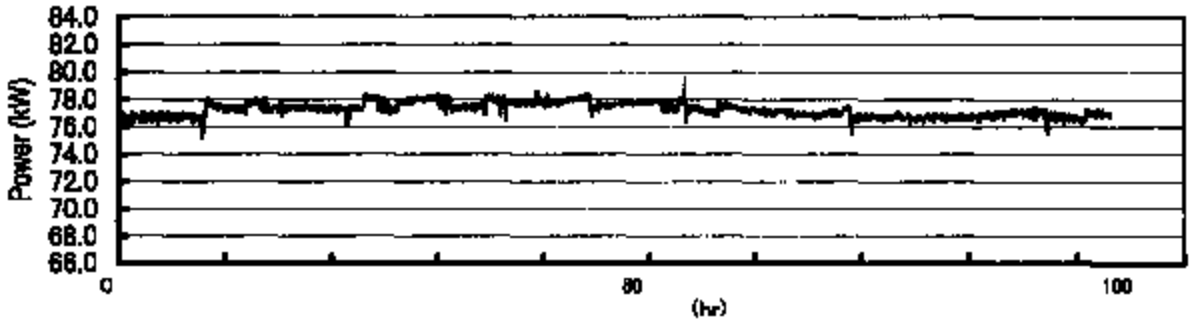
1) T. OIL MG ... Oil temperature at main gallery
2) T. W HEAD R ... Temperature at the position of R cylinder head that corresponds to coolant temperature sensor position of L cylinder head
3) T. W HEAD L ... Temperature at coolant temperature sensor position of L cylinder head
4) T. W Rad IN ... Coolant temperature at radiator inlet
5) T. W W/P IN ... Coolant temperature at W/P inlet
6) T. PLUG1–6 ... #1–#6 plug seat temperature

	[illegible]	Oil pressure (kPa)	T.OIL MG(°C)	T.W HEAD R(°C)	T.W HEAD L(°C)	T.W Rad IN(°C)	T.W W/P IN(°C)	T. OIL drain (°C)	Intake air temp. (°C)
MAX	79.5	512.0	157.4	163.0	161.1	118.1	76.9	149.8	39.9
MIN	75.1	298.0	100.1	112.1	126.6	101.8	64.9	94.0	28.3
AVERAGE	77.2	395.1	154.4	139.4	139.1	113.9	71.4	145.4	35.2

	T.PLUG 1(°C)	T.PLUG 2(°C)	T.PLUG 3(°C)	T.PLUG 4(°C)	T.PLUG 5(°C)	T.PLUG 6(°C)	[illegible]	Dry bulb temp. (°C)	Wet bulb temp. (°C)
MAX	204.0	191.2	194.9	197.1	164.7	176.0	1018.5	51.5	32.1
MIN	185.1	183.7	186.3	171.7	155.1	164.3	866.7	37.0	22.9
AVERAGE	189.7	172.7	172.5	184.6	168.9	171.9	1012.0	47.1	28.1

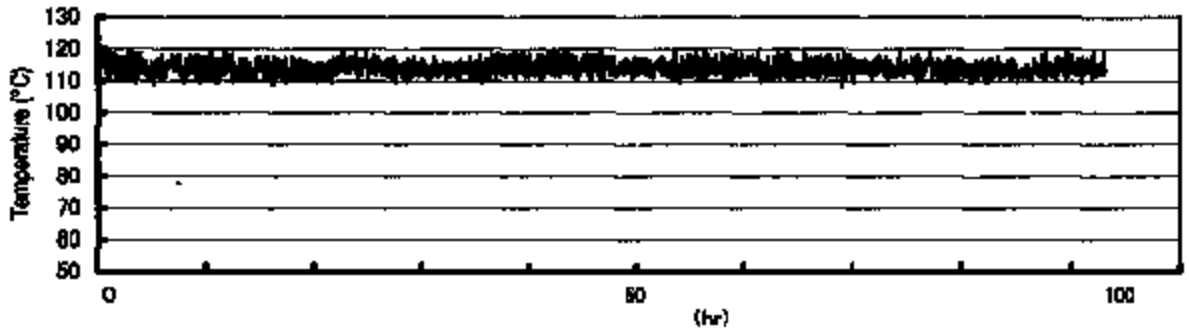
W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data

Power



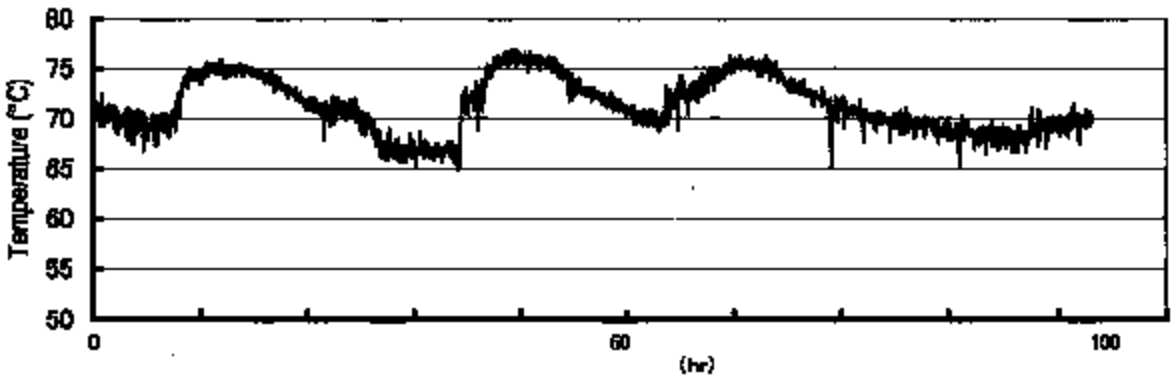
W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data

T.W Rad IN 1

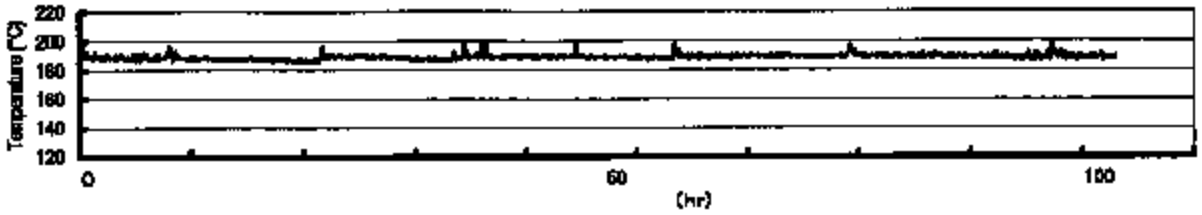


W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data

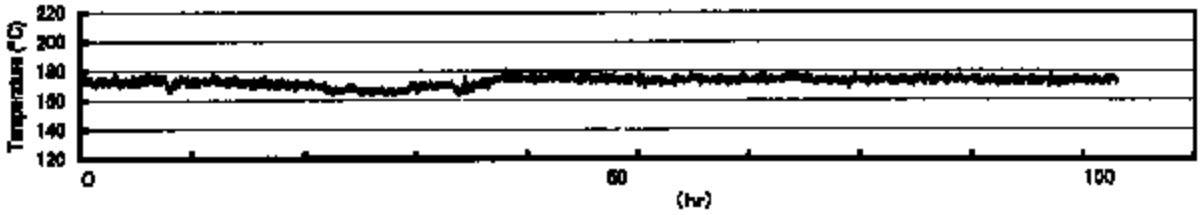
T.W W/P IN



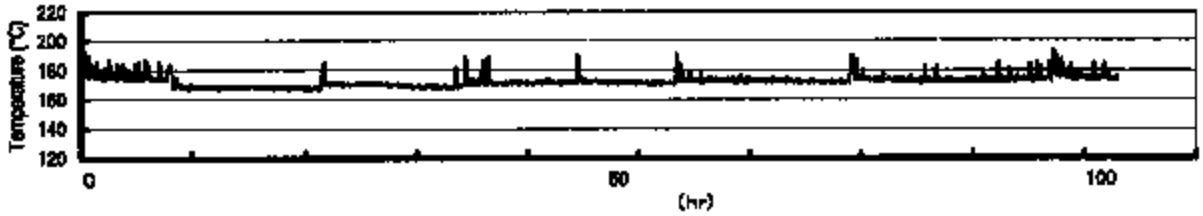
WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
T.PLUG #1



WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
T.PLUG #2



WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
T.PLUG #3



WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
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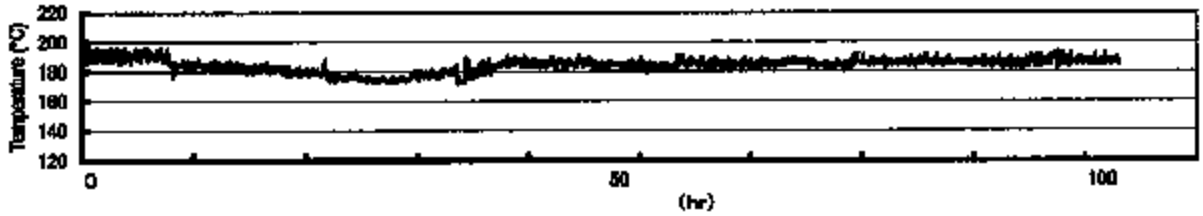

WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
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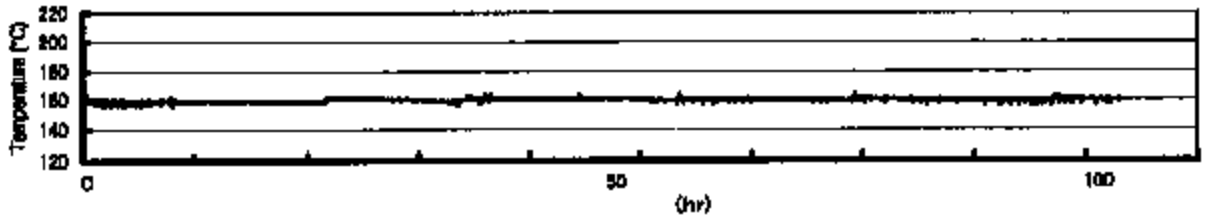
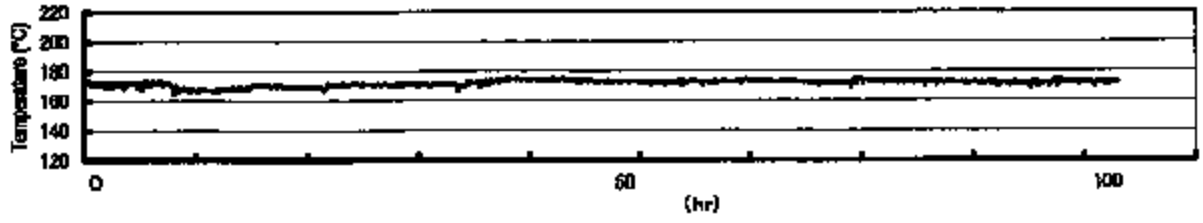
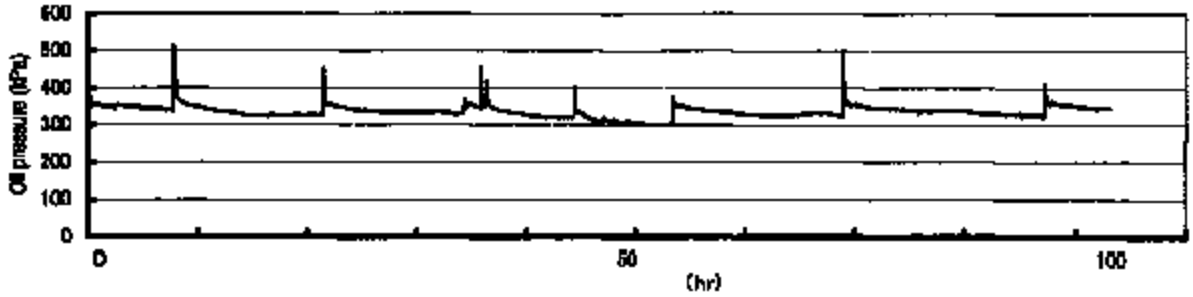


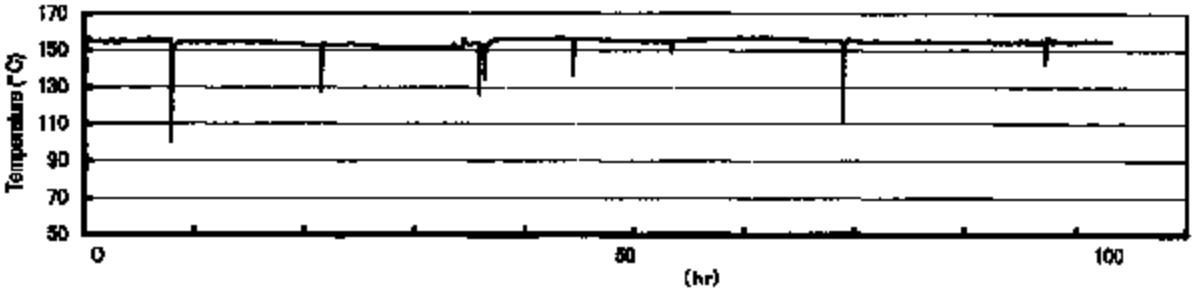
WU-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
T.PLUG #6



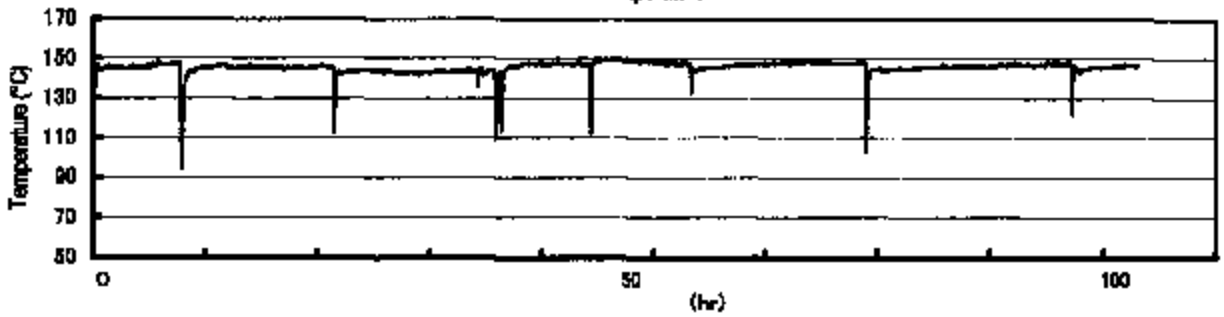
W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
Oil pressure



W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
MG oil temperature



W/J-blocked MCA vehicle's EH high-speed durability test (100 hrs) data
Drain oil temperature



Change in tappet clearance

	IN					
	#1	#2	#3	#4	#5	#6
0 hours	0.16	0.18	0.17	0.17	0.15	0.19
100 hours	0.17	0.19	0.2	0.19	0.15	0.19
Change	0.01	0.01	0.03	0.02	0	0
	EX					
	#1	#2	#3	#4	#5	#6
0 hours	0.24	0.23	0.23	0.23	0.21	0.24
100 hours	0.24	0.27	0.25	0.26	0.26	0.25
Change	0	0.04	0.02	0.03	0.05	0.01

Valve leak rate

cc/min	#1	#2	#3	#4	#5	#6
100 hours	851	863	418	1022	335	246

Valve leak should be not more than 300cc/min during ordinary durability test

Oil consumption

Durability test conducted this time		40
At MCA development	[illegible]	47.2
	[illegible]	66.3
	[illegible]	32

Radiator coolant level

Initial time	3.2
After operation in parade mode	1.9
After 100hrs of EH high-speed durability test	1.7

Operated until coolant overflow reached saturation (6.8hrs)

Tightness of each point

The requirement for decrease in torque was satisfied at all the major tightening points.

Change in tappet clearance

	IN					
	#1	#2	#3	#4	#5	#6
0 hours	0.16	0.18	0.17	0.17	0.15	0.19
100 hours	0.17	0.19	0.2	0.19	0.15	0.19
Change	0.01	0.01	0.03	0.02	0	0
	EX					
	#1	#2	#3	#4	#5	#6
0 hours	0.24	0.23	0.23	0.23	0.21	0.24
100 hours	0.24	0.27	0.25	0.26	0.26	0.25
Change	0	0.04	0.02	0.03	0.05	0.01

Radiator coolant level

Initial time	3.2
After operation in parade mode	1.9
[illegible]	1.7

Operated until coolant overflow reached saturation (6.8hrs

Tightness of each point

The requirement for decrease in torque was satisfied at all major tightening point

Oil consumption

Durability test conducted this time		40
At MCA development	[illegible]	47.2
	[illegible]	66.3
	[illegible]	62

Valve leak rate

cc/min	#1	#2	#3	#4	#5	#6
100 hours	851	863	418	1022	366	246

Valve leak should be not more than 300cc/min during ordinary durability tes

MCA W/J中子折れトラブル
最終事象確認耐久 ENG分解検証

GMG	主務	担当
石井	石田	佐藤

原紙承認済 2002/10/31

【目的】 W/J閉塞により高水温となり、水を吹き続けたまま走行した場合の最終事象の確認をEH高速耐久にて行う。

【結論】 耐久100時間でENGには致命傷(エンジンストップ)となるようなトラブルは発生せず。
(しかし、耐久要件上NGレベルとなる事象あり。)

【テスト仕様】 ENG:MCAF量産 ヘッド:R側AB閉塞 L側AB閉塞
クーラント:ウルトラフジエダ液 濃度50%

【テスト条件】 パレード走行相当を6.8時間運転後
EH高耐(4950r/min WOT) 100時間 実施
(パレード走行相当モードにて水噴き量がサブレートするまで運転→6.8時間、
全容量3.2ℓに対して吹き出し量1.3ℓ。100時間での吹き出し量は更に0.2ℓ)

EH耐久時各部温度

	耐久時温度	MCA開発時
プラグ座	196~204℃(#1)	133~160℃
油温(ドレン)	84~150	116~128
冷却水温度(ヘッド出口)	102~118	91~98
冷却水温度(W/P入口)	66~77	—
ヘッド水温センサ部(R)	112~163	—
ヘッド水温センサ部(L)	127~161	—

W/J閉塞部位(Lヘッド)

【テスト結果】
①発生事象

No	部品名	事象及び問題点	推定原因	判定
1	ファイナルドライブギヤ	ピッチング	高油温下での運転による潤滑不良	NG
2	ピストン #3気筒	トップランド当り	ヘッドW/J内の冷却水が減少した事によりピストン頂頂部が温度上昇したため	NG

No	部品名	事象及び問題点	推定原因	判定
3	コンロッドメタル (#1～#6)	当り強い 	高油温下での運転による潤滑不良	NG
4	クランクジャーナルメタル (#1～#4)	当り強い 	高油温下での運転による潤滑不良	NG
5	クランクジャーナル (#1～#4)	当り強い クランクジャーナル#4	高油温下での運転による潤滑不良	NG
6	クランクピン (#1～#6)	当り強い クランクピン#6	高油温下での運転による潤滑不良	NG
7	タペットクリアランス	変化大 目標 《メンテスケジュール24000km相当で±0.04mm以下》のところ Max +0.05mm	カーボン噛みによるタペットクリアランス増加	NG

②耐久推移データ

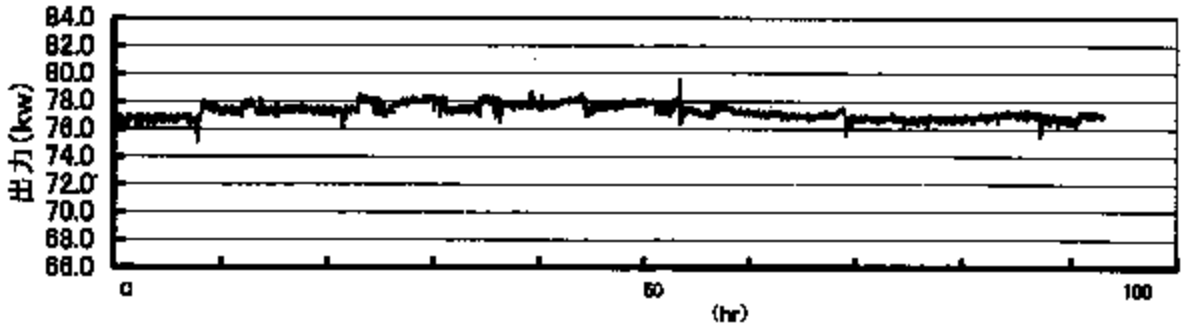
温度測定ポイント

1)T.OIL MG…メインギャラ油温
2)T.W HEAD R…R側ヘッド水温センサー部相当位置
3)T.W HEAD L…L側ヘッド水温センサー部位置
4)T.W Rad IN…ラジエタ入口水温
5)T.W W/P IN…W/P入口水温
6)T.PLUG1～6…プラグ座温#1～#6

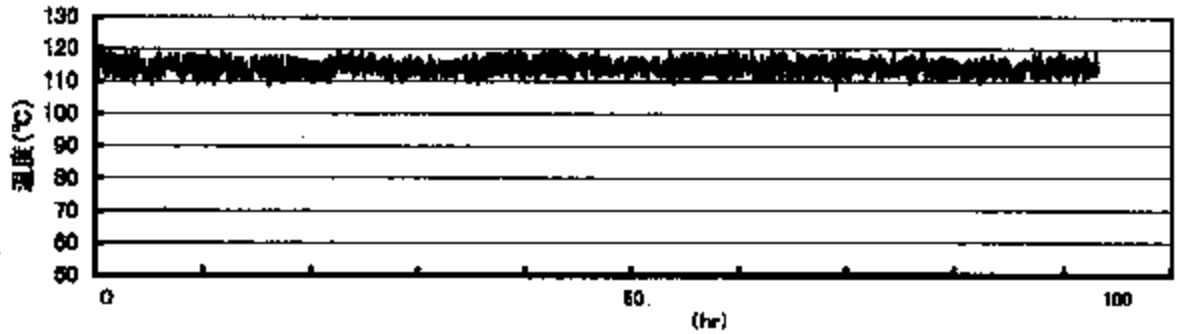
	検定軸出力(kw)	油圧(kPa)	T.OIL MG(℃)	T.W HEAD R(℃)	T.W HEAD L(℃)	T.W Rad IN(℃)	T.W W/P IN(℃)	T.OIL ドレン(℃)	吸気温度(℃)
MAX	79.6	512.0	157.4	163.0	161.1	118.1	78.9	149.6	39.9
MIN	76.1	259.0	100.1	112.1	126.6	101.8	84.9	94.0	26.3
AVERAGE	77.2	335.1	154.4	158.4	138.1	113.9	71.4	145.4	35.2

	T.PLUG 1(℃)	T.PLUG 2(℃)	T.PLUG 3(℃)	T.PLUG 4(℃)	T.PLUG 5(℃)	T.PLUG 6(℃)	大気圧(Pa)	乾球温度(℃)	湿球温度(℃)
MAX	204.0	181.2	194.3	197.1	184.7	178.0	1018.3	51.5	32.1
MIN	185.1	183.7	186.3	171.7	155.1	164.3	998.7	37.0	22.9
AVERAGE	188.7	172.7	172.5	184.8	158.8	171.9	1012.0	47.1	28.1

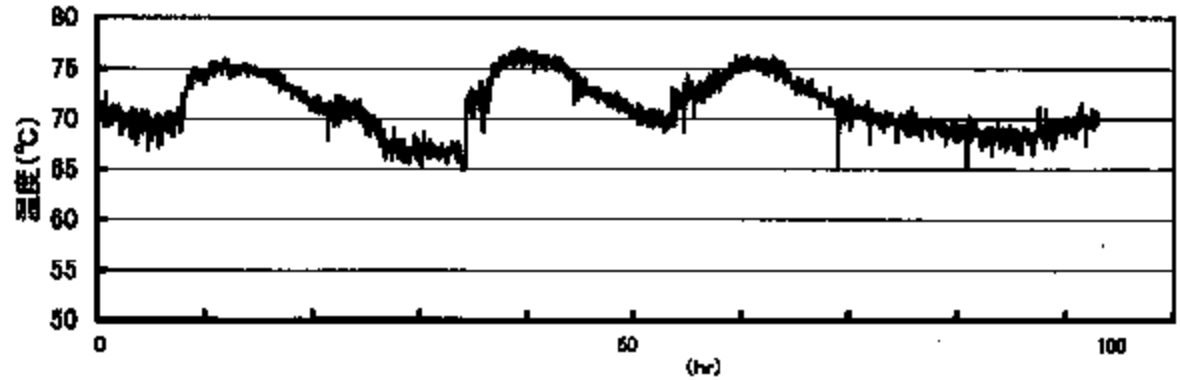
MCA W/J開塞品 EH高耐 100hr
出力



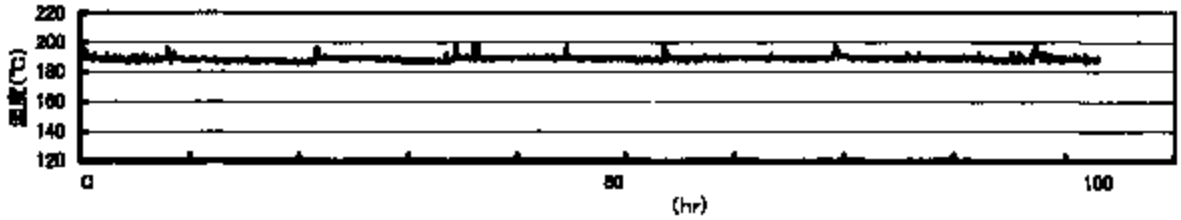
MCA W/J開塞品 EH高耐 100hr
T.W Rad IN 1



MCA W/J開塞品 EH高耐 100hr
T.W W/P IN



MCA W/J開発品 EH高耐 100hr
T.PLUG #1



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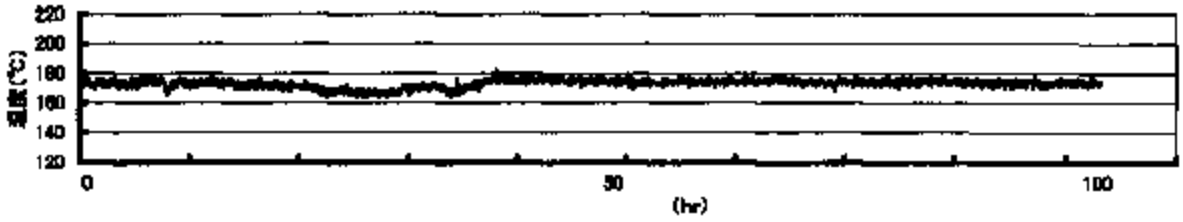

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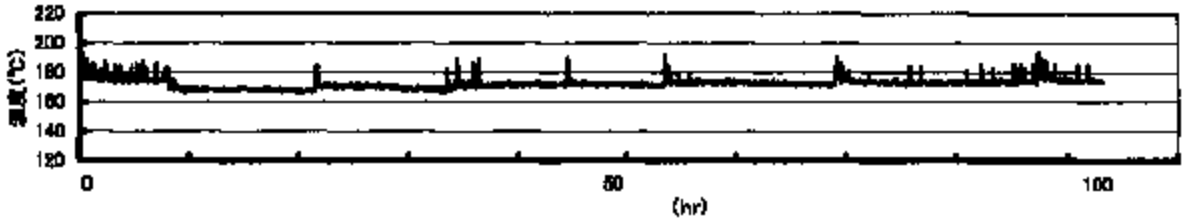

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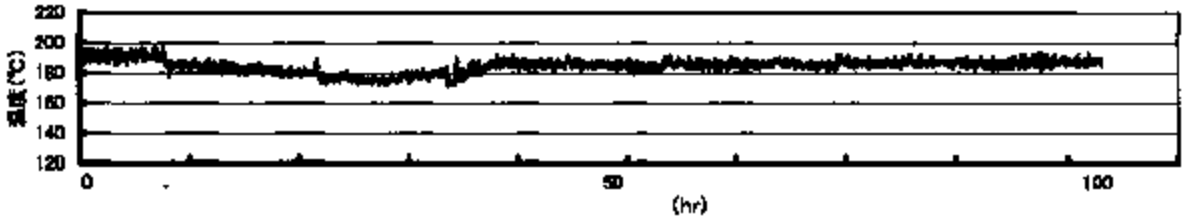
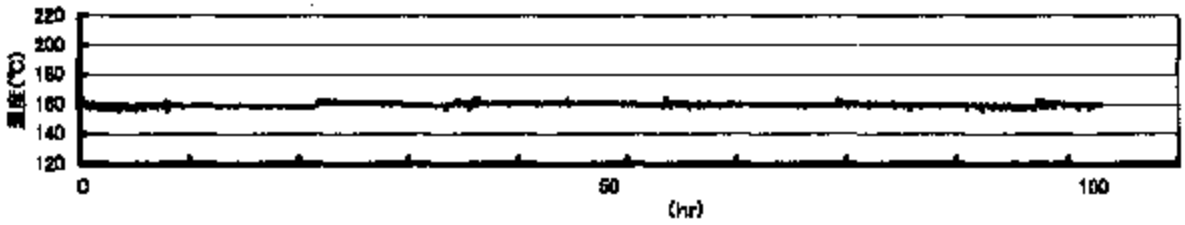
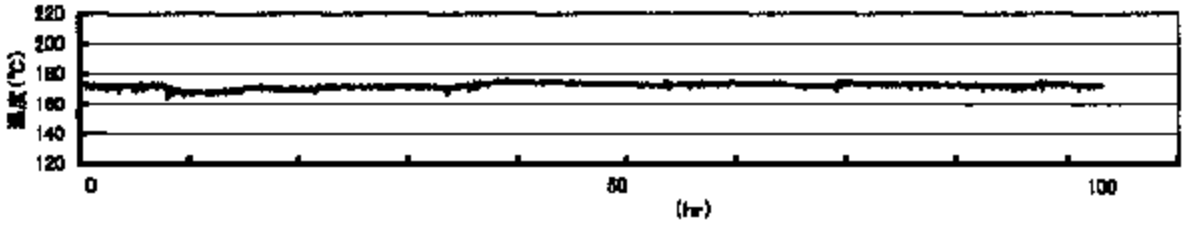


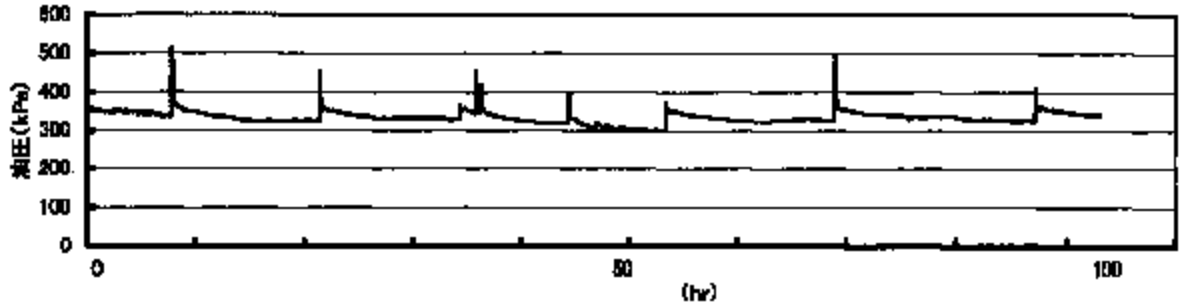
MCA W/J開発品 EH高耐 100hr
T.PLUG #5



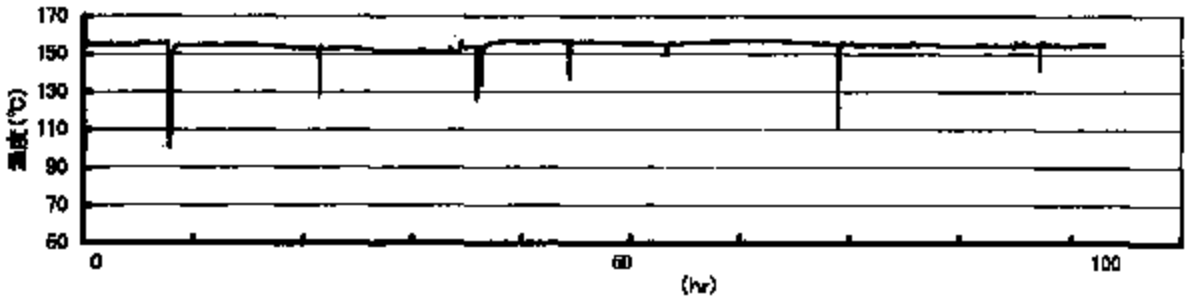
MCA W/J開発品 EH高耐 100hr
T.PLUG #6



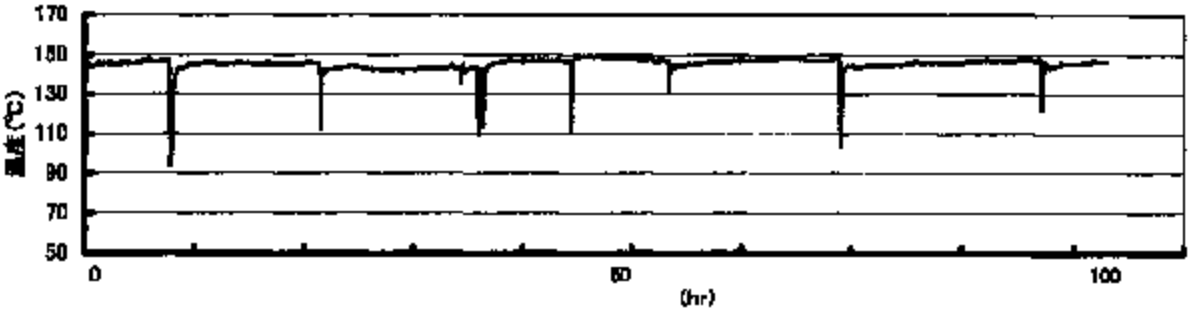
MCA W/J開発品 EH高耐 100hr
油圧



MCA W/J開発品 EH高耐 100hr
MG油温



MCA W/J開発品 EH高耐 100hr
ドレン油温



絞り径変化

	IN					
	#1	#2	#3	#4	#5	#6
0時間	0.16	0.16	0.17	0.17	0.16	0.19
100時間	0.17	0.19	0.2	0.19	0.16	0.19
変化	0.01	0.01	0.03	0.02	0	0
	EX					
	#1	#2	#3	#4	#5	#6
0時間	0.24	0.23	0.23	0.23	0.21	0.24
100時間	0.24	0.27	0.25	0.26	0.26	0.25
変化	0	0.04	0.02	0.03	0.05	0.01

ポンプリーク量

cc/min	#1	#2	#3	#4	#5	#6
100時間	351	303	418	1022	356	248

通常の耐久にて300cc/min以下

オイル温度

今回の耐久		40
MCA開発時	US高耐	47.2
	R/Z	56.3
	EH高耐	52

ラジエター温度

初期	3.2
パレード指導モード後	1.9
EH高耐100hr後	1.7

吹き出し量がサチレートするまで運転(0.6hr)

全部締付
主要締付箇所は要件のトルクダウン率を満足している。

ﾊﾞﾙﾌﾞ別摩耗

	IN					
	#1	#2	#3	#4	#5	#6
0時間	0.16	0.18	0.17	0.17	0.15	0.19
100時間	0.17	0.19	0.2	0.19	0.18	0.19
変化	0.01	0.01	0.03	0.02	0	0
	EX					
	#1	#2	#3	#4	#5	#6
0時間	0.24	0.23	0.23	0.23	0.21	0.24
100時間	0.24	0.27	0.25	0.26	0.26	0.25
変化	0	0.04	0.02	0.03	0.05	0.01

ﾗｼﾞｴﾀｰ流量

初期	3.2
ﾊﾚｰﾄ制御ﾓｰﾄﾞ後	1.9
EH高耐100hr後	1.7

吹き出し量がﾊﾚｰﾄするまで運転(6.8hr)

焼嵌締付

主要締付箇所は要件のﾄﾙｸﾀﾞｳﾝ率を満足している。

ｵｲﾙ粘度

今回の耐久		40
MCA開発時	US高耐	47.2
	R/Z	86.3
	EH高耐	52

ﾊﾞﾙﾌﾞﾘｰｸ量

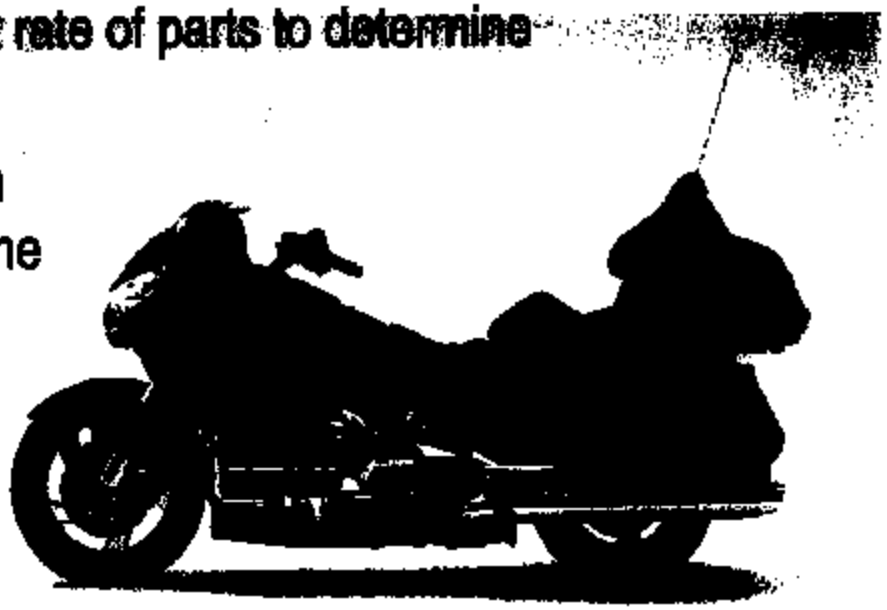
cc/min	#1	#2	#3	#4	#5	#6
100時間	851	883	418	1022	355	248

通常の耐久にて300cc/min以下

GL1800 (01~03YM) Cooling System Problems

<Matters pointed out at Market Quality Information Investigative Commission held on October 28>

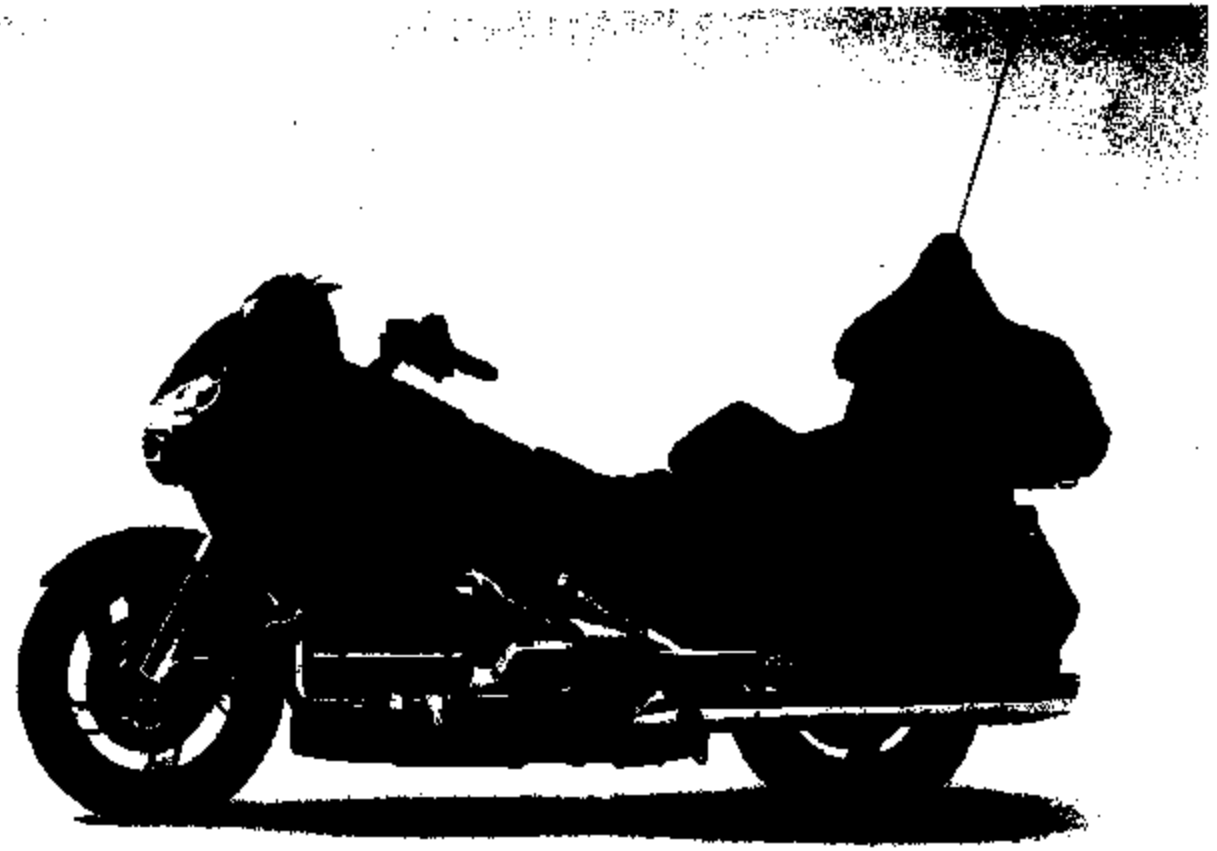
1. We were requested to review the defect rate of parts to determine whether to take market action.
2. We were requested to analyze the Tech Line information in detail and estimate the expected effect of the proposed measures against the cooling system problems.
3. We were requested to identify the grounds on which we determine whether the alleged defect is a safety-related defect.



Approval	Issuer
Nakamura	Kobayashi

GL1800 (01~03YM) Cooling System Problems

1. Structure of Cooling System
2. Occurrence in the Market
   Overview of Problems
3. Poor Cooling Performance
   at Low Speeds
4. Blocking of Cylinder Head
   Water Jacket
5. Blocking of Radiator
   Summarized Overview of
   Problems
6. Analysis to Determine
   Whether Factors Leading to
   Safety-related Defect Exist
7. Proposal of Market Action to
   Take
8. Chronology of
   Countermeasures

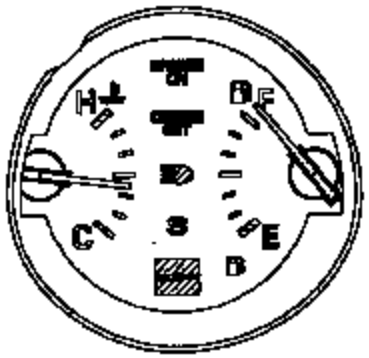


Materials for secondary report at Market Quality Information Investigative Commission

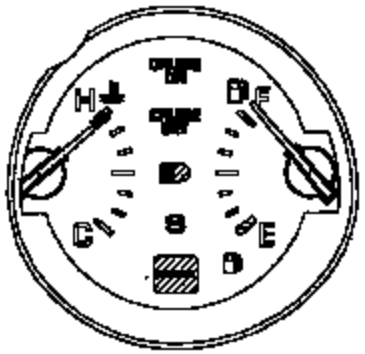
2002-11-01

Temperature gauge layout

[redacted]

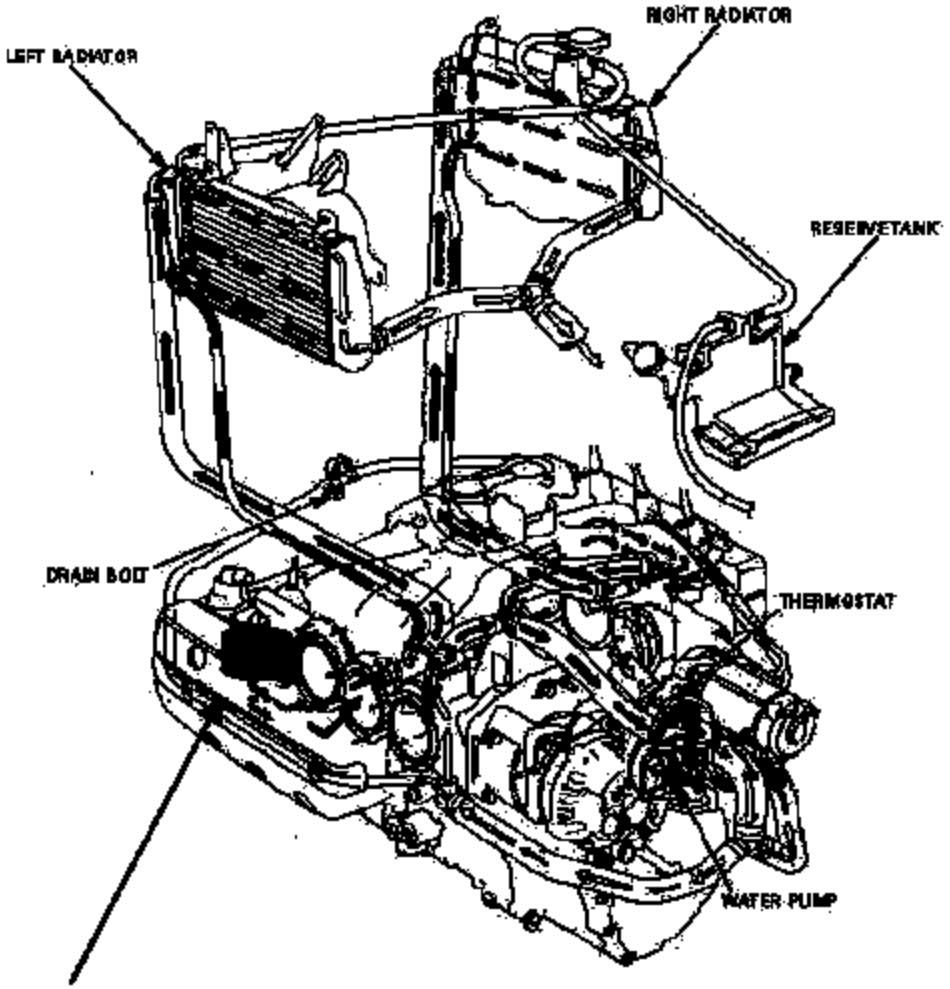


Indication during normal engine operation



When the pointer reached the red zone

Flow of coolant

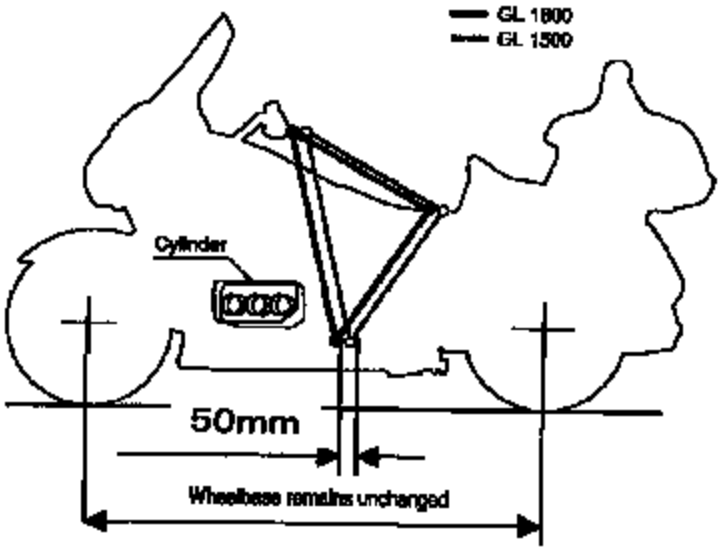


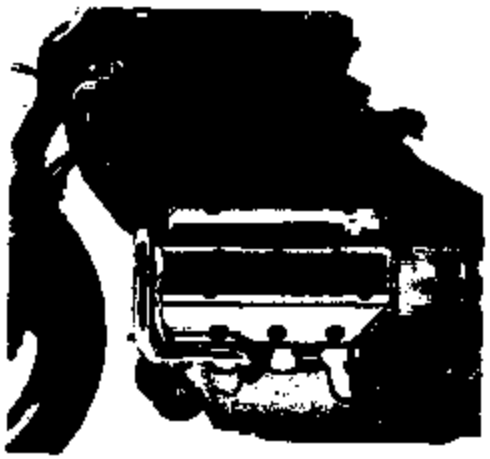
Coolant temperature sensor

1-2. Aim of Radiator Layout Change

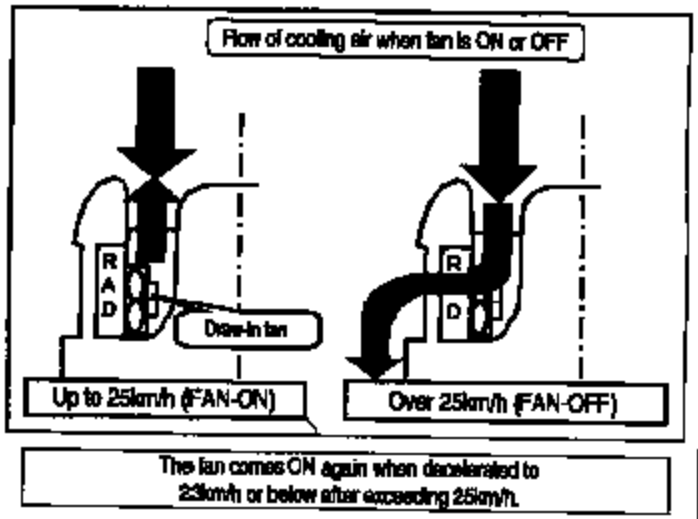
1. **In order to embody the concept of "motorcycle-like" GL in the MCA, we have adopted the "side radiator" layout for MCA and moved the engine mounting position forward for this purpose. This enabled us to move the riding position 50mm further forward than that of GL1500.**
2. **With regard to the air discharged from radiator, we viewed it from the aspects of rider's comfort (protection from hot air) and quietness, and designed in such a way that the air would be discharged by the internal fan in the forward direction and that the fan switch ON-OFF would be controlled according to vehicle speed (15mph).**

RIDING POSITION





AIR FLOW



2-1. Details

GL1800 (MCA)

[redacted] [redacted]

Issue of QIC/QID reports in all the world (TTL 16 complaints)

QIC NO	Place of occurrence	Model	Frame No.	Engine No.	Total distance traveled	Date of registration	Date of occurrence	Category	Alleged problem	Confirmation result R A	R B	R C	I A	I B	I C
	Japan (Tokyo)	2002	1000305	1000356	6700	2001/8/28	2002/8/20	3	Temperature gauge climbed above red zone during prolonged riding in stop-and-go traffic.						
	Japan (Tokyo)	2002	1000245	1000245	7579	2001/9/26	2002/8/29	3	Temperature gauge climbed above red zone during prolonged riding in stop-and-go traffic.	O	O	O	O	O	O
	Japan (Osaka)	2002	1000157	1000201	2586	2002/2/22	2002/7/26	1	Temperature gauge climbed above red zone when riding. Radiator was found stopped with foreign matter.	O	O	O	O	O	O
M2OH100	U.S.A	2002	101134	2102559	8000	2001/9/1	2002/9/9	1	Temperature gauge climbed above red zone when riding. Cylinder head was found having casting defect.				x	x	O
M2M115-1	U.S.A	2002	110786	2114235	20		2002/6/11	2	Temperature gauge climbed above red zone when riding at low speeds (25-30km/h).						
2IH2001041	Italy	2001	169	2008805	1000	2001/4/19	2001/4/20	3	Temperature gauge indicated high temperature when riding at low speeds (15-20km/h).						
M1M067	U.S.A.	2001	48	2000199	12000		2001/8/27	3	Overheated on uphill road or in slow-moving traffic in urban area.						
2SH2001005	Switzerland	2001	33	2006815	1200	2001/3/28	2001/7/29	3	Overheated when climbing 15km mountain road at 30km/h.						
2MH2001048	Spain	2001	723	2008652	90	2001/5/25	2001/8/9	3	High temperature was indicated when riding at low speeds.						
2HVC-2002001	Venezuela	2002	100223	2100344		2001/8/6	2001/8/15	3	Temperature gauge indicated hot range.						
M2MOH028	U.S.A	2002	101162	2102592	1081	2001/8/10	2001/8/21	3	Temperature gauge indicated red zone.				x	O	O
M3M009	U.S.A	2003	200179	2201288	1200	2002/7/23	2002/8/1	2	Cylinder head was found having casting defect.				x	x	O
M3M011	U.S.A	2003	202304	2203050	447	2002/8/23	2002/9/5	2	Cylinder head was found having casting defect.				O	O	O
M2M115-2	U.S.A	2002	109003	2111995	10241	2002/5/31	2002/9/24	2	Cylinder head was found having casting defect.				x	O	O
M3M011-1	U.S.A	2003	202623	2203244	5	2002/9/28	2002/10/7	3	High temperature was indicated when riding at low speeds.	O	O	O			
2EH2002059	Germany	2002	100840	2114449	8000	2002/4/14	2002/9/17								

Complaints in the US : Tech Line/NHTSA information

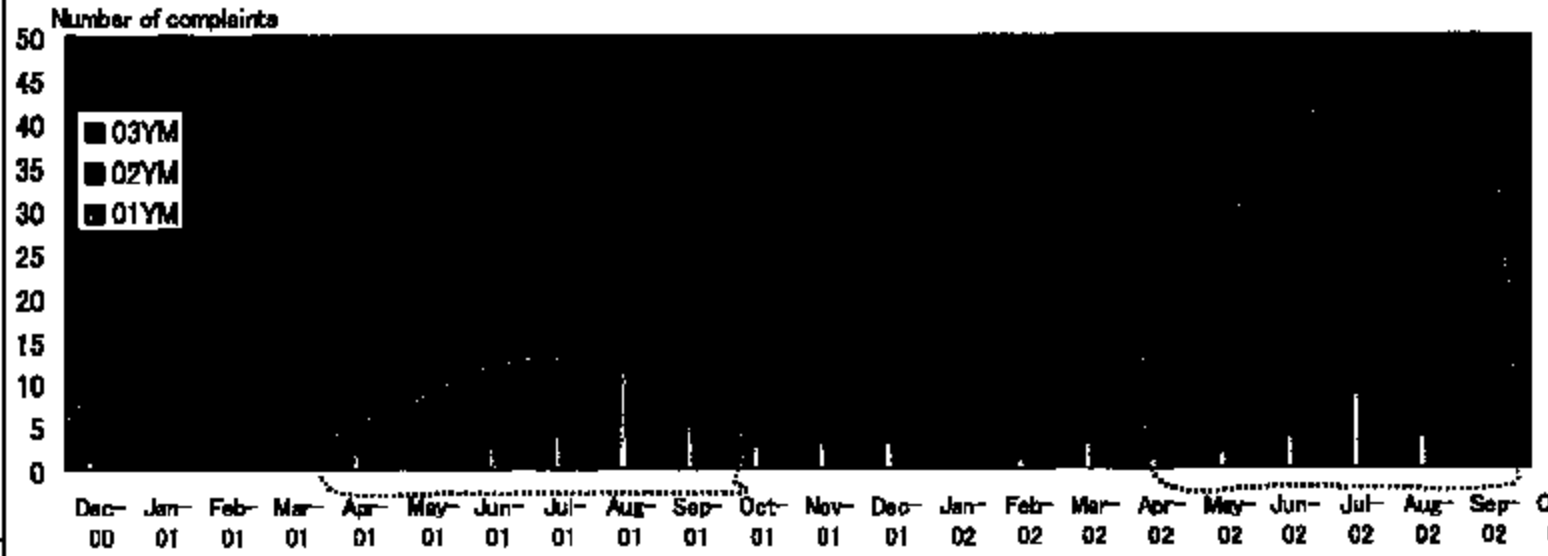
	01YM	02YM	03YM	Total
NHTSA	15	36	6	57
TEC/CR/QIC	129	217	19	365
			Grand total	422

[redacted]

2-2. Occurrence in the Market

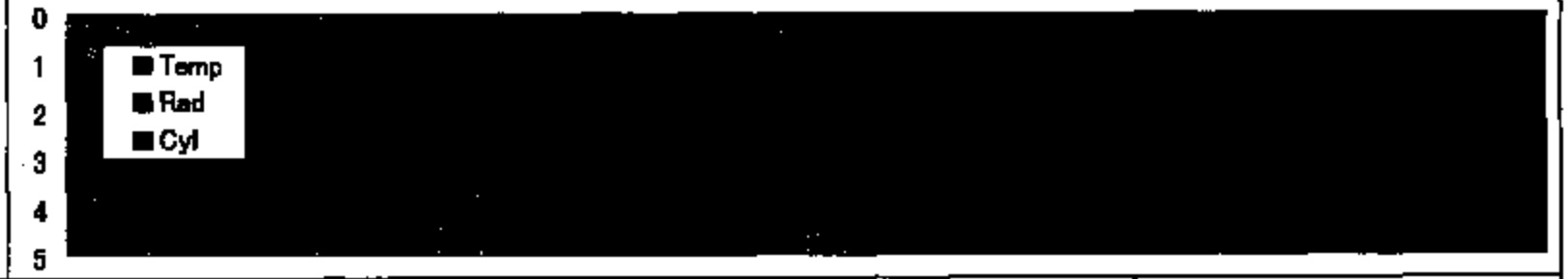
Complaints received by Tech Line
'01 = 60 complaints
'02 = 107 complaints
'03 = 5 complaints
TTL = 172 complaints

As of 10 SEP 2002



QIC/QID reports issued (in all the world)

As of 24 OCT 2002



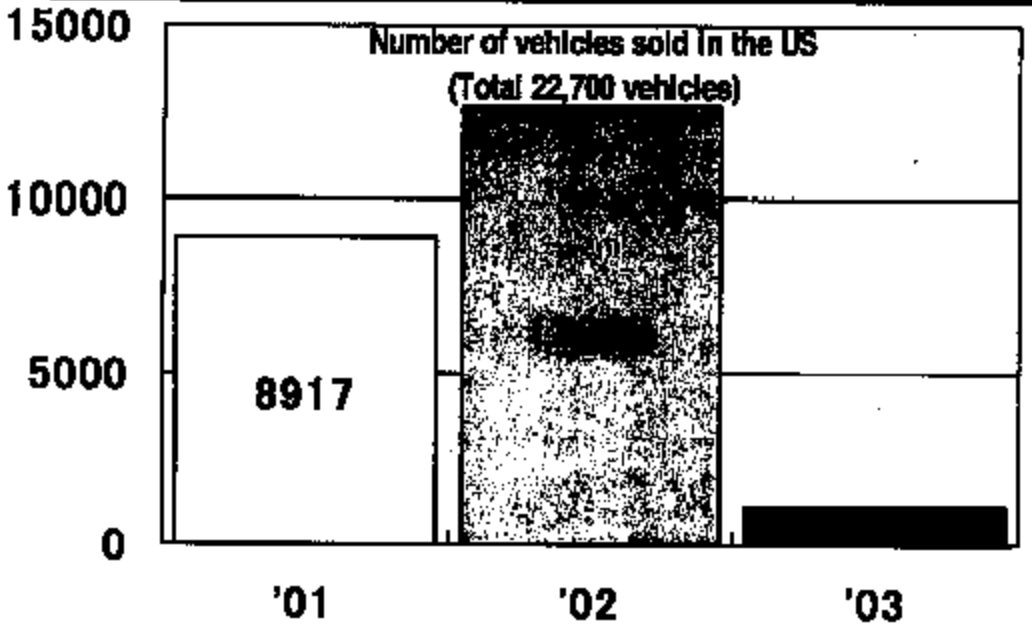
YM	01	02	03
Number of vehicles sold	13,194 vehicles	16,100 vehicles	

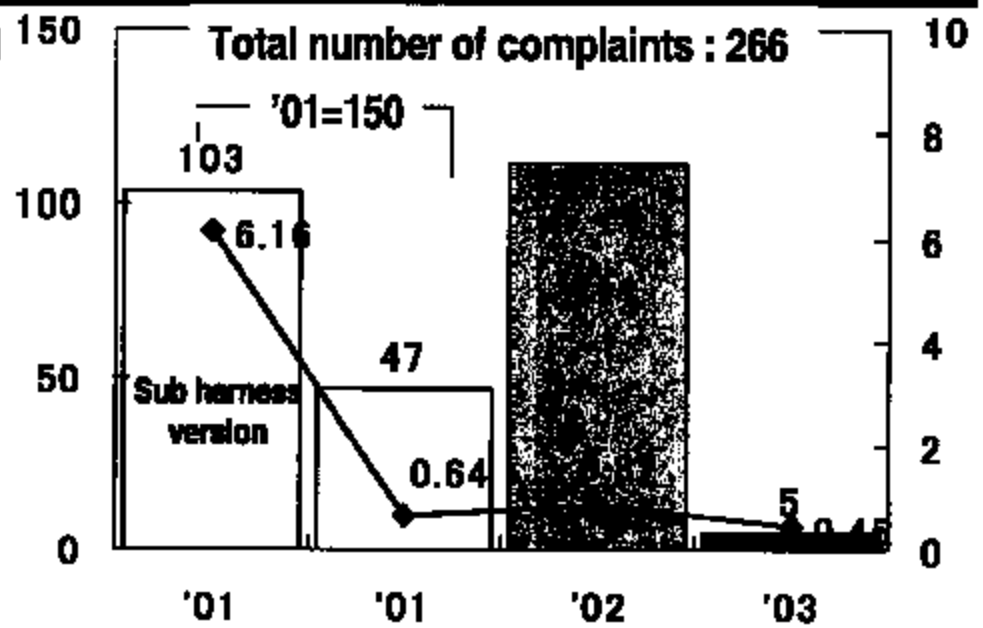
Comment

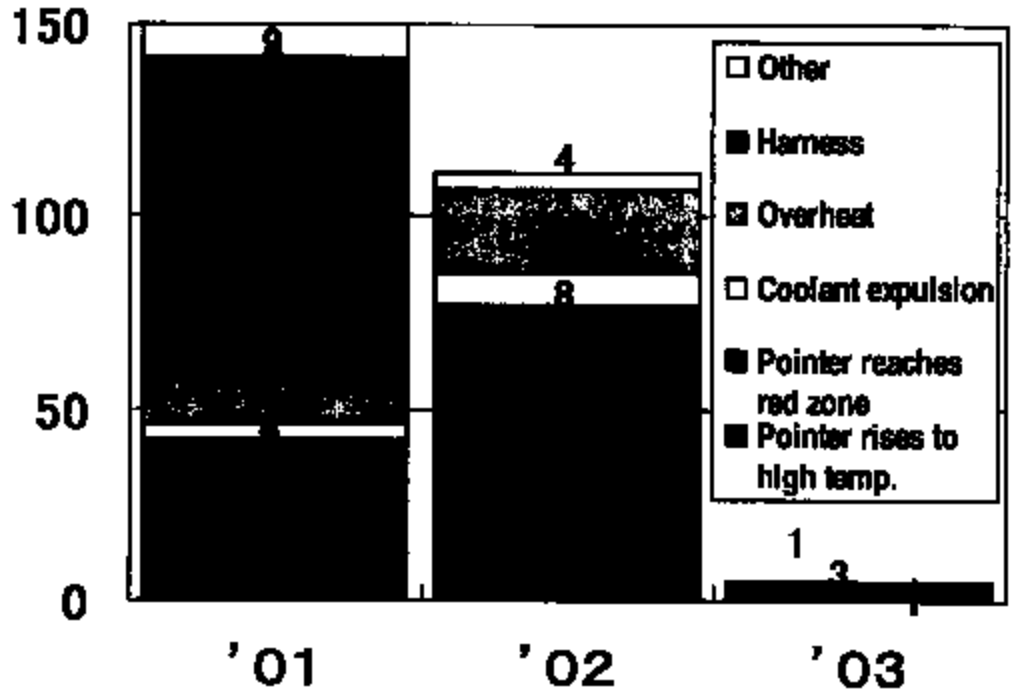
- **Both '01YM and '02YM received more complaints in summer than in other seasons.**
- **'03YM received the fewest complaints among the three.**

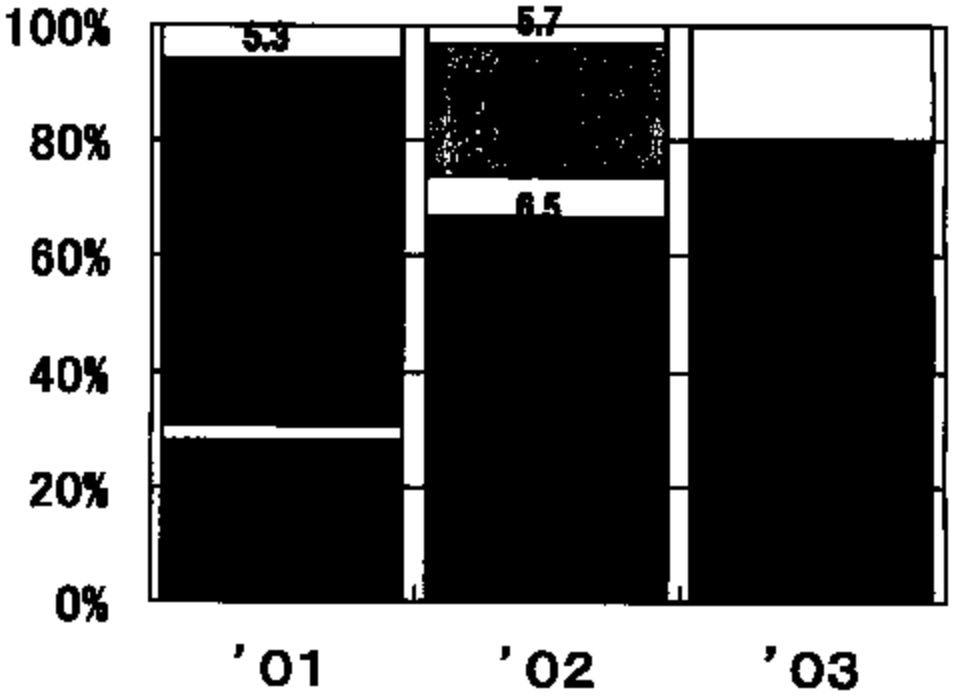
GL1800(MCA)

2-3. Occurrence in the Market



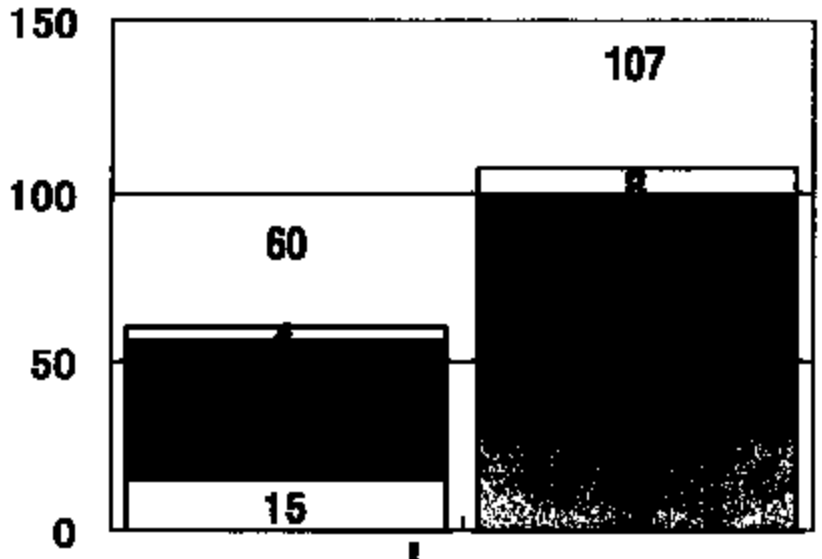




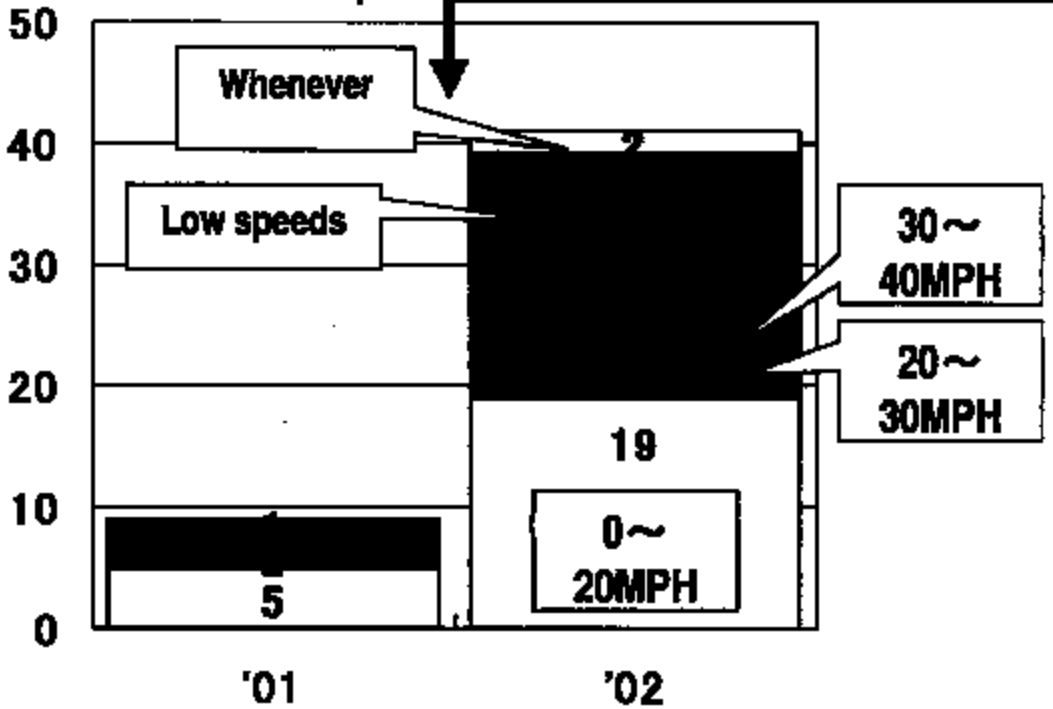


2-4. Occurrence in the Market

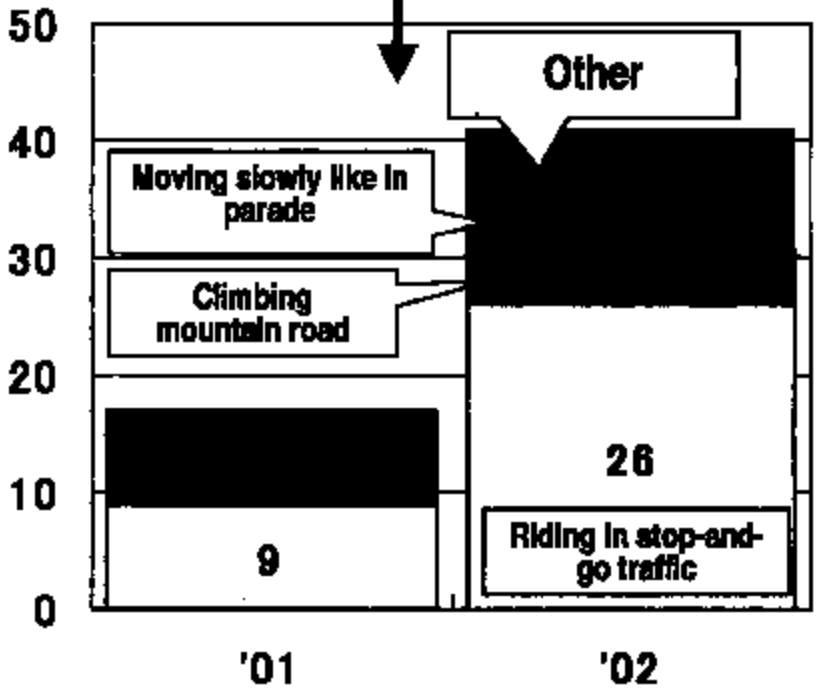
Number of complaints related to coolant temperature received by Tech Line : 167 ('01 and '02 total)



Occurrence speed

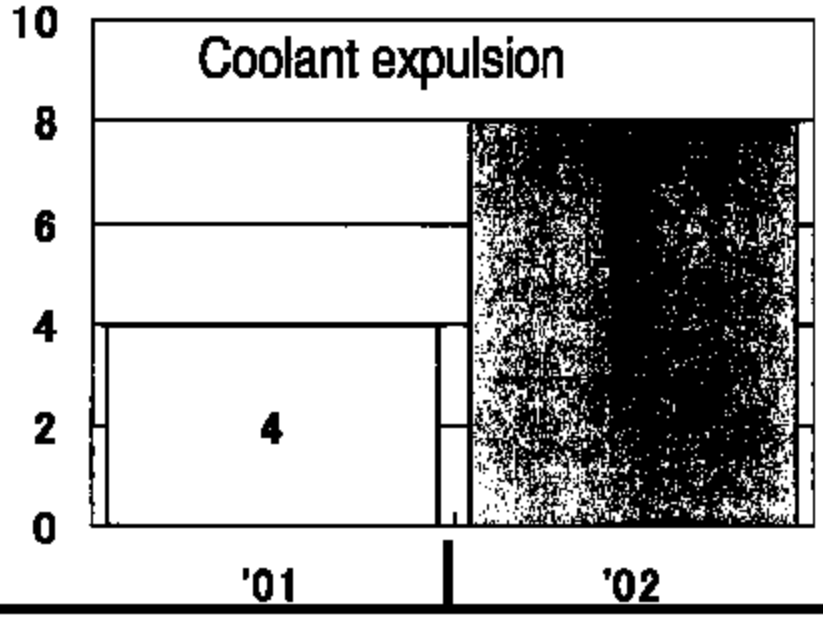


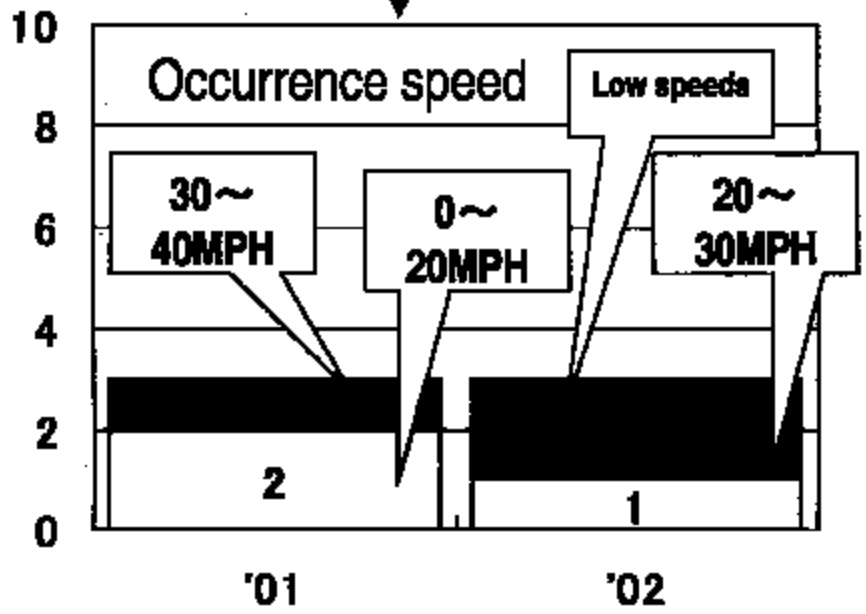
Occurrence situation

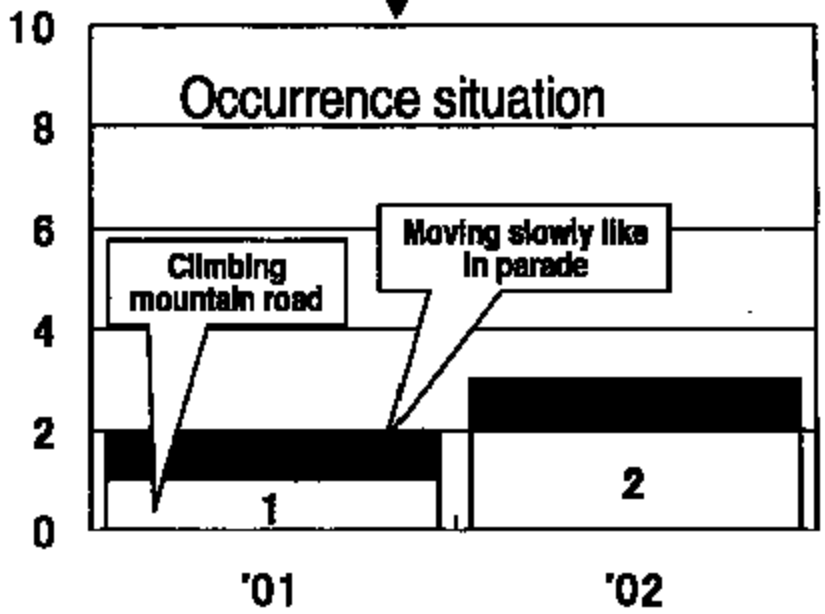


2-5. Occurrence in the Market

Number of complaints about coolant expulsion : 12

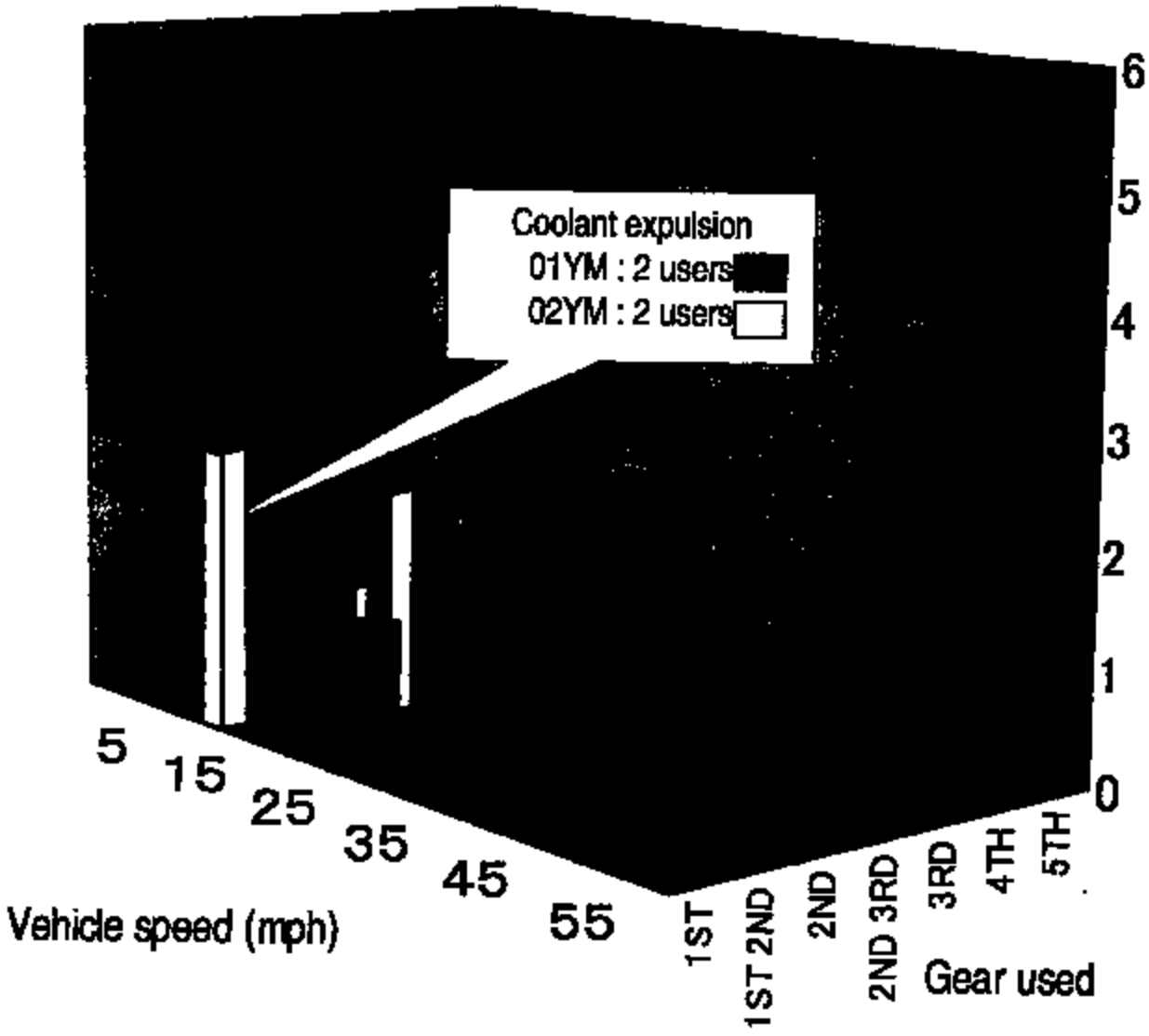




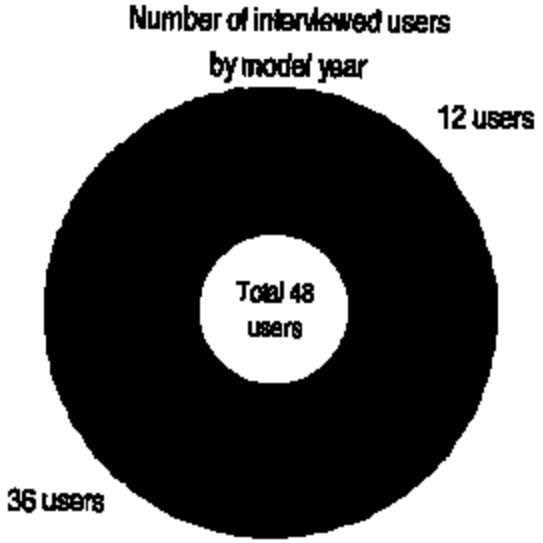


2-6. Occurrence in the Market

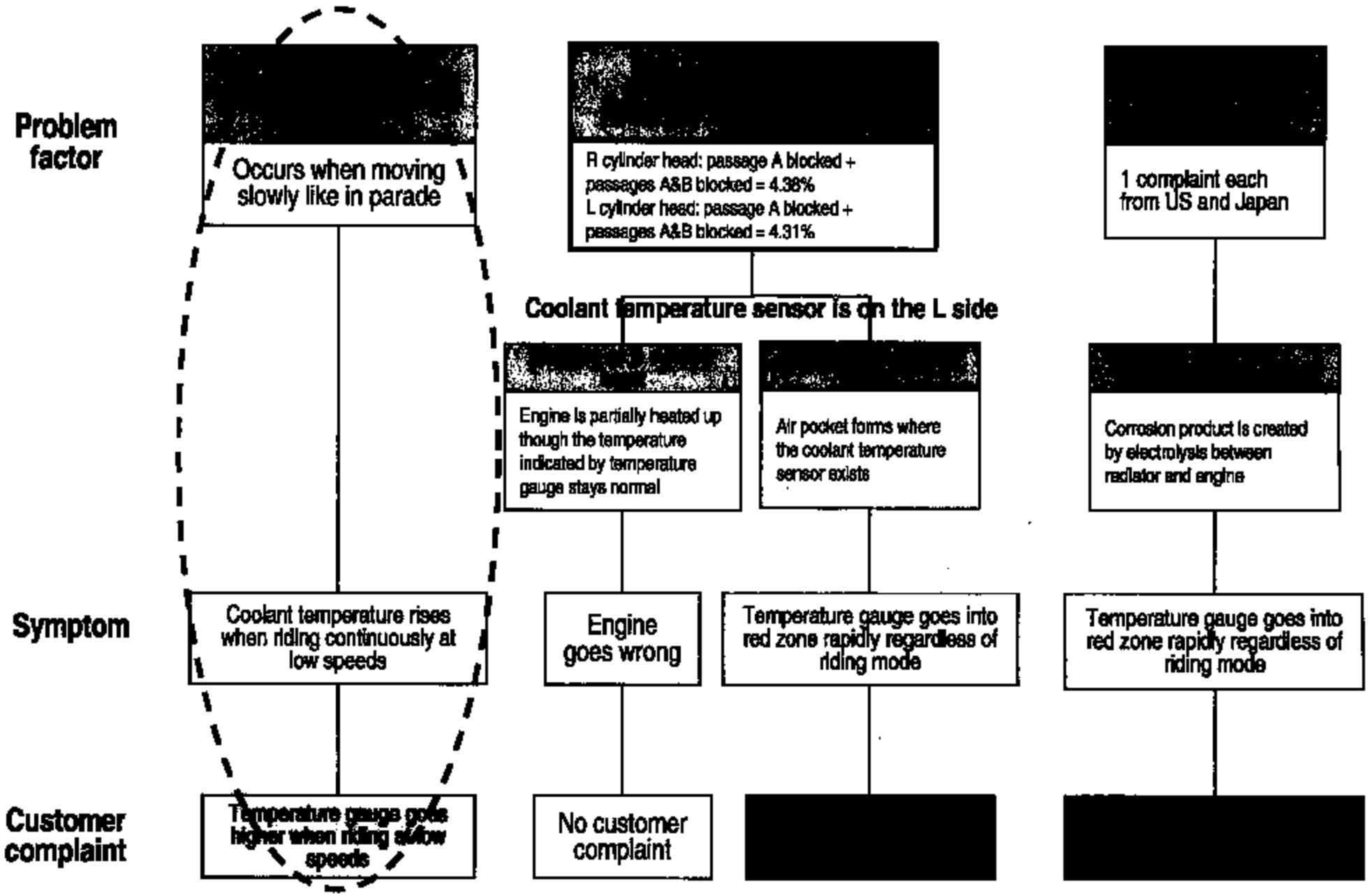
⟨Result of interview with users⟩



- Users have experienced cooling system problems mostly when riding at slow speeds from 10 to 20mph in 1st or 2nd gear.
- Though few in number, some users have also experienced cooling system problems when riding at mid-to-high speeds in 3rd, 4th or 5th gear.



GL1800(MCA) Overview of Problems



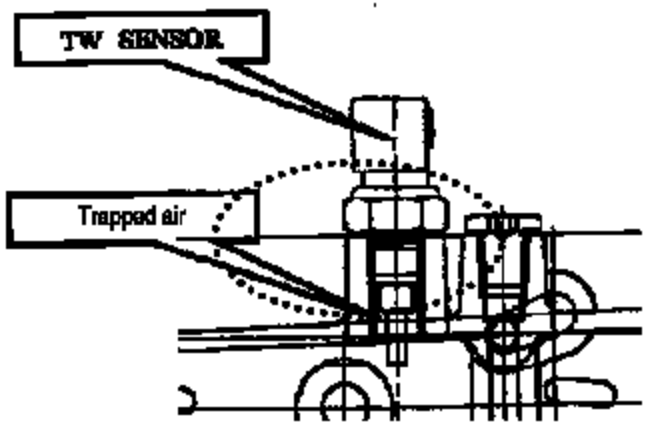
3-1. Poor Cooling Performance at Low Speeds

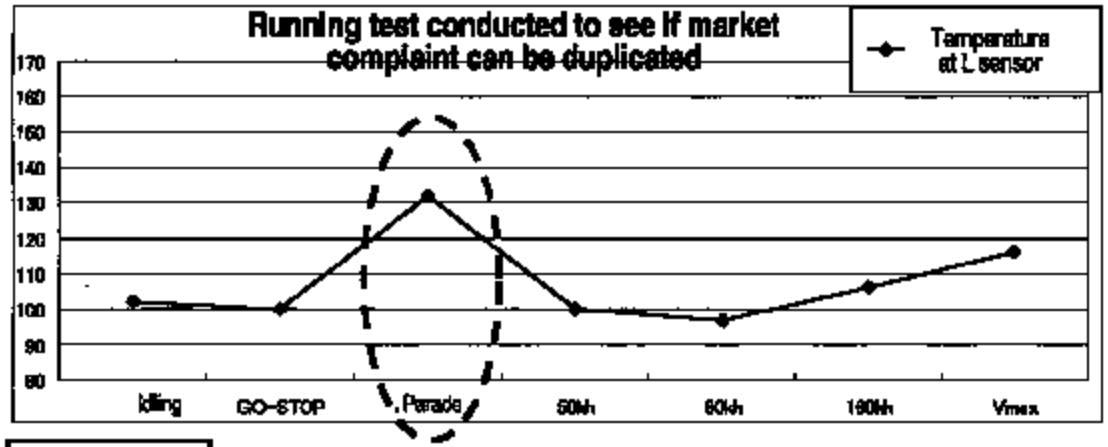
01 'YM **Red zone beginning temperature was set at 122°C (±4.5°C)**

- Air was trapped in the temperature detecting area of the coolant temperature sensor, and this caused the temperature gauge to indicate higher temperature than actual. (The temperature gauge reached red zone at coolant temperature of 112°C)

⇒ As a countermeasure, the existing sub harness was replaced with a sub harness with a 2.7Ω resistor for vehicles that were off the line, and a fairing harness with a built-in 2.7Ω resistor was applied to vehicles on the line.

We conducted continuous running test at low speeds (which was not among the requirements), when we were aware that coolant temperature was high, however, we judged that prolonged vehicle operation in LOW gear would be not in normal usage.





02 'YM **Red zone beginning temperature was set at 122°C (±4.5°C)**

- Coolant temperature sensor area of the cylinder head was modified to prevent air from being trapped.

For Japanese version, red zone beginning temperature was set at 126°C in consideration of traffic congestion.

03 'YM **Red zone beginning temperature was set at 126°C (±4.5°C)**

04 'YM **Same as '03YM**

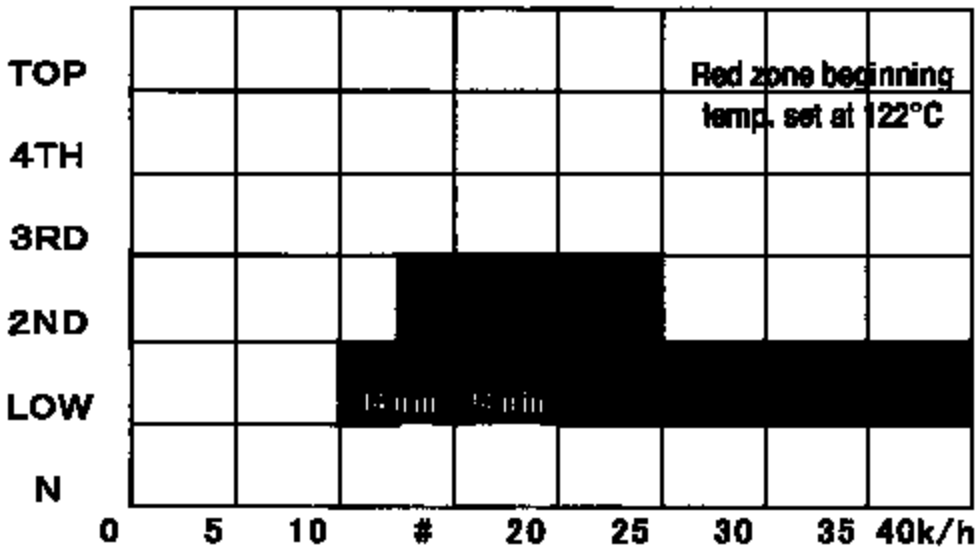
[redacted]

3-2. Poor Cooling Performance at Low Speeds

《Effect of red zone beginning temperature change》

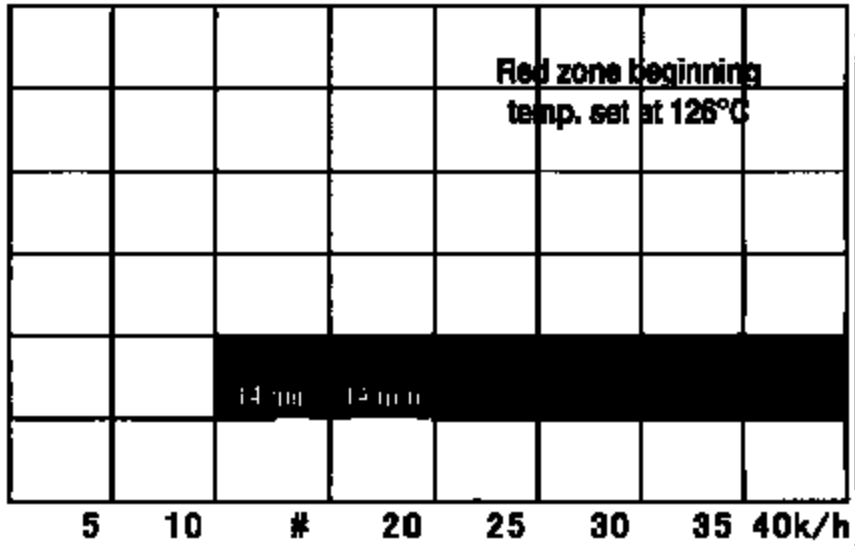
Conditions : In an atmospheric temperature of 35°C, continuously drive down a level road with the gear in LOW position, starting with the coolant at 100°C

01YM、02YM



R/Z Coolant expulsion

Remedial action for '03YM



+

Advise customers to use the 2nd gear position

3-3. Poor Cooling Performance at Low Speeds

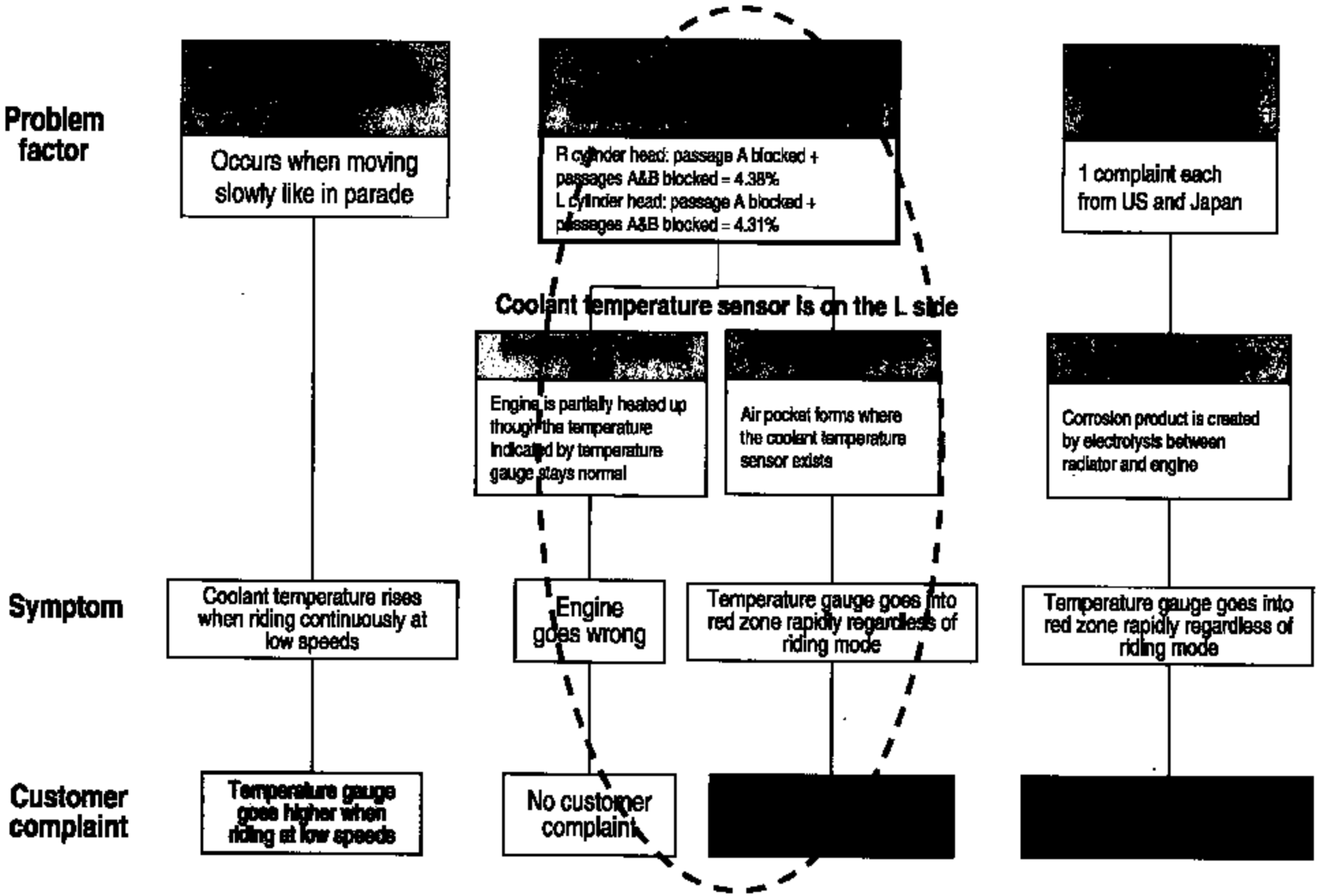
《Cooling system specifications for '05 and subsequent model-year vehicles (JBP)》

We judge the following specifications suit our purpose.

		JBP	MCAA ('01～'04)	As against base
Heat radiation of radiator		32.2kw	26.4kw	1.22 times larger
FAN	Flow	External draw-in fan	Internal draw-in fan	Quantity of airflow 2.7 times larger
	Diameter	φ210	φ157	
Motor revolving speed		3700rpm	3350rpm	

List of external changes

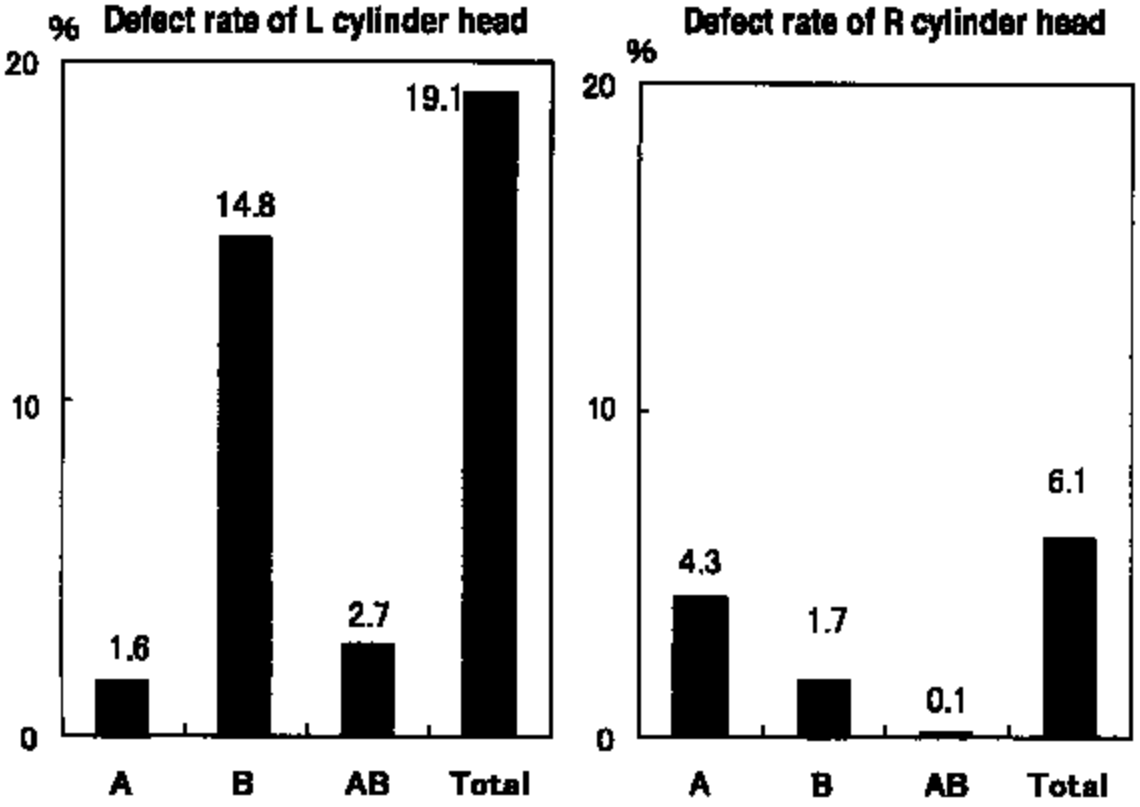
Overview of Problems



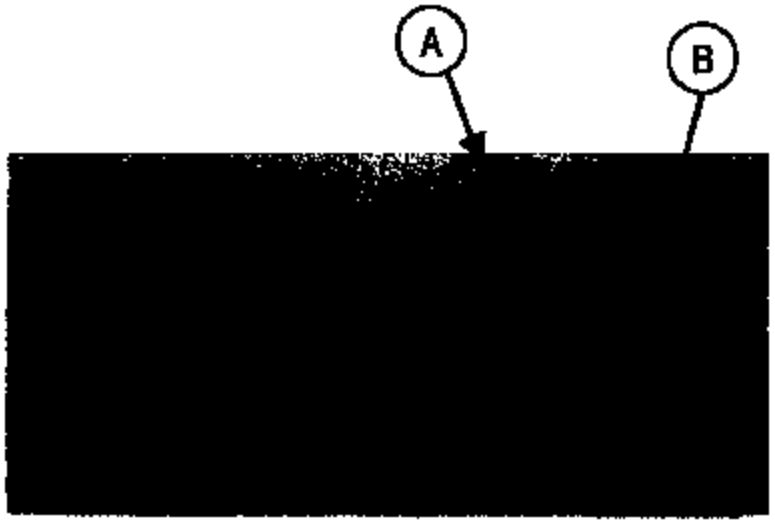
4-1. QIC that Started Suspicion about Blocking of Cylinder Head

	The first case ('02YM)	The second case ('03YM)
QIC No.	M2M115	M3M011
QIC issue date	September 3, 2002	September 6, 2002
Date of registration	Unsold	August 23, 2002
Date of occurrence	June 11, 2002	September 5, 2002
Total distance traveled	20 miles (32km)	447 miles (719km)
Frame No.	1HFSC47092A110786	1HFSC47073A202304
Symptom	After a few minutes of running at any speed, the temperature gauge would go into the red zone.	The temperature gauge indicates high temperature regardless of vehicle speed.
Investigation result	It was possible to duplicate the alleged symptom though there was no apparent irregularity.	The fan stays on at idling.

4-2. Defect Rate that is Possibly Affected by Blocking of Cylinder Head Water Jacket



	Number of parts inspected	Number of parts found defective
R cylinder head	5,544 pieces	337 pieces
L cylinder head	5,318 pieces	1,016 pieces
TOTAL	10,862 pieces	1,353 pieces



Rate of occurrence (%) of passage A and passages A & B block that can exert a great thermal influence

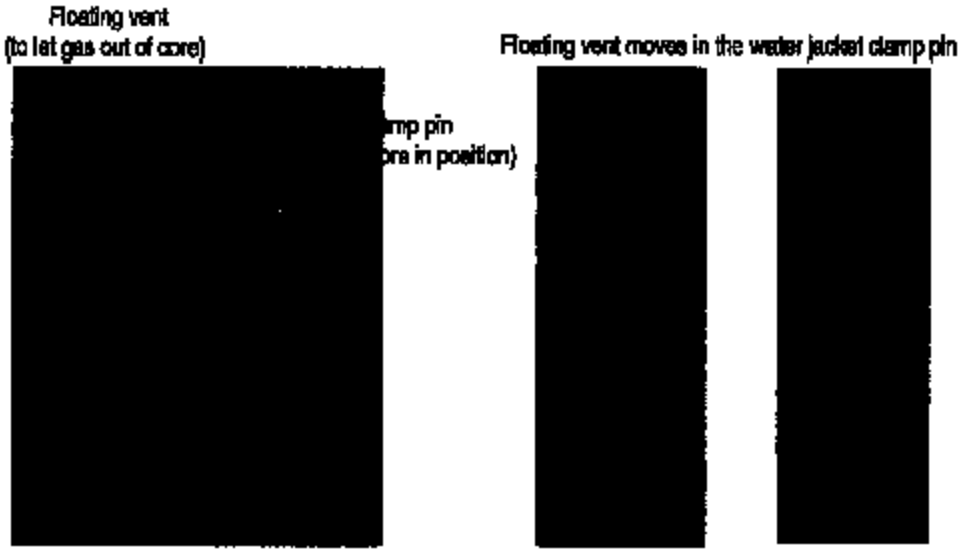
	A	AB	Total
L	1.60%	2.71%	4.31%
R	4.29%	0.09%	4.38%

4-3. Blocking of Cylinder Head Water Jacket

• Mechanism of water jacket core breakage due to floating problem

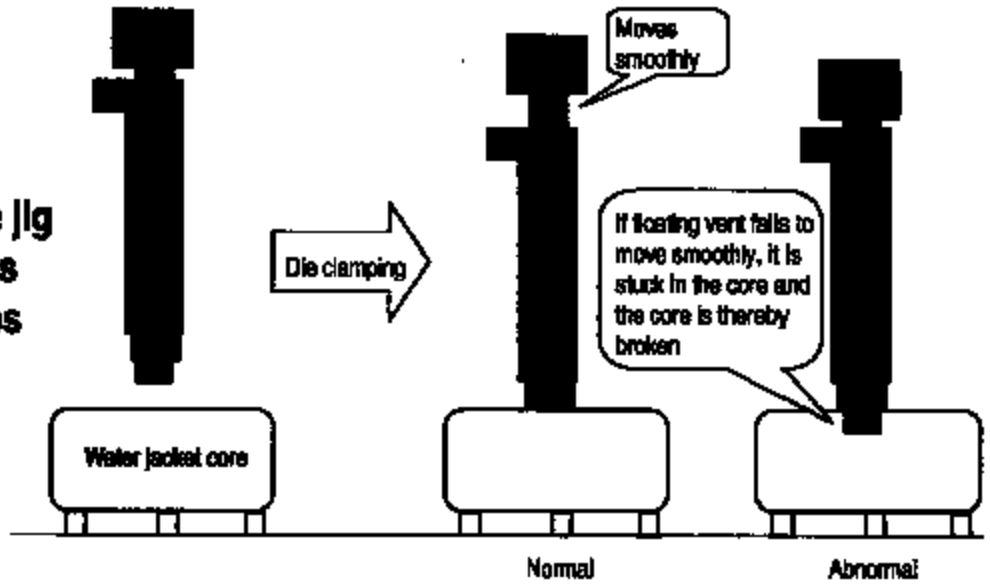
There has been no change since the floating vent was first applied (from '01YM)

It is impossible to determine which one is defective



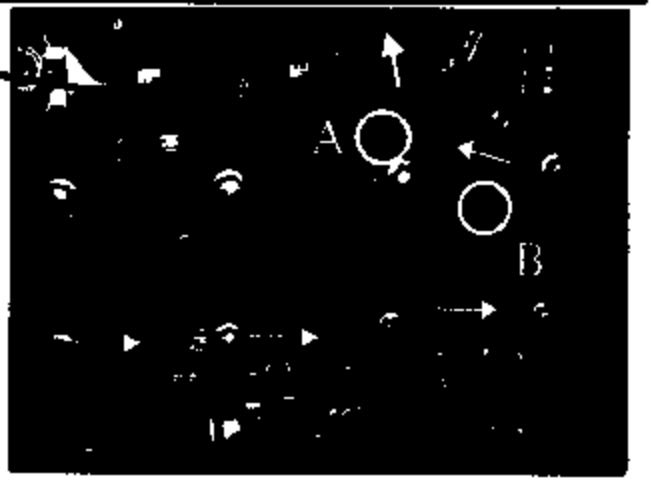
- Revised Operation Standard has been effective since September 12

  The obsolete version specifies that the jig should be checked when a problem has arisen, but the revised version specifies that the jig should be checked when unclamping die after every shot.



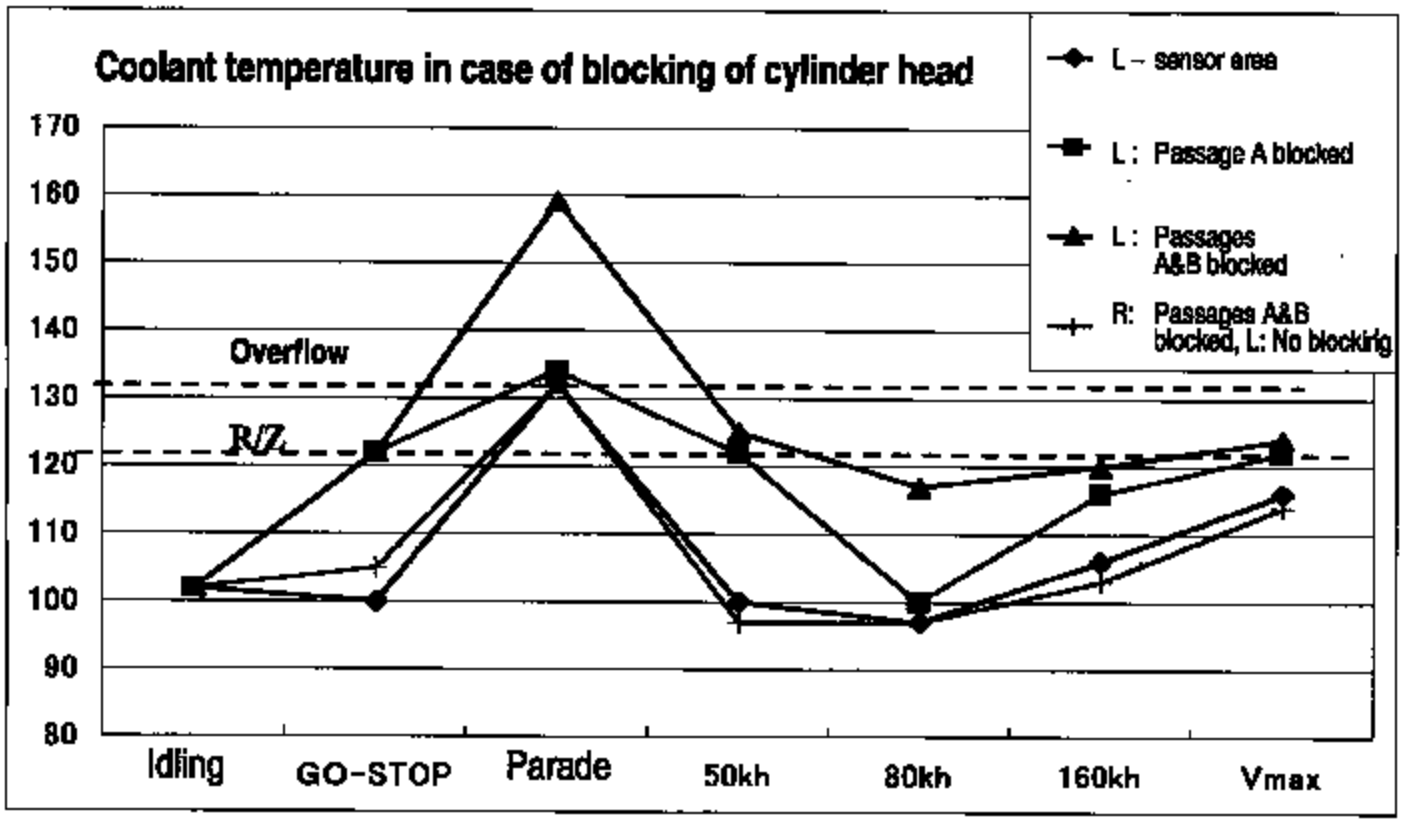
4-4. Blocking of Cylinder Head Water Jacket

Problems caused if the water jacket is blocked



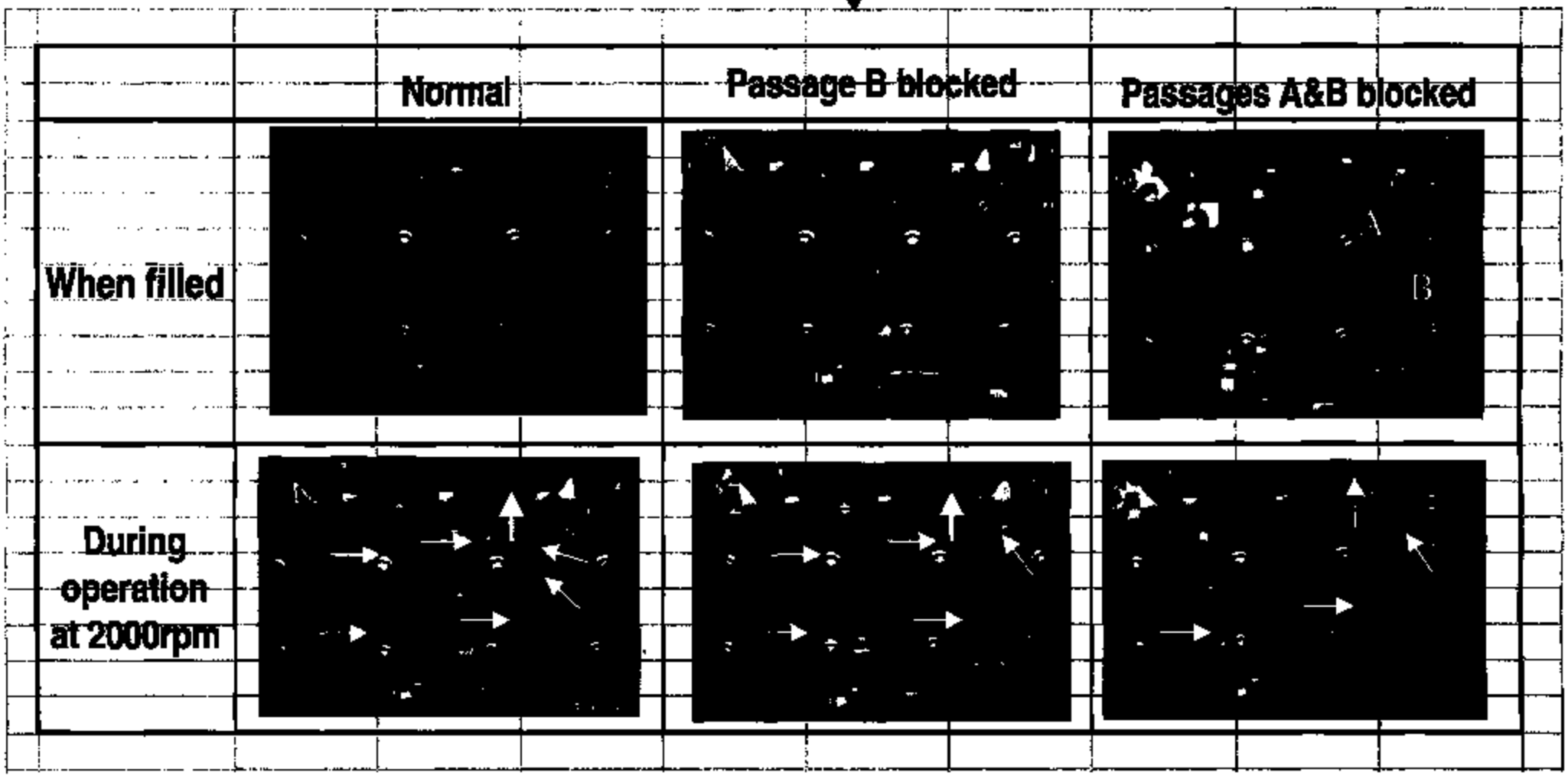
- If the water jacket of L cylinder head is blocked, an air pocket is thereby formed where the coolant temperature sensor exists. Due to such air pocket, the sensor detects higher temperature than actual coolant temperature, thus increasing the likelihood of the temperature gauge going into the red zone.

- Even if the water jacket of R cylinder head is blocked, the temperature indicated by the temperature gauge stays normal, because coolant temperature sensor does not exits there. In actuality, however, the condition is just as same as the L cylinder head.



4-5. Flow of Coolant when Water Jacket is Blocked

Air pocket is not formed so far as only the passage B is blocked

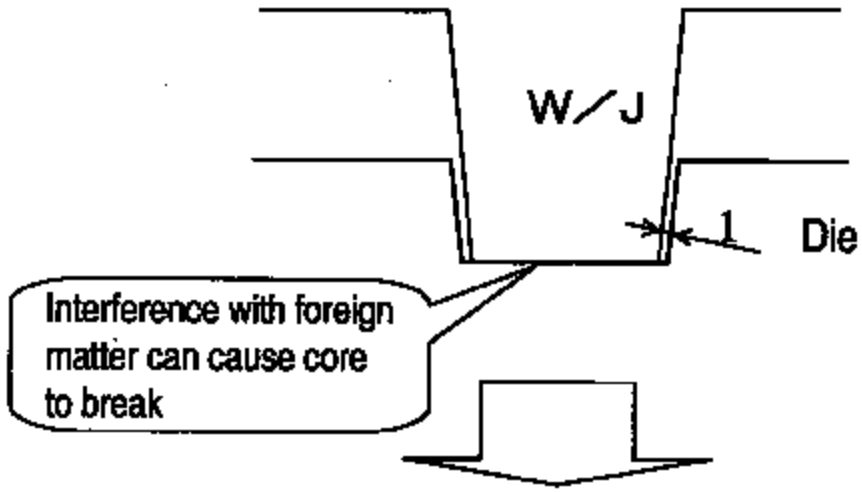


4-6. Blocking of Cylinder Head Water Jacket

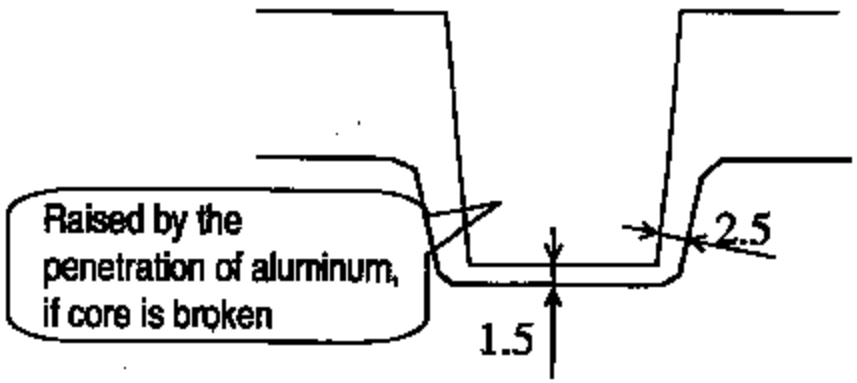
- It was so arranged that the core would be, if broken, separated from the core print.
- It was so arranged that the two portions (indicated by "a") at where breakage had occurred would not interfere with foreign matter such as burr.

These preventive measures have been effective since August 29

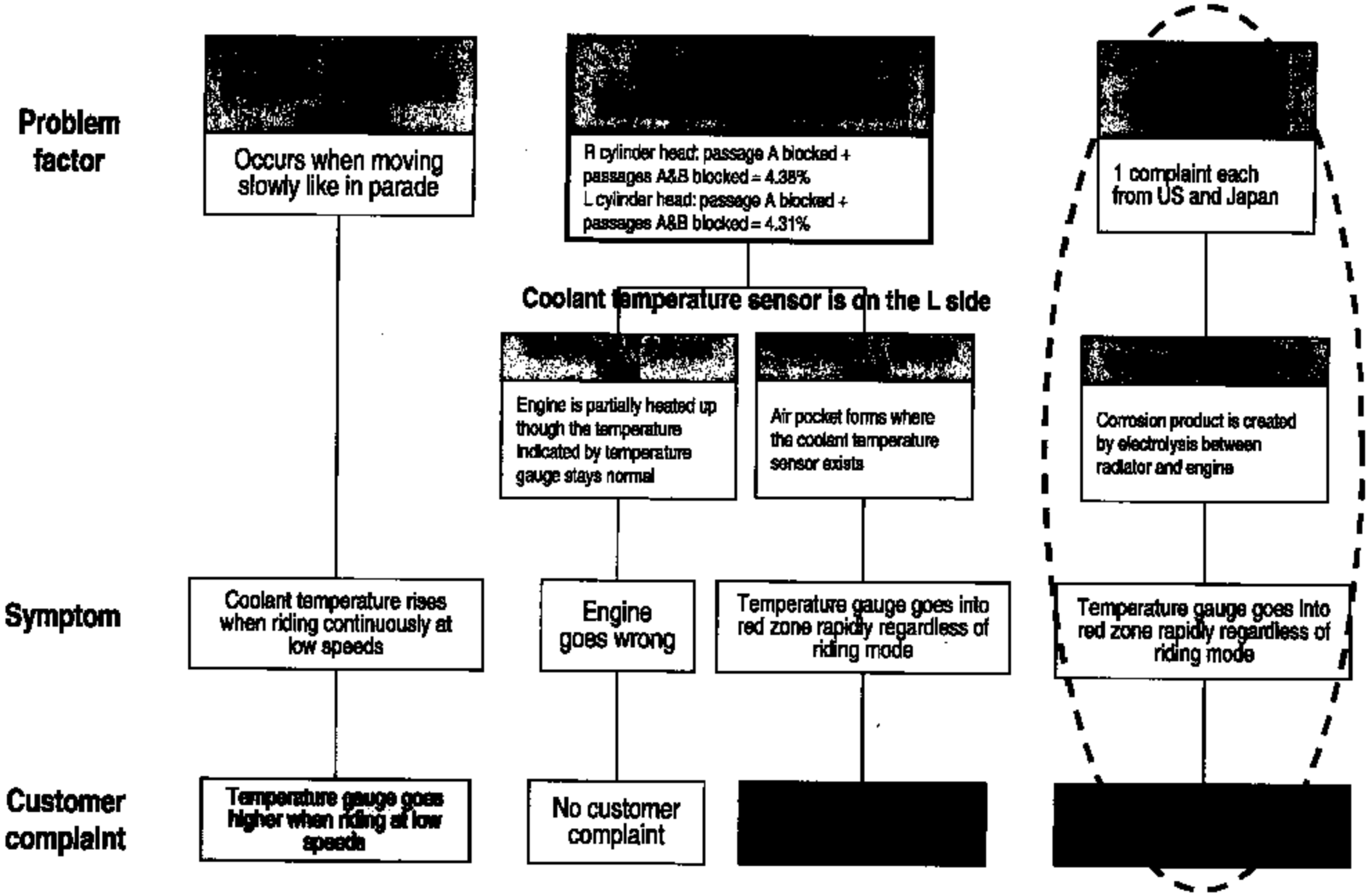
Before C/M



After C/M



Overview of Problems

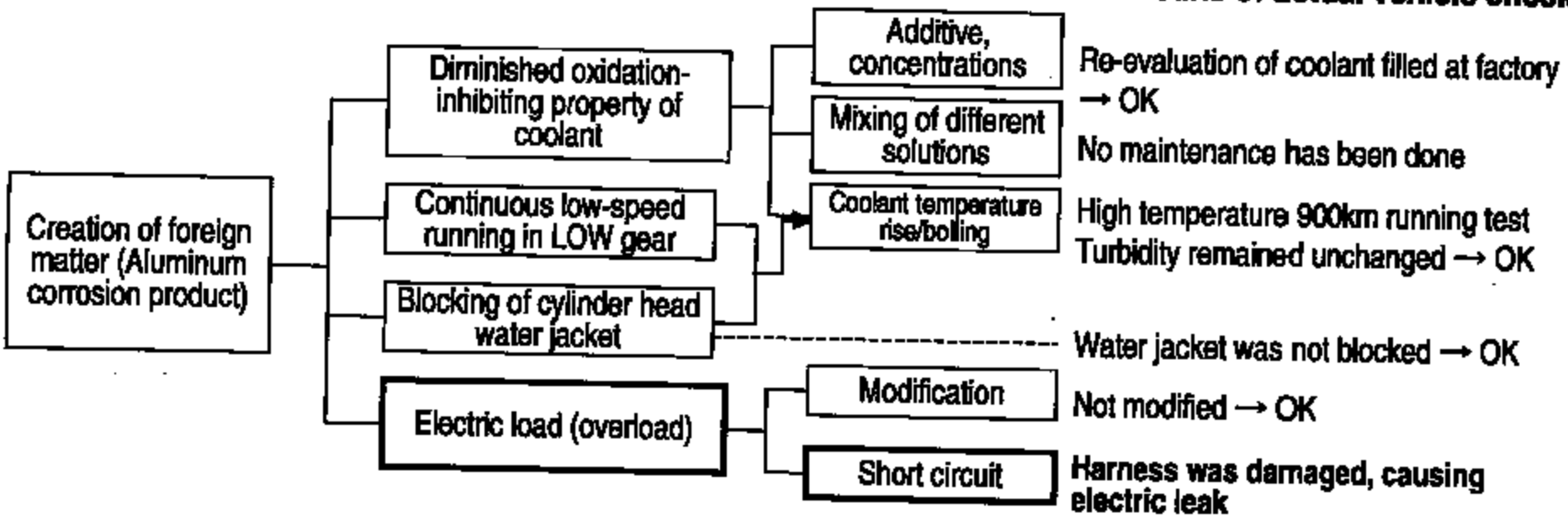


GL1800 (MCA) 5-1. Blocking of Radiator

Brief description of complaints about overheat that was found caused by foreign matter in radiator (2 complaints)

	First complaint (Japan)	Second complaint (USA)
Date of occurrence	July 23, 2002	September 9, 2002
Date of registration	February 22, 2002 ('02YM)	September 9, 2001 ('02YM)
Total distance traveled	2566km	8000 miles (12800km)
Frame No.	SC47-1000157	1HFSC47092A101134
Alleged symptom	When riding, vehicle has given overheated indication by the temperature gauge climbing above the red zone.	Temperature gauge went into the red zone after 20 minutes of riding at highway speeds.
Check result	The L radiator was clogged with foreign matter.	When measured with infrared thermometer, the temperature of L radiator was 38 deg C and that of R radiator was 92 deg C. When the radiator was removed, it was found clogged with foreign matter.
Past maintenance record	No maintenance has been done	No maintenance has been done

<Results of actual vehicle check>



5-2. Blocking of Radiator

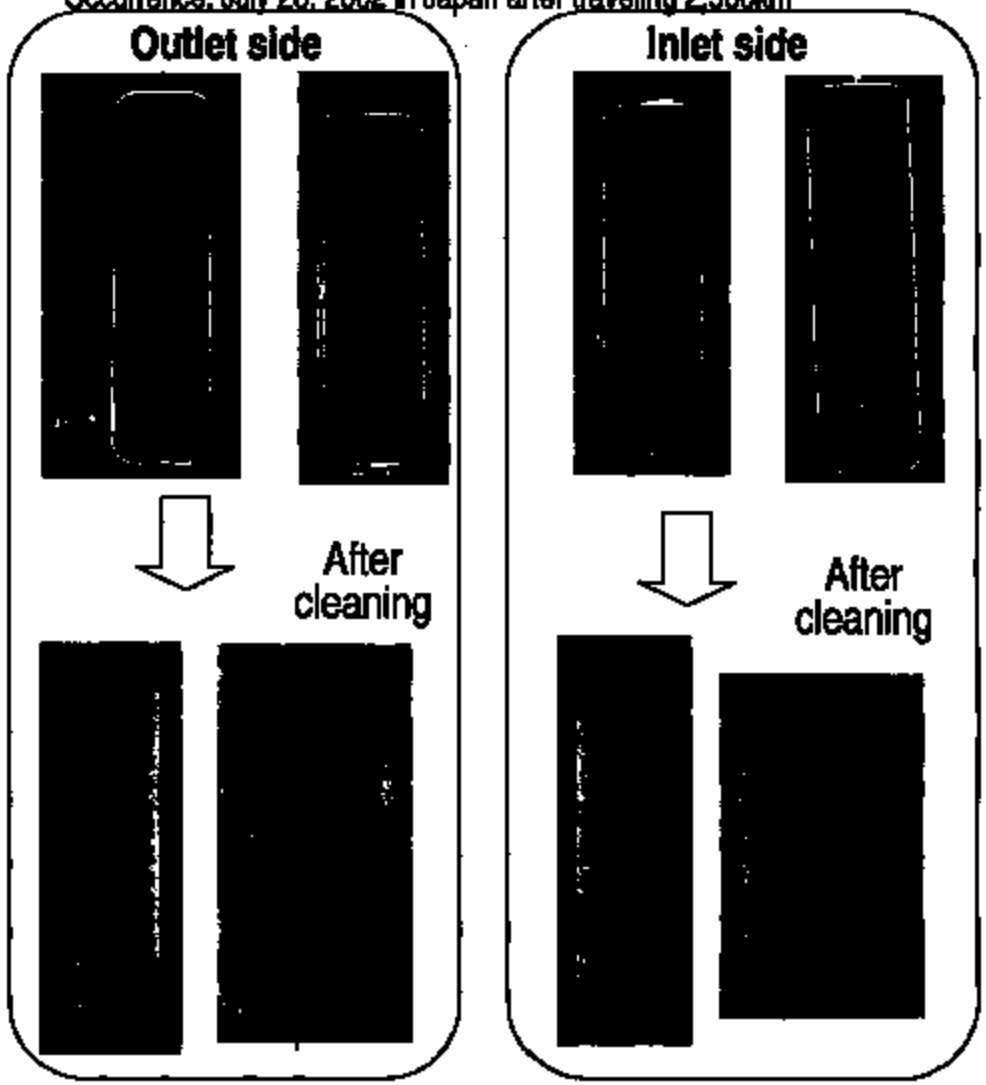
《Result of investigation of affected radiators》

Findings : Pipes were badly clogged and corroded

Subject radiator of complaint arose in US

Subject radiator of complaint arose in Japan

Occurrence: July 23, 2002 in Japan after traveling 2,566km



5-3. Blocking of Radiator

Result of investigation into foreign matter found in radiator

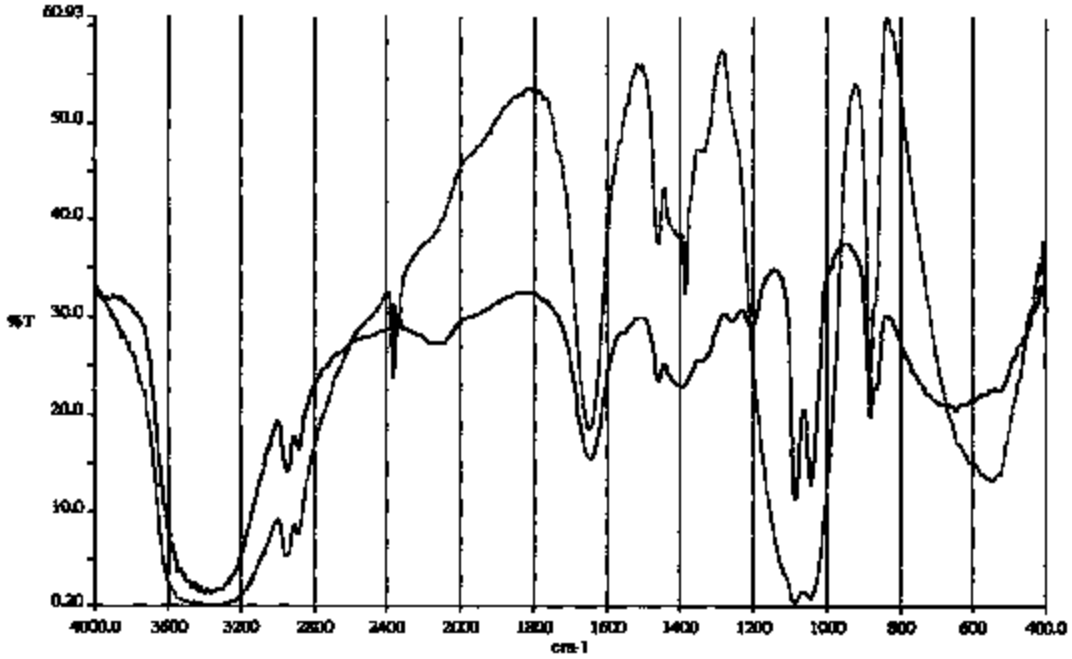
[redacted]

Both the constituents of coolant and oxide of aluminum were detected.

FT-IR analysis result

Foreign matter showed almost the same peaks as those of coolant.

—Foreign matter
—Coolant



EDS analysis result

C	33. 97	%
O	34. 17	
Na	2. 67	
Al	11. 92	
Si	1. 73	
P	9. 34	
S	0. 72	
K	4. 30	
Mo	1. 17	

5-4. Actual Vehicle Test to Establish Duplicability of Foreign Matter Creation in Radiator

PART-1 : Influence of heat of hot engine

- Cylinder heads: passages A&B in R cylinder head blocked, No blocking in L cylinder head
- Mode: Continuous running at 15km/h in LOW (with regulated quantity of airflow)

1) 0 ~ 300km	Coolant became turbid
2) 300 ~ 600km	Turbidity remained unchanged
3) 600 ~ 900km	Turbidity remained unchanged

→ Heat was not the cause of foreign matter creation

PART-2 : PART-1 + Electric load of 12V

1) 0 ~ 300km (additional) **Gelled substance** was created on the inside of the radiator pipe and hose

Radiator pipe (outlet)

Air bleed pipe

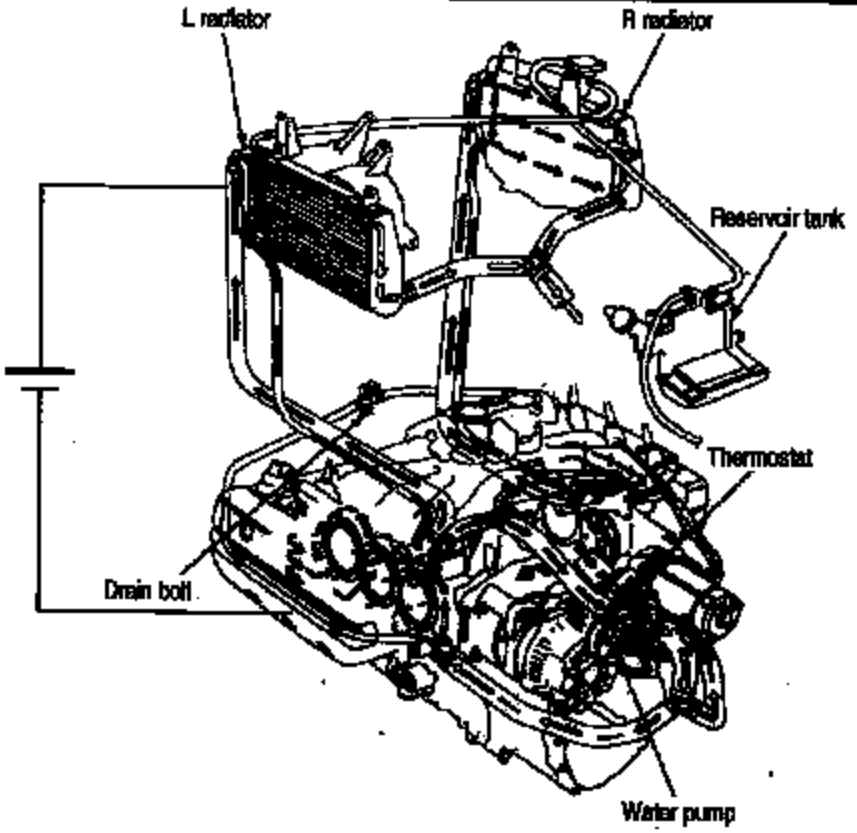
5-5. Result of Affected Vehicle Check

Taping was peeled and cord sheath was damaged.

There was a sharp edge on the end face of the front SUS clip on top of the radiator.

Cause

Wire harness, which was incorrectly routed, was damaged and the radiator was charged with electricity leaked from the wire harness, and electrolysis occurred between the radiator and engine as the coolant served as electrolyte.



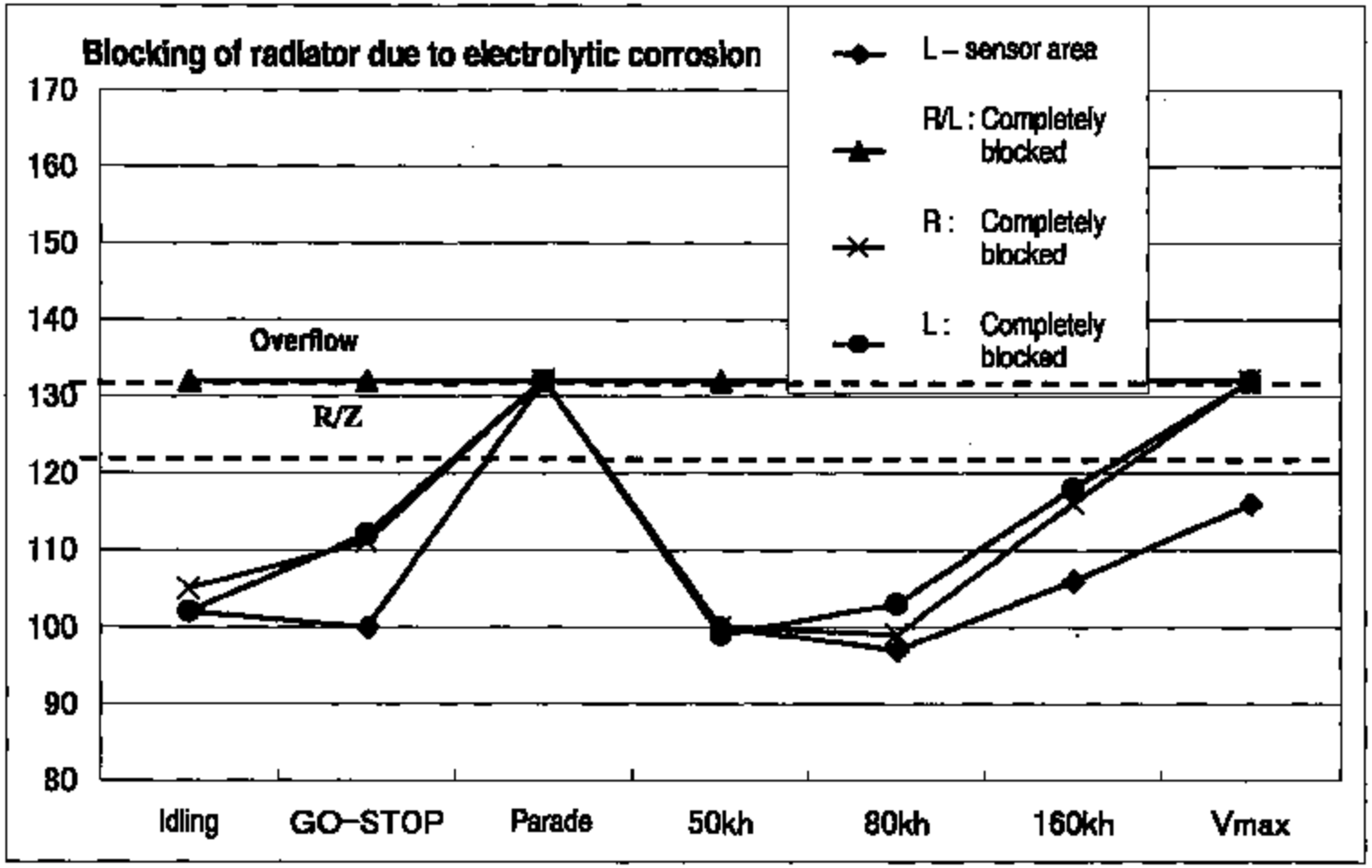
This is judged to be an irregularity in manufacture or maintenance.

5-6. Blocking of Radiator

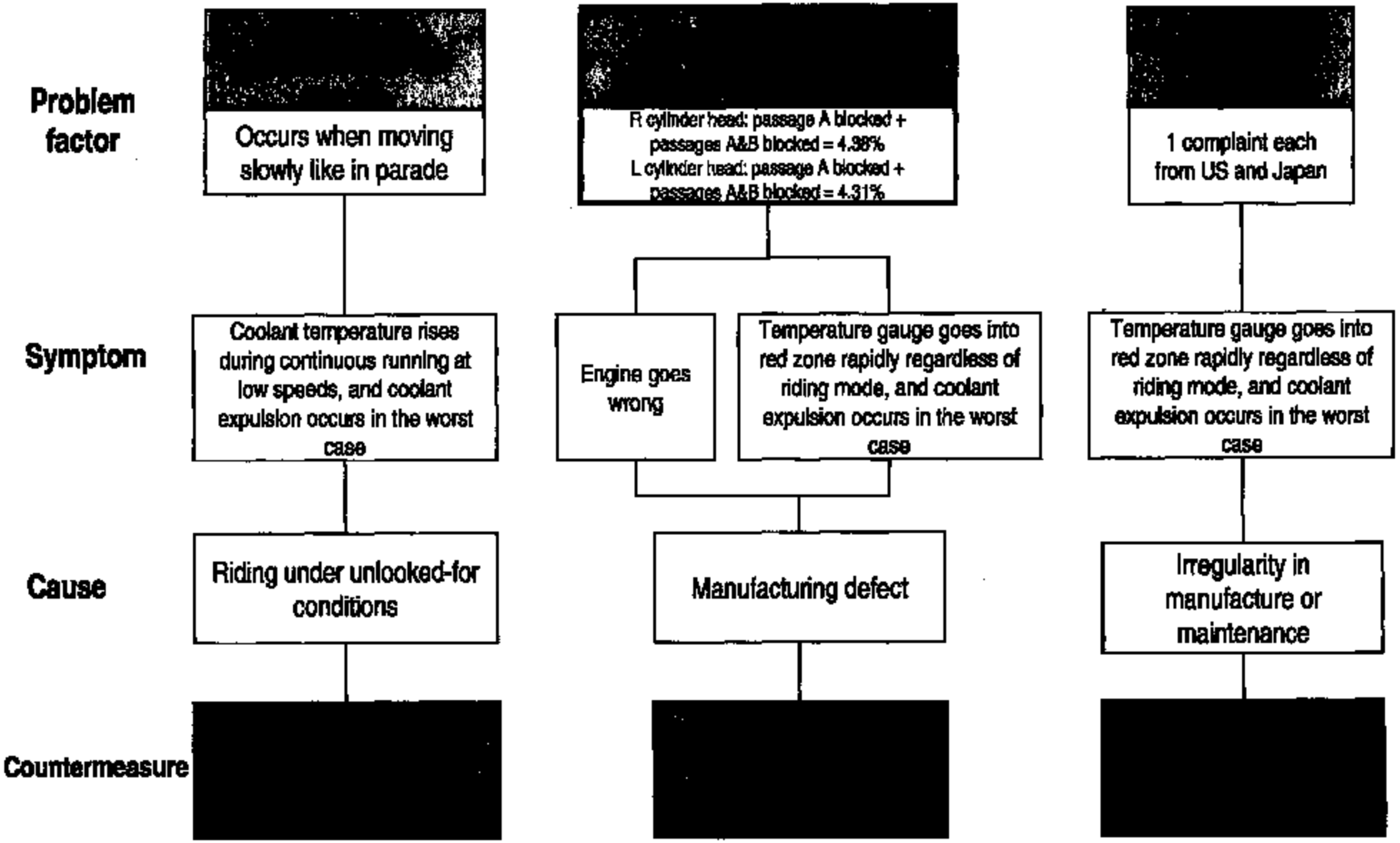
Problems caused if the radiator is blocked

- If either R or L radiator is blocked, the likelihood of the temperature gauge going into the red zone is increased at high-speed range.
- If both R and L radiators are blocked, the likelihood of the temperature gauge going into the red zone is increased regardless of riding mode or vehicle speed.

Just keep watching for occurrence of radiator blocking due to electrolytic corrosion by designating it as a check item, judging that the problem is highly irregular.

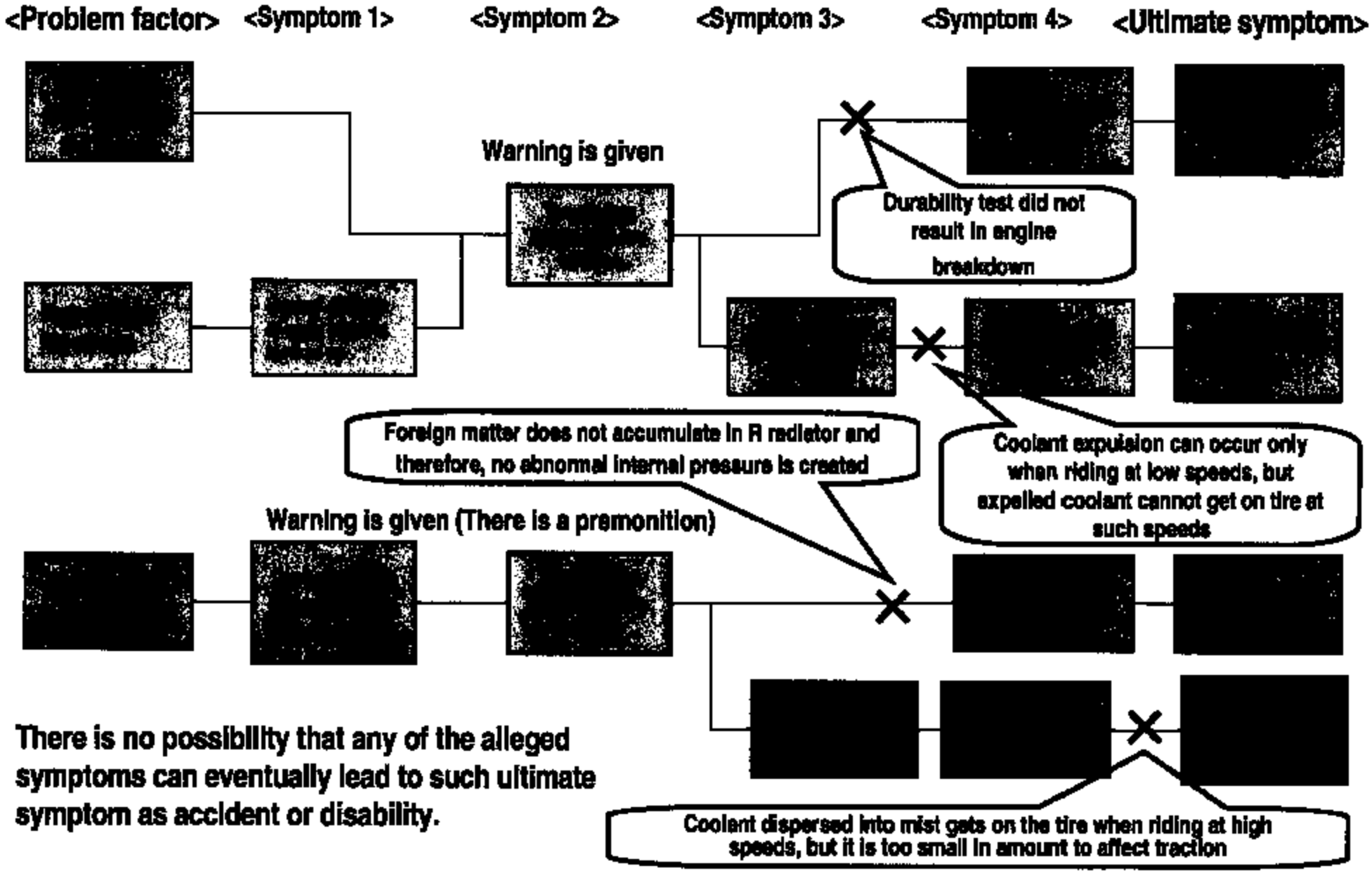


GL1800 (MCA) Summarized Overview of Problems

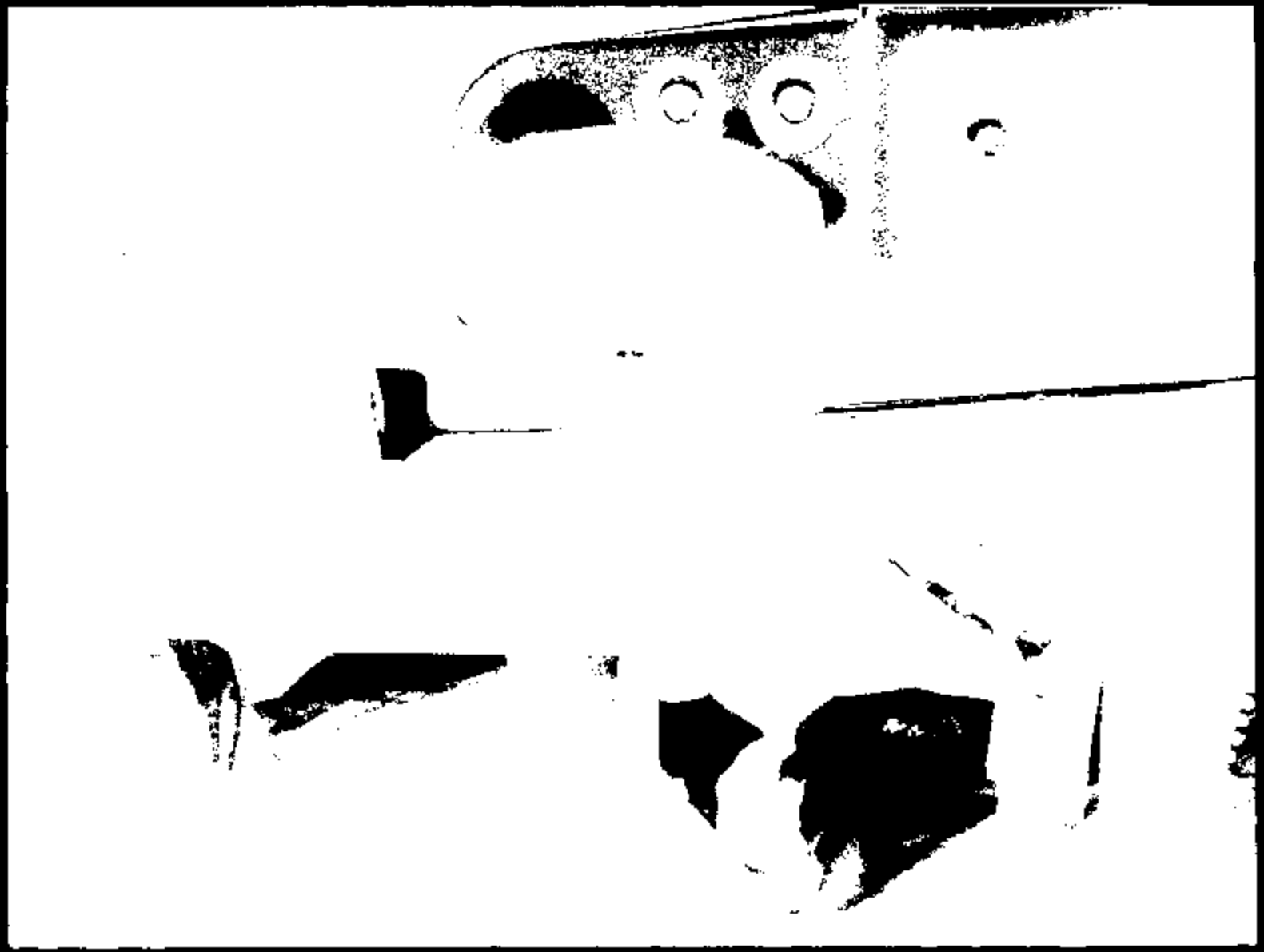


6. Analysis to Determine Whether Factors Leading to Safety-related Defect Exist

GL1800(MCA) 6-1. Result of Confirmation of Alleged Symptoms



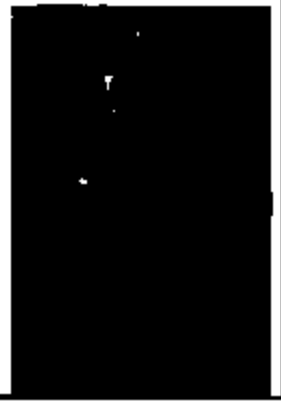
6-2



- The radiator drain tube is provided in such a location that the drained cooling water will not splash on the rider's leg or foot.

6-3. Result of Confirmation of Alleged Symptoms

Test conducted to establish whether coolant expelled in case of overflow gets on the rear tire

Riding conditions	Move slowly like in parade		Ride in an overheated condition created forcedly (by cutting off cooling air)			
	Run at 20km/h		Run at 80km/h		Run at 120km/h	
	Straight	Slalom	Straight	Slalom	Straight	Slalom
Coolant got on tire?	No	No	No	Yes	Yes	Yes
Observation	Coolant was expelled 30mm outward of the tire side.	Tire tread did not get on the trail of expelled coolant even during left turn. 	Coolant was expelled 30mm outward of the tire side as in the case of riding at 20km/h.		Coolant was dispersed into mist by the head wind. Coolant got on the tire tread and side wall, though small in amount.	

A series of tests was conducted on an asphalt-paved road, and the rider did not feel the tires slipping on the road throughout the testing.

6-4. Influence of Coefficient of Friction on a Road (GL1800)

~1) Coefficient of friction on a road and corresponding banking angle

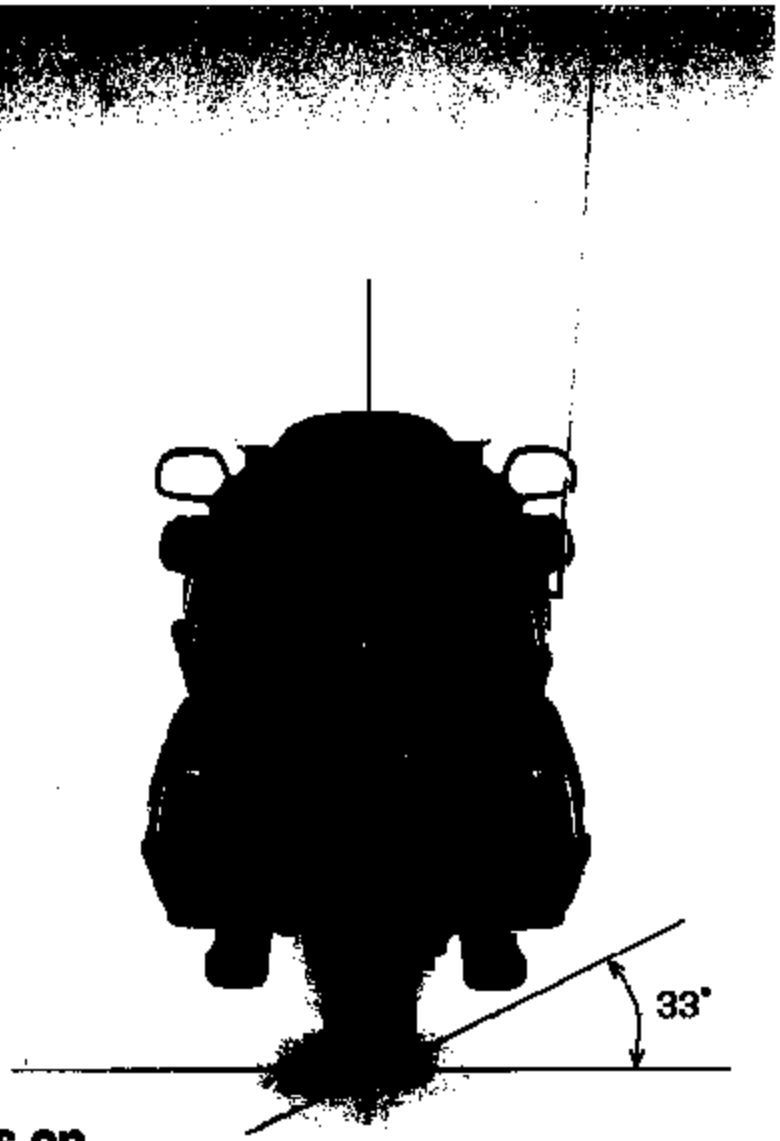
	Coefficient of friction on a road μ	Corresponding banking angle (deg)
DRY	0.95	43.5
WET	0.8~0.85	38.7~40.4

* Coefficient of friction on a road has been calculated from braking G (obtained on HGP-T general test road)

~2) Banking angle on layout

33 deg when ridden single

(See figure at right)



The above ~1) and ~2) show that, even if coolant gets on the tire, it won't cause any problem so far as ordinary slalom goes.

Engine durability with cylinder head water jacket blocked

Check whether the alleged symptom (engine trouble) occurs when the engine is revved at full throttle after coolant expulsion (with the coolant passages A&B blocked in both R and L cylinder heads).

1) Ride slowly like in a parade so that coolant is expelled.

- During a total of 6.8 hours of operation in parade mode, 1.3 liters of coolant was overflowed.

2) Thereafter, do a high speed durability test (for 100 hours).

- After 100 hours of operation, the engine had no fatal problems such as breakdown, loss of power, etc.
- When the engine was disassembled, traces of pitching of final gear, contact of piston top land, etc. were found. These conditions are, if aggravated with the lapse of time, considered to lead to unusual engine noise.

	During durability test conducted this time	During normal operation (at development)
Plug seat temperature (#1)	186~204℃	133~160℃
Oil temperature (Drain)	94~150℃	119~128℃
Coolant temperature (Head outlet)	102~118℃	91~95℃

6-6. Problems Found after Durability Test

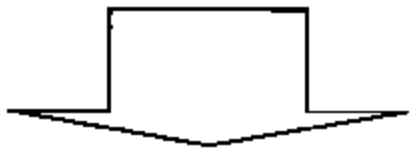
Problem	Pitching of final gear	Contact of #3 piston top land	Strong contact of connecting rod metal (#1~6)
Condition			
Possible cause	Deterioration in lubricity of oil due to rise in oil temperature	Rise in temperature of top of piston due to loss of coolant	Deterioration in lubricity of oil due to rise in oil temperature

Problem	Strong contact of crank journal metal (#1~6)	Strong contact of crank journal	Strong contact of crank pin (#1~6)	Increase in tappet clearance
Condition				MAX + 0.05mm (Target 0.04mm MAX)
Possible cause	Deterioration in lubricity of oil due to rise in oil temperature	Deterioration in lubricity of oil due to rise in oil temperature	Deterioration in lubricity of oil due to rise in oil temperature	Sticking of carbon

7-1. Proposal of Market Action to Take

Analysis of the cooling system problems has shown that coolant expulsion can occur as alleged but it cannot lead to any ultimate symptom such as slip & fall or burn.

On this ground, the alleged defect is judged to come under problems that can affect marketability, however, we cannot blink away the fact that a manufacturing defect (blocking of the cylinder head water jacket) constitutes a factor in the causation of deterioration in cooling performance.



Therefore, we propose that we should take a voluntary market action.

1. We will introduce appropriate field actions to use on affected vehicles in view of the actual circumstances in each country.
2. We will send a notice (direct mail) to all owners of the affected vehicles to notify them of replacement of affected parts.

7-2. Proposal of Market Action to Take

Draft [redacted]

<Field action method>

Notification by direct mail

Customer has ever found any irregular indication by the temperature gauge (e.g. climbing of pointer to or above the red zone)

YES

NO

Customer may ride his or her vehicle as it is

Customer visits his or her dealer

Vehicle is checked by dealer

Correct fault in hardware

Make customer feel safe

	Replacement of blocked cylinder head	Radiator check for electric leak	Sensor accuracy improvement (setting change to 128±2°C)	Advice to use 2nd gear
01 model	○ RH/LH	○	○	○
02 model	○ RH/LH	○	○	○
03 model	○ RH/LH	○	○	○

7-3. Proposal of Market Action to Take

<Occurrence rate>

	Number of MY-determined vehicles of the 93 vehicles about which NHTSA received complaints	Number of complaints (Tech Line/Customer Relations/CIC)	Number of complaints made known to AH	Number of vehicles sold by AH	Occurrence rate
01M	15 vehicles	129	144	8996	1.60%
02M	36 vehicles	217	253	13519	1.87%
03M	6 vehicles	19	25	1949	1.28%
Total	57 vehicles	365	422	24464	

<Number of vehicles expected to be brought to dealers – Worldwide>

01M 13914 vehicles × 1.60% = 223 vehicles × 3 = 669 vehicles

02M 18100 vehicles × 1.87% = 339 vehicles × 3 = 1017 vehicles

03M 7240 vehicles × 1.28% = 93 vehicles × 3 = 279 vehicles

655 vehicles 1965 vehicles

↓

2000 vehicles

<Number of cylinder heads required>

	R	L
01M	39234 X4. 31% =1691	39234 X4. 38% =1718
02M		
03M		
Total	1691 units	1718 units

Finally,

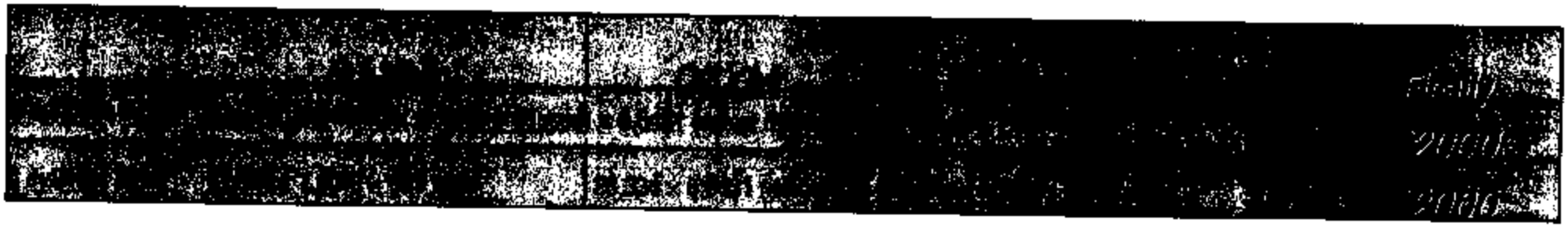
2000 units each of R cylinder head and L cylinder head will be required

GL1800(MCA) 7-4. Estimated Cost of Market Action

A total of 39,234 vehicles is involved in all the world

[redacted]

Number of cylinder head assemblies required to be supplied



1. Cylinder head assembly 14,500 yen × 4,000 assemblies = 58,000,000 yen

+

2. Sensor 15,000 yen × 2,000 pieces = 30,000,000 yen

+

3. Labor cost 49,823 yen × 2,000 × 1.5 = 149,469,000 yen

4. Required investment 62,200,000 yen

- Cost of parts = 70% of price of parts

- Rough estimate of cost of parts and labor cost

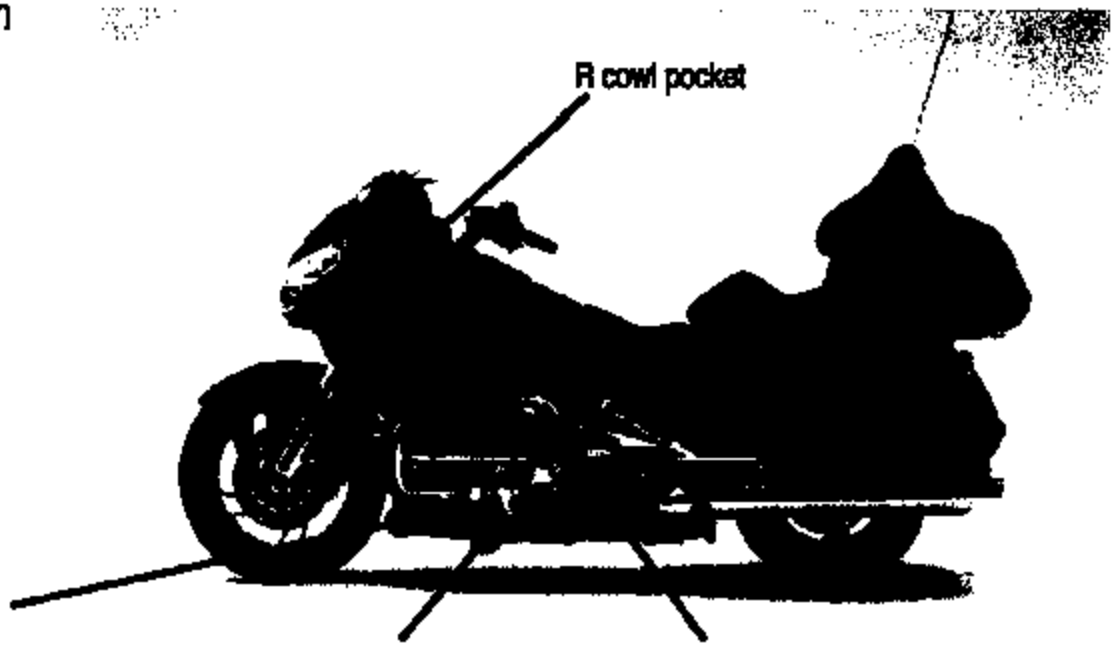
Costs such as W/H modification cost and parts delivery cost are not included.

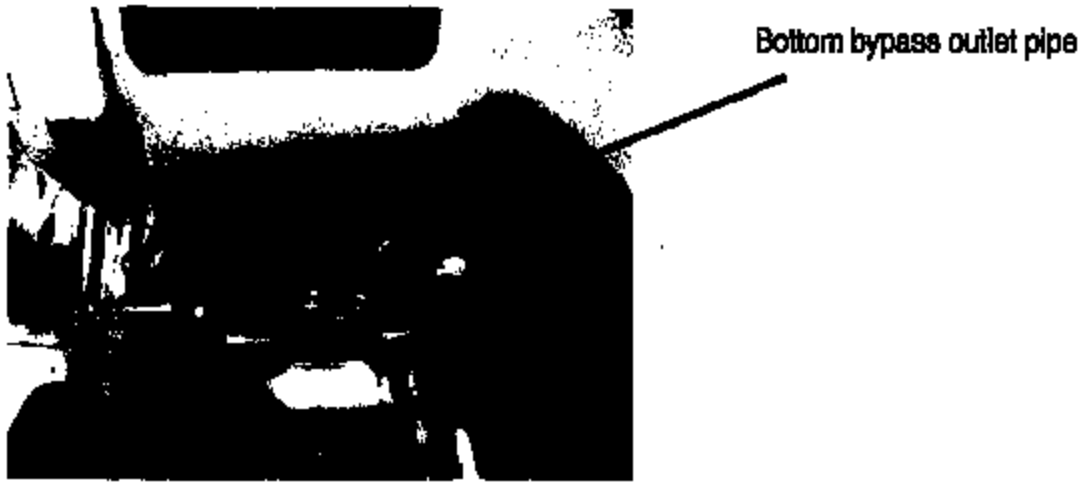
Total 299,669,000 yen

* Supply of 1,700 sets (of R and L cylinder head assemblies) is scheduled to complete by the end of February 2003

7-5. GL1800 Cylinder Head Water Jacket Check Method (1/2)

- **Preparation**





7-5. GL1800 Cylinder Head Water Jacket Check Method (2/2)

- **Check Method**

1. Method to check the passage A for blocking

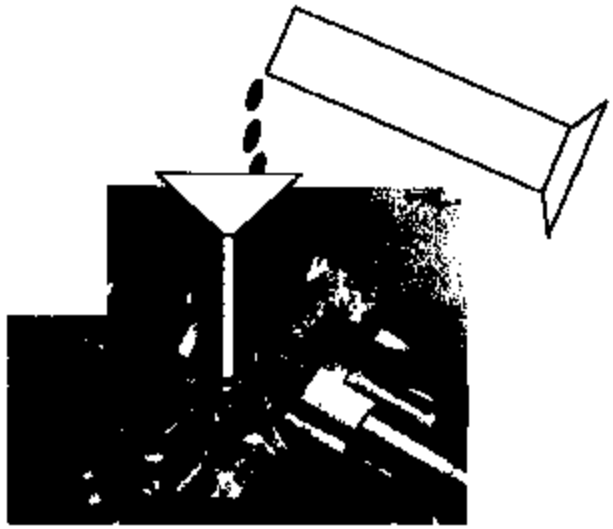
Pour coolant into the cylinder head water jacket from the bottom bypass outlet.

If the passage A is blocked, air pocket is formed and thereby the amount of coolant that can be poured into the cylinder head water jacket is reduced.

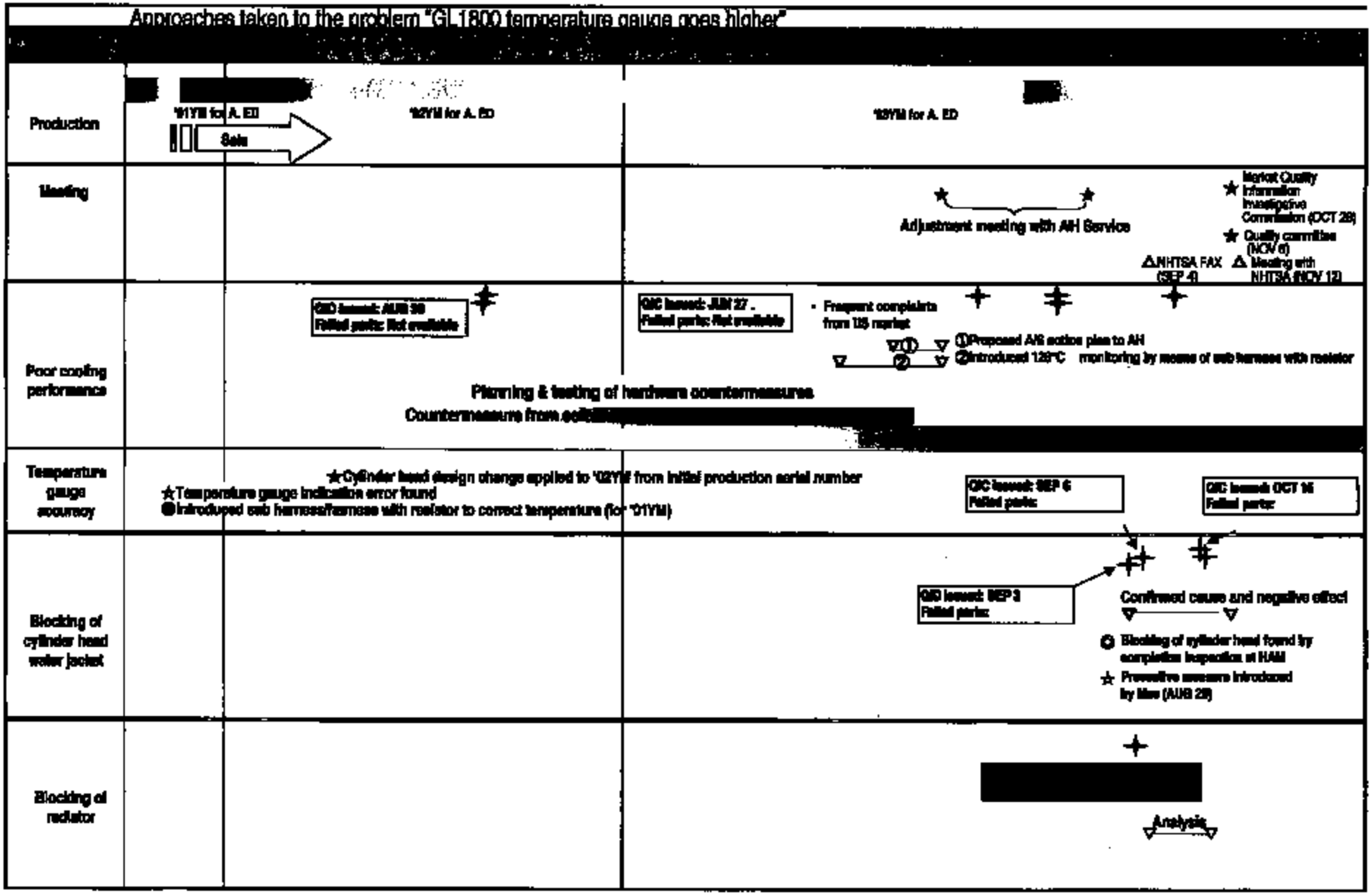
If not blocked, about 600cc of coolant is required to fill up
If blocked, about 500cc of coolant is required to fill up

How to judge : Pour a fixed amount (600cc) of coolant into the cylinder head water jacket, and

- If coolant does not overflow, there is no block in the passage A.
- If coolant overflows, there is a block in the passage A.



8. Chronology of Countermeasures



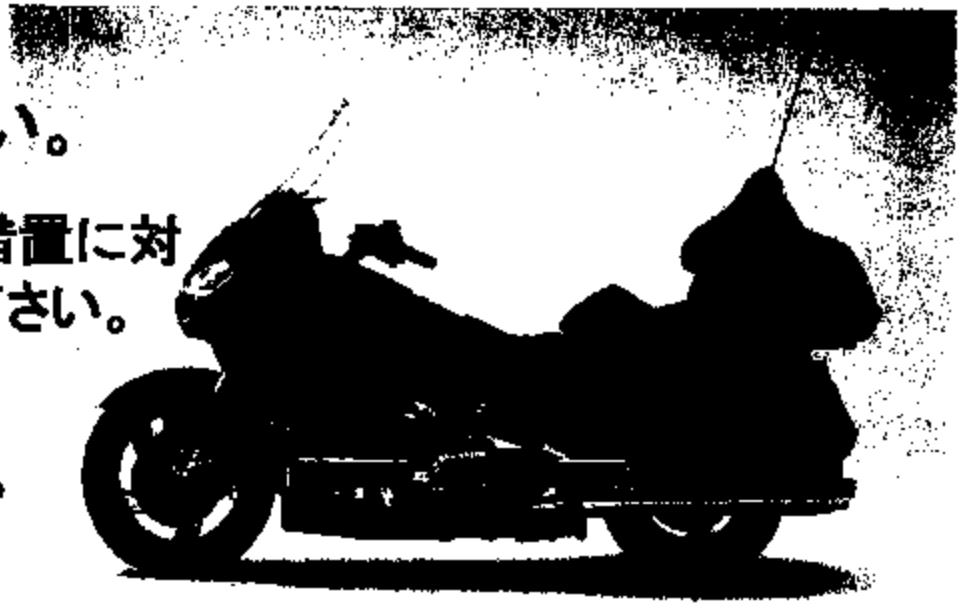
GL1800(01～03YM)　冷却系不具合

＜10／28　検討会指示事項＞

1、部品不良率を検討し
　　市場対応を決めて下さい。

2、テックラインの詳細を分析し、措置に対
　　しての効果を見積もって下さい。

3，安全欠陥かどうかの根拠を
　　明確にして下さい。



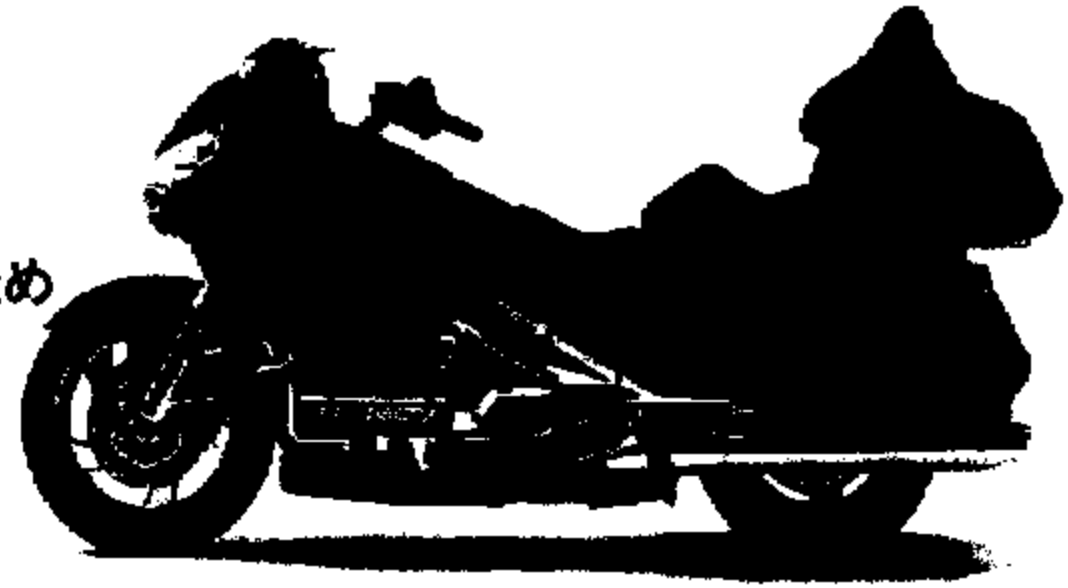
承認	作成
中 村	小 林

GL1800(01～03YM)　冷却系不具合

1. 冷却システムの構造
2. 市場発生状況

   不具合全体概要
3. 低速時の冷却不足
4. ヘッドW／J閉塞
5. ラジエーター閉塞

   不具合全体概要のまとめ
6. 安欠性要因分析
7. 市場措置案提案
8. 対策経緯

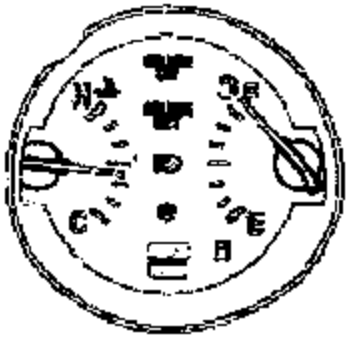


検討会2次報告資料

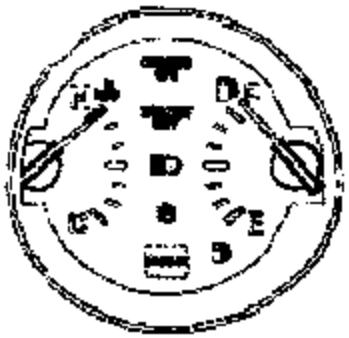
2002－11－01

GL1800(MCA)　1-1. クーリングシステムの説明

水温計のレイアウト

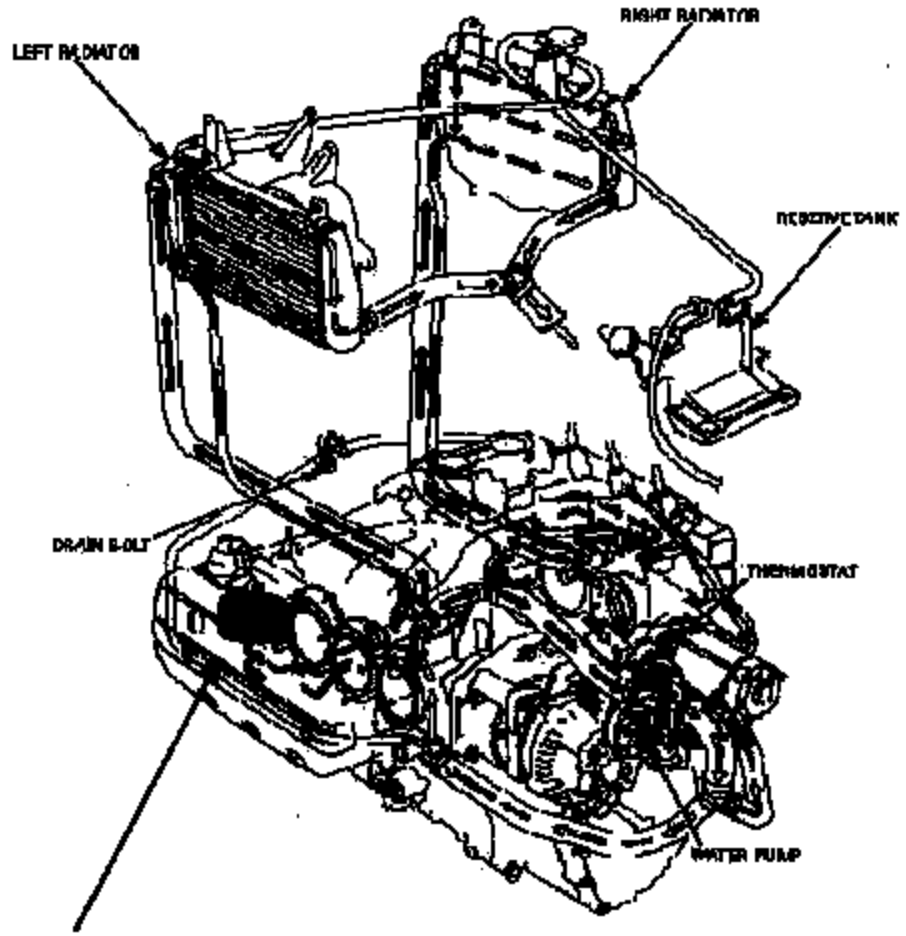


通常時の指示



R/Zに入った状態

冷却水の流れ

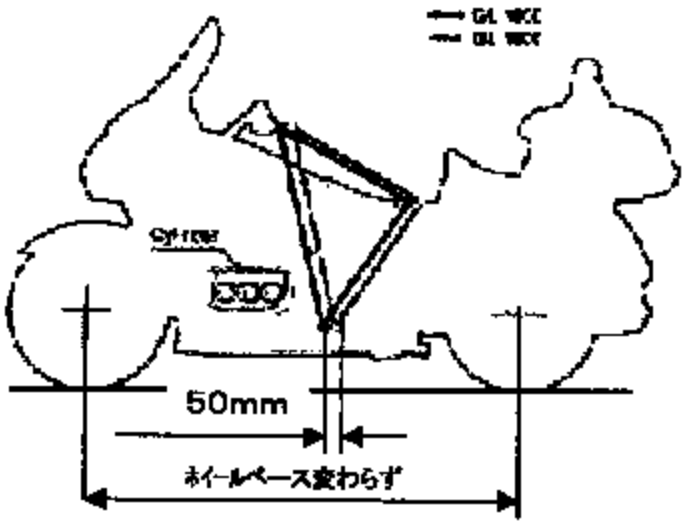


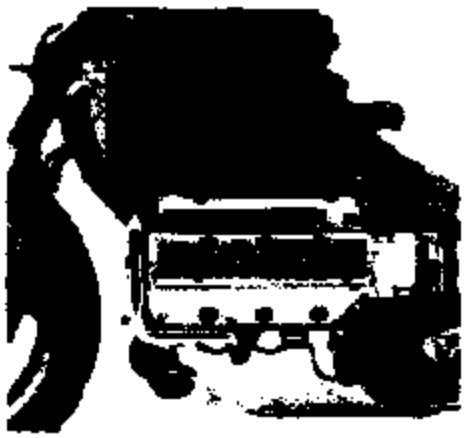
水温センサー

1-2. Rad L/Oの狙い

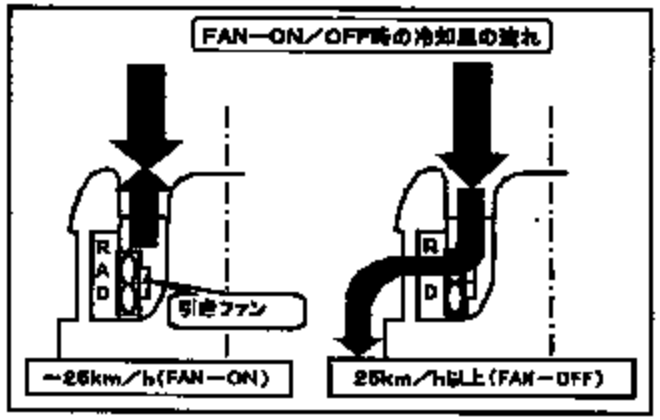
1. MCAについては、ｺﾝｾﾌﾟﾄである"ﾓｰﾀｻｲｸﾙﾗｲｸ"なGL を実現する為、
ﾗｼﾞｴﾀｰ配置は、<u>ｻｲﾄﾞﾗｼﾞｴﾀｰを採用し、ENG搭載位置の前方移動</u>をおこなった。
これにより、ライダー位置をGL1500に対し、50mm 前方に移動出来た。
2. RAD排風については、<u>ライダー熱居住性／静粛性の観点より 内側FANの前方排気</u>
とし、ｽﾋﾟｰﾄﾞ(15ﾏｲﾙ)にてFAN SWのON/OFを制御している。

RIDING POSITION





AIR FLOW



OFF域からの戻りは23km/h以下(FAN—ON)

GL1800(MCA)　2-1.市場発生状況詳細

全世界QIC/品情連発行状況(TTL件数16件)

[redacted]　[redacted]

QIC NO	発生	モデル	車台No	原動機No	走行距離	登録	発生	分類	既存	確認結果 R A	R B	R C	L A	L B	L C
	国内(東京)	2002	1000306	1000358	6700	2001/8/28	2002/8/20	3	低速走行時水温計振り切る						
	国内(東京)	2002	1000245	1000245	7579	2001/9/28	2002/8/29	3	低速走行時水温計振り切る						
	国内(大阪)	2002	1000157	1000201	2566	2002/2/22	2002/7/26	1	走行中水温計振り切る、ラジエター風動強まり	○	○	○	○	○	○
M2OH100	アメリカ	2002	101134	2102559	8000	2001/9/1	2002/9/9	1	ハイウエー走行中水温計振り切る、ラジエター風動強まり	○	○	○	○	○	○
M2M115-1	アメリカ	2002	110788	2114235	20		2002/6/11	2	走行中水温計振り切る、ヘッド鋳造不具合				×	×	○
2IH2001041	イタリア	2001	169	2006805	1000	2001/4/19	2001/4/20	3	低速走行中(25−30km)水温計レッドゾーンを示す						
M1M057	アメリカ	2001	48	2000199	12000		2001/8/27	3	低速走行時(18−20MPH)水温計指示が高い						
2SH2001005	スイス	2001	33	2006815	1200	2001/3/28	2001/7/28	3	市街地のとり線、渋滞中にオーバーヒート						
2MH2001048	スペイン	2001	723	2006852	80	2001/5/25	2001/8/9	3	15KMの山道を鋳造30km/hにて走行時オーバーヒート						
2HVC-2002001	ベネゼーラ	2002	100223	2100344		2001/8/8	2001/8/15	3	低速走行時温度が高い						
M2MOH028	アメリカ	2002	101182	2102582	1081	2001/8/10	2001/8/21	3	水温計が高温域を示す						
M3M009	アメリカ	2003	200179	2201288	1200	2002/7/23	2002/8/1	3	水温計がレッドゾーンを示す						
M3M011	アメリカ	2003	202304	2203050	447	2002/8/23	2002/9/5	2	ヘッド鋳造不良				×	○	○
M2M115-2	アメリカ	2002	109003	2111995	10241	2002/5/31	2002/9/24	2	ヘッド鋳造不良				×	×	○
M3M011-1	アメリカ	2003	202623	2203344	5	2002/9/28	2002/10/7	2	ヘッド鋳造不良				○	○	○
2EH2002059	ドイツ	2002	100840	2114449	6000	2002/4/14	2002/9/17	3	低速走行時温度が高い	○	○	○	×	○	○

アメリカの状況:テックライン/NHTSA情報

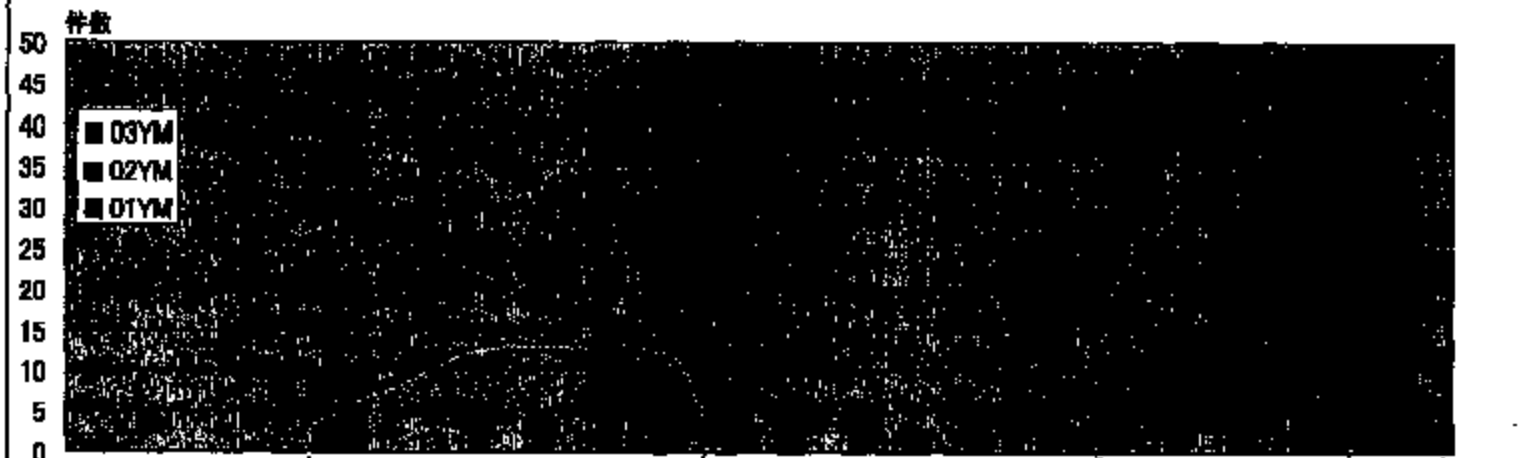
	01YM	02YM	03YM	TOTAL数
NHTSA	15	36	6	57
TEC/CR/QIC	129	217	19	365
			総TOTAL	422

[redacted]

2-2.市場発生状況

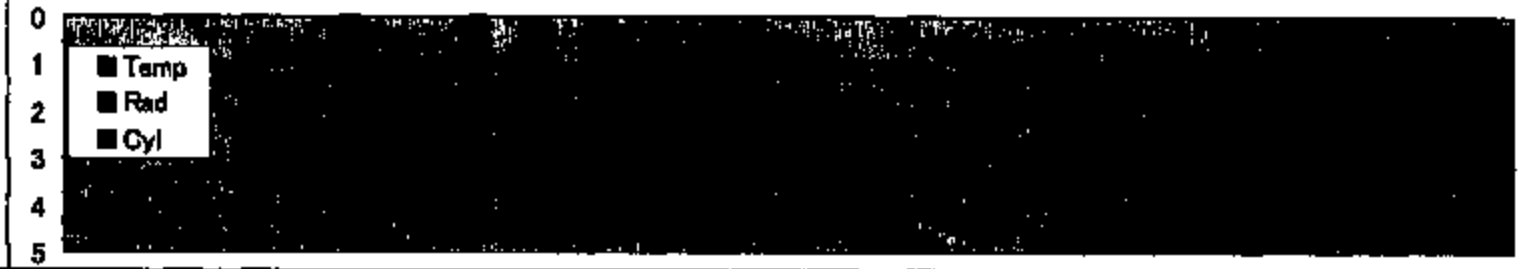
テックライン情報
・01'＝ 60
・02'＝ 107
・03'＝ 5
TTL 172件

9月10日時点



QIC/品情連発行
（全世界）

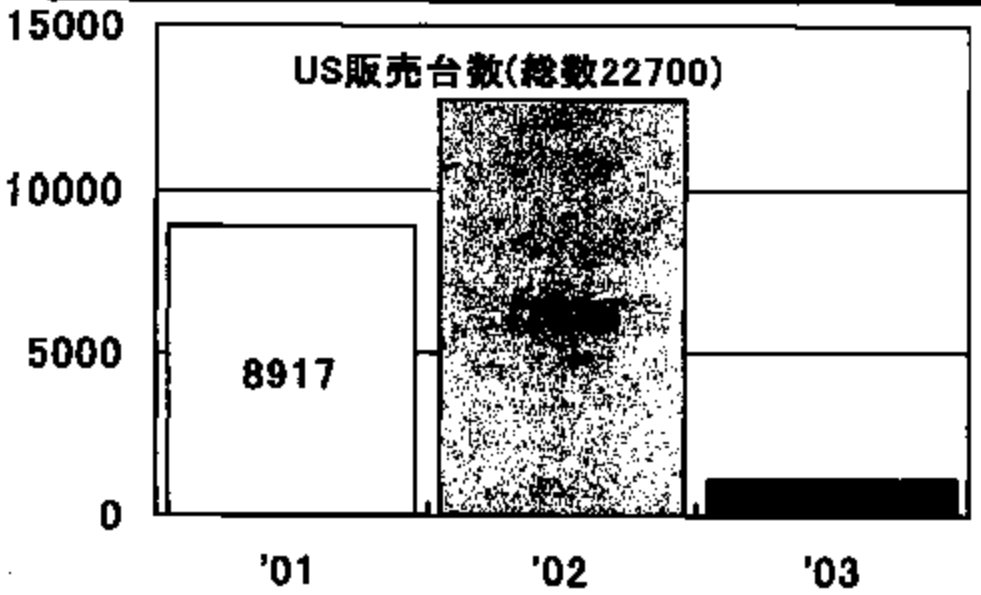
10月24日時点

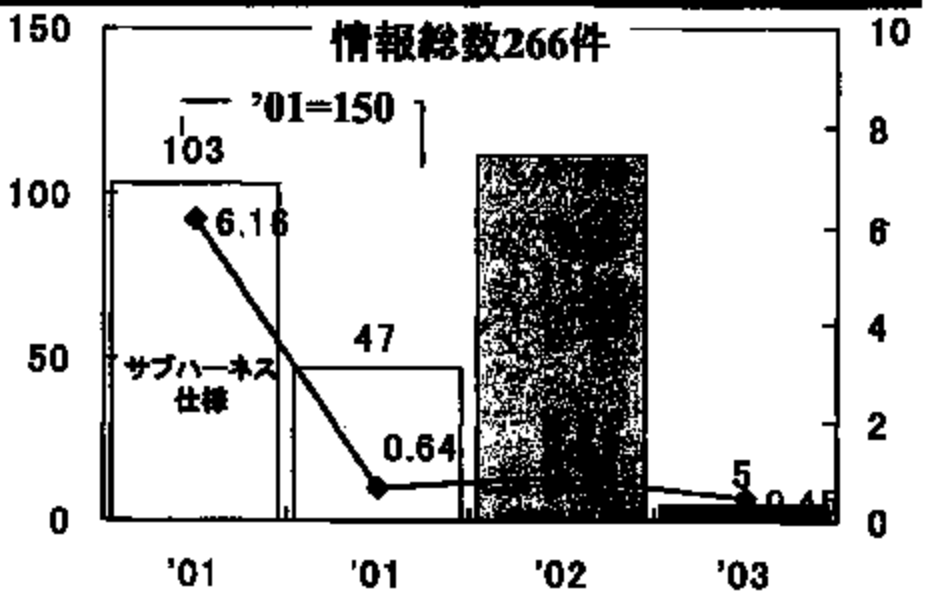


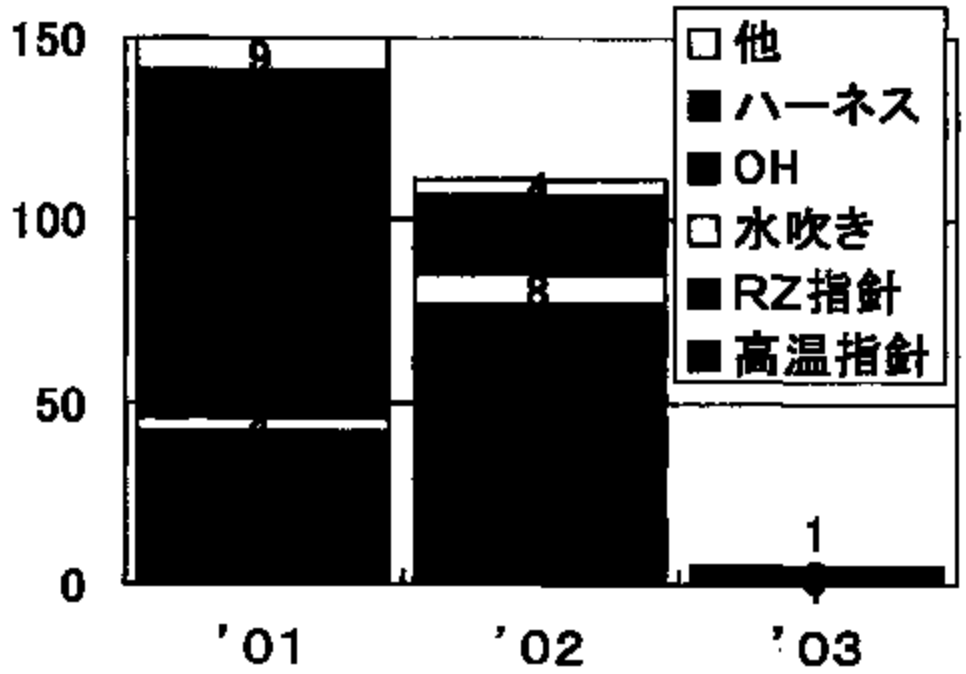
YM	01	02	03
販売台数			

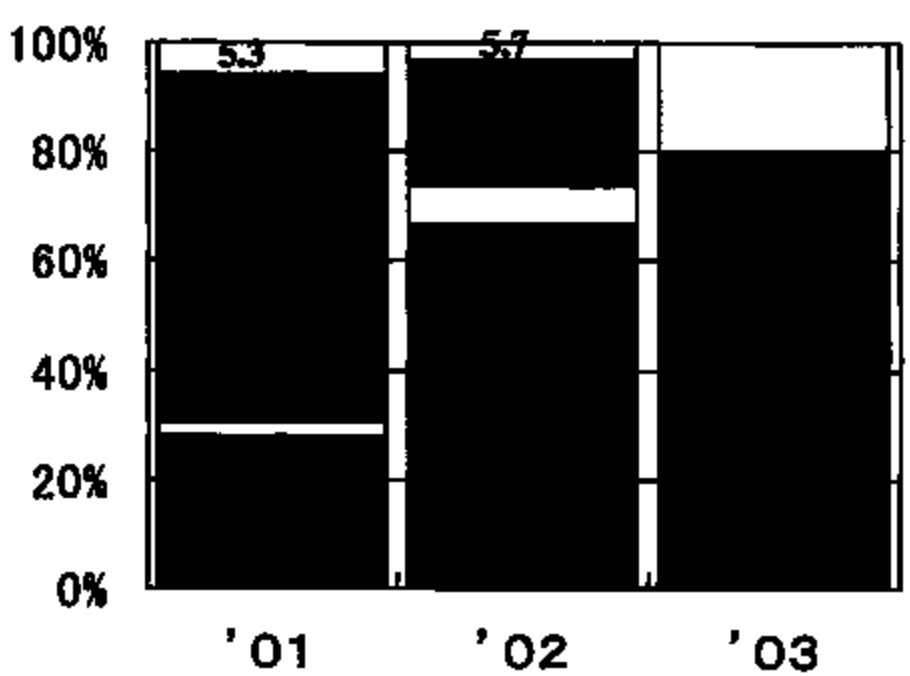
言えること
・01年度、02年度共に夏場の訴え件数が多い。
・YM別発生率は03YMが少ない。

GL1800(MCA)　2-3. 市場発生状況



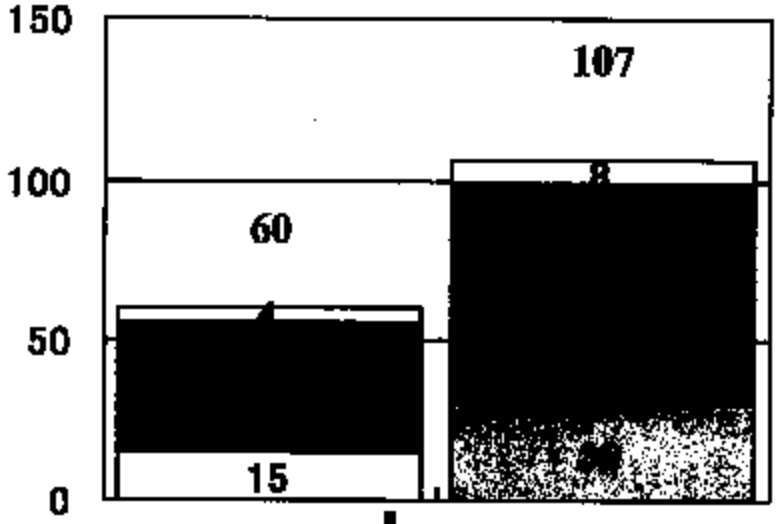




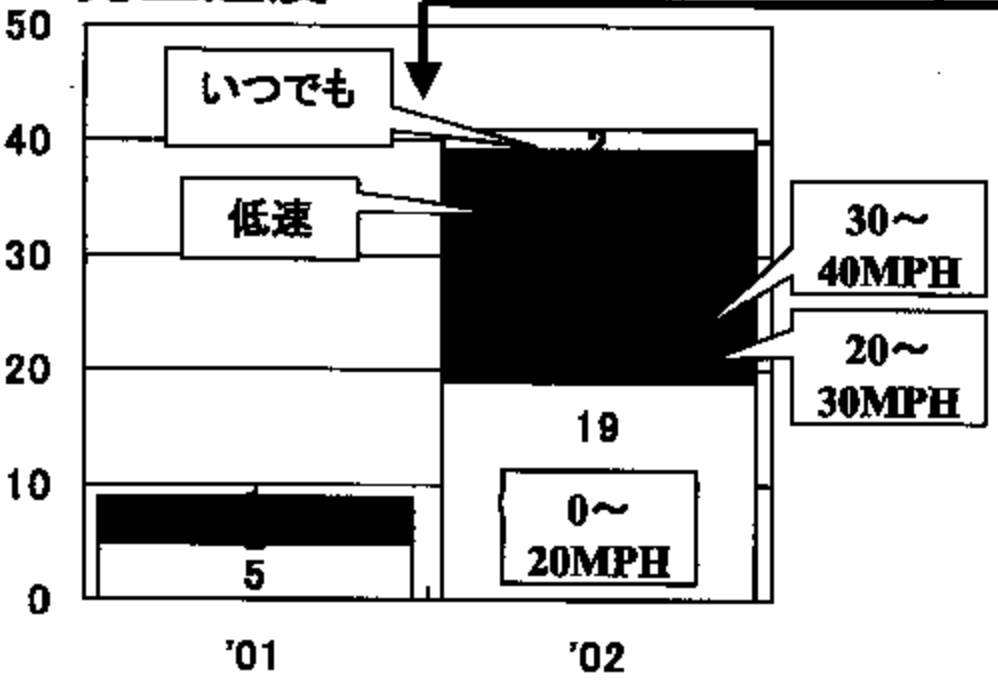


GL1800(MCA)　2-4. 市場発生状況

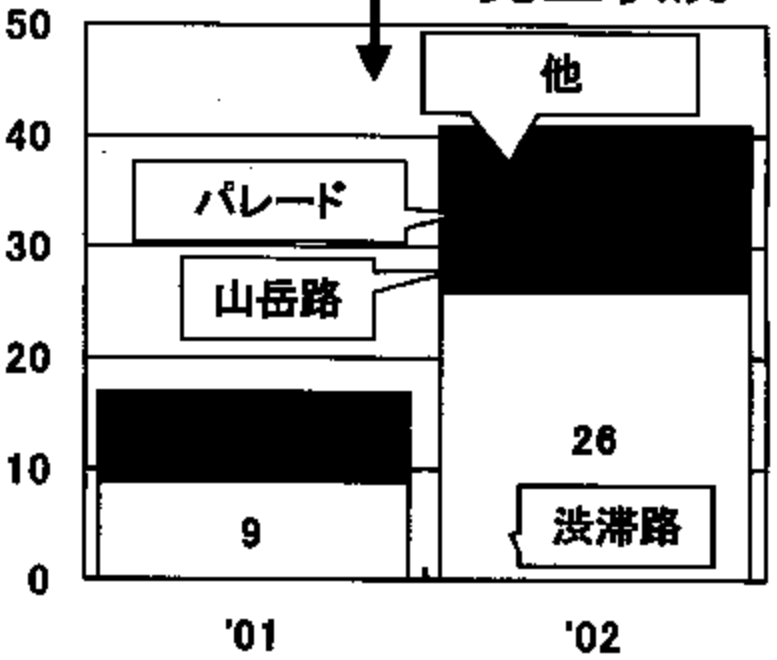
テックライン上で水温不具合に関する打ち上げ件数
167件(01.02‘)



発生速度

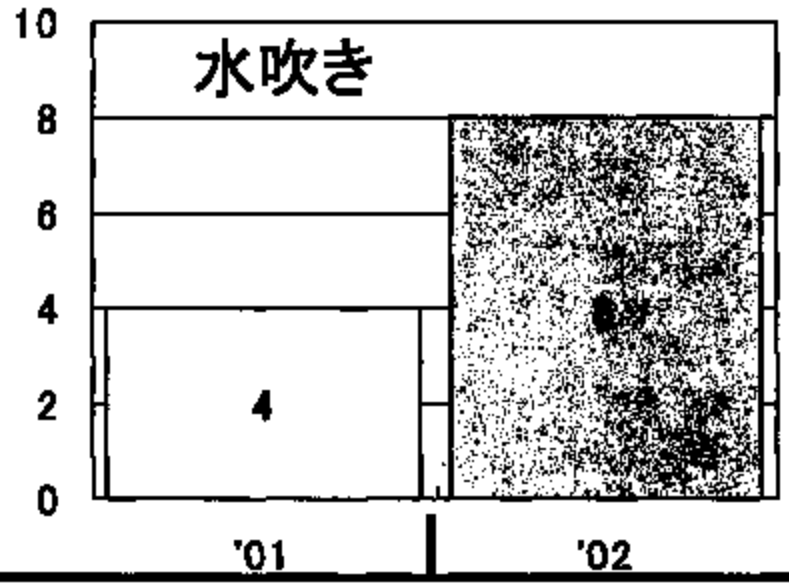


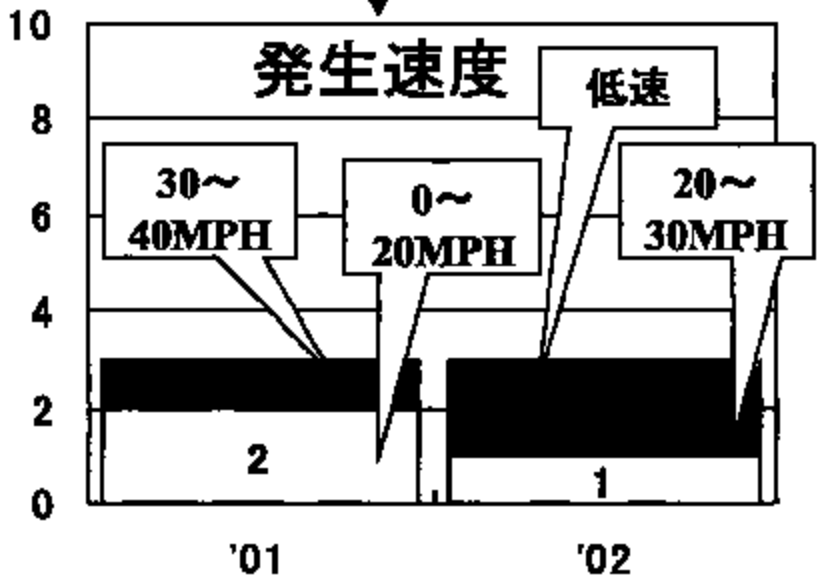
発生状況

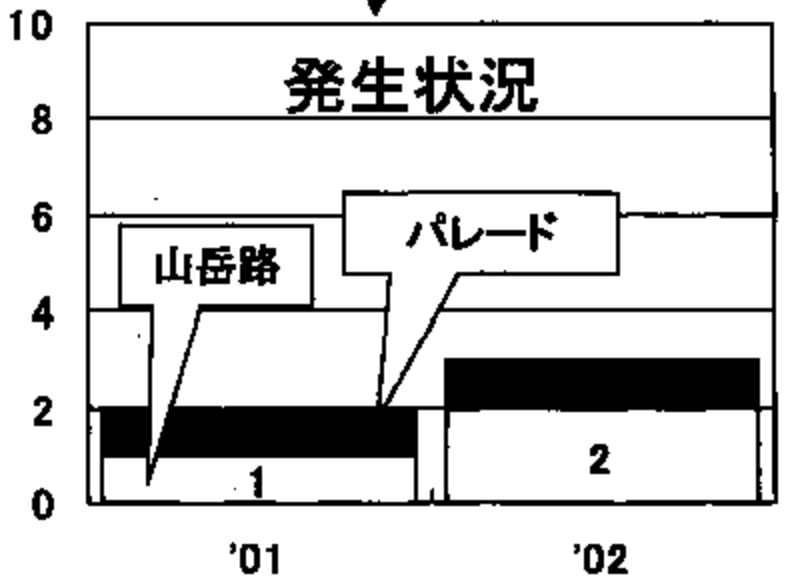


2-5. 市場発生状況

水吹き発生件数
12件

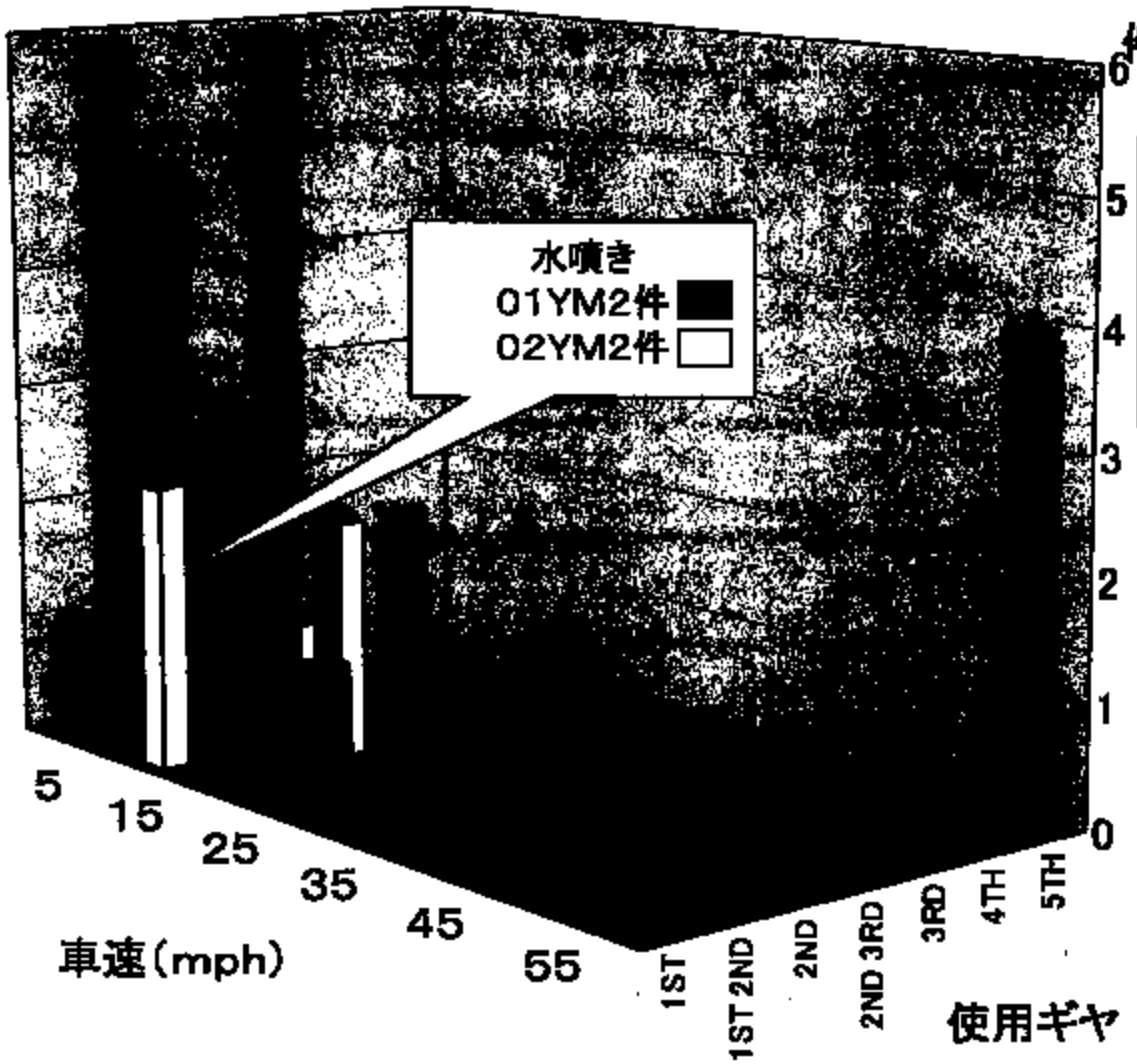






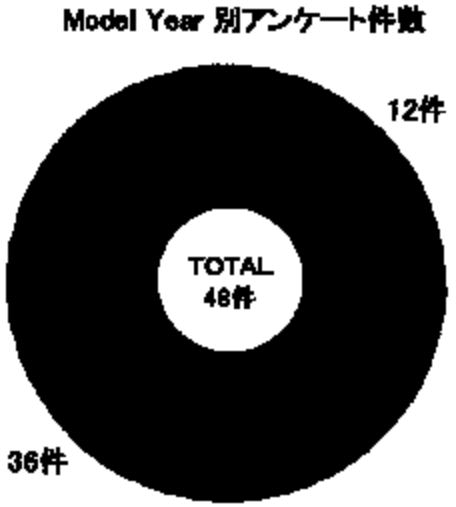
GL1800(MCA)　2-6. 市場発生状況

《ユーザーインタビュー結果》

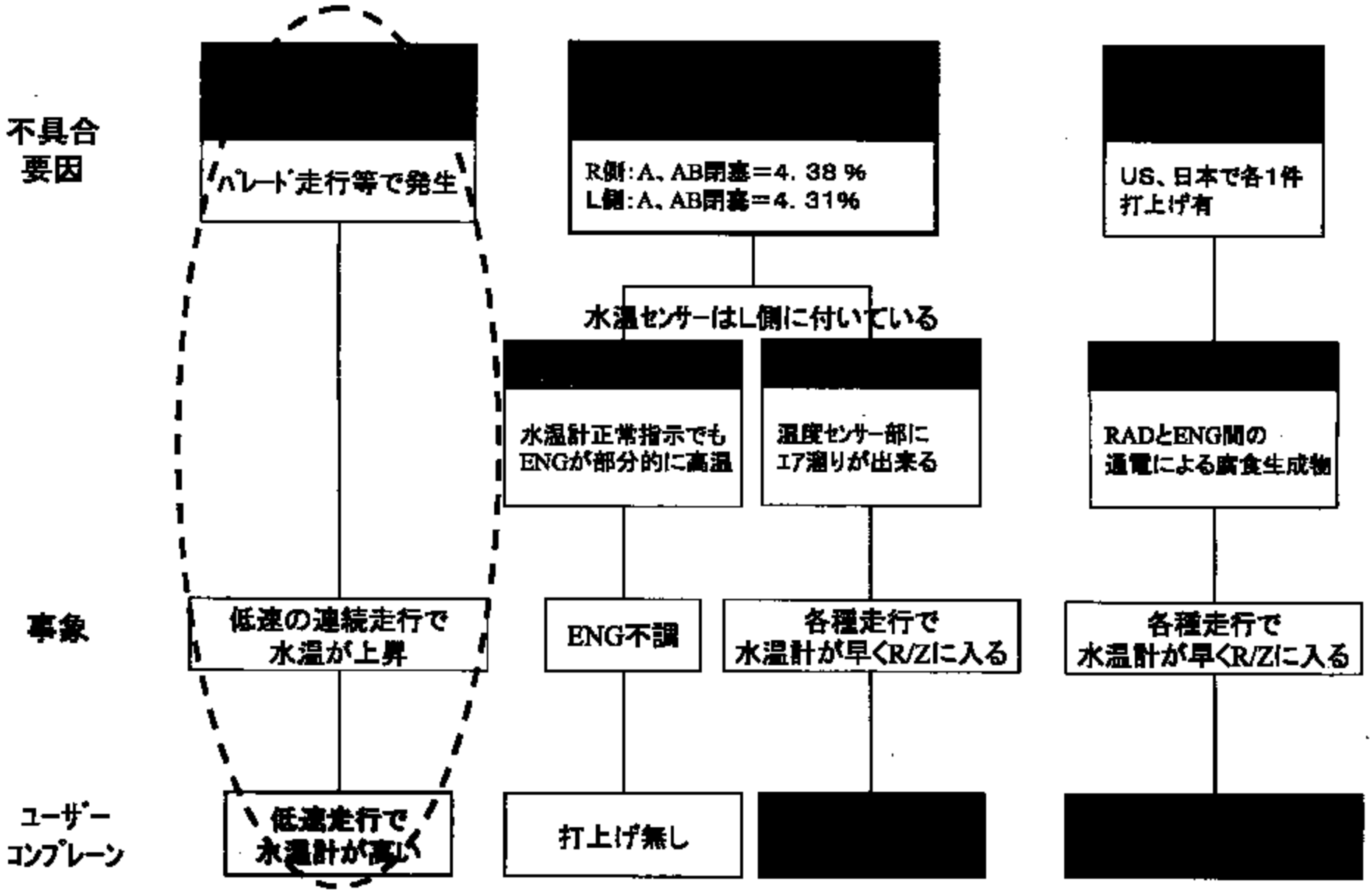


・1～2速、10～20mphの低速走行での発生が集中している。

・件数は少ないものの、3～5速、中速～高速での発生もある。



GL1800(MCA)　不具合全体概要



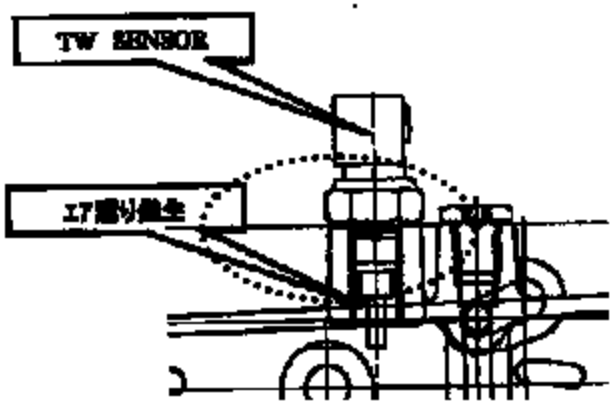
GL1800(MCA)　3-1.低速時の冷却不足

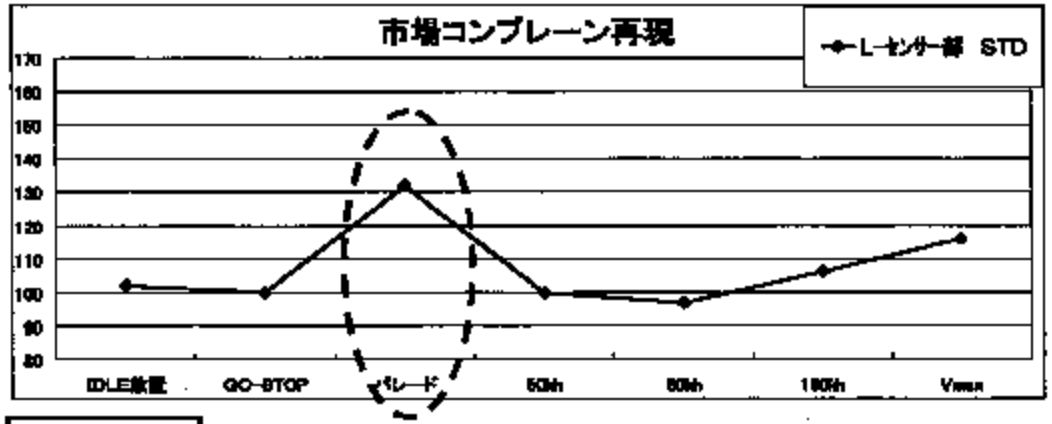
01 'YM R/Z入口温度122℃(±4．5℃)設定

・水温センサーエアー溜まりにより水温計の指示が高く表示(水温112℃でR/Zを示した)

⇒リリース直前に　サブハーネス及びハーネスに補正抵抗(2.7Ω)を追加対応

この時　低速連続走行(要件外)で水温が高いのに気付いたが
1速での連続走行は、通常使い勝手に無いと判断した。





02 'YM R/Z入口温度122℃(±4．5℃)設定

・ヘッドセンサー部を変更し、エアー溜まりを無くした。
　　但し日本仕様については渋滞を考慮し、R/Z入口温度を126℃とした

03 'YM R/Z入口温度126℃(±4．5℃)設定

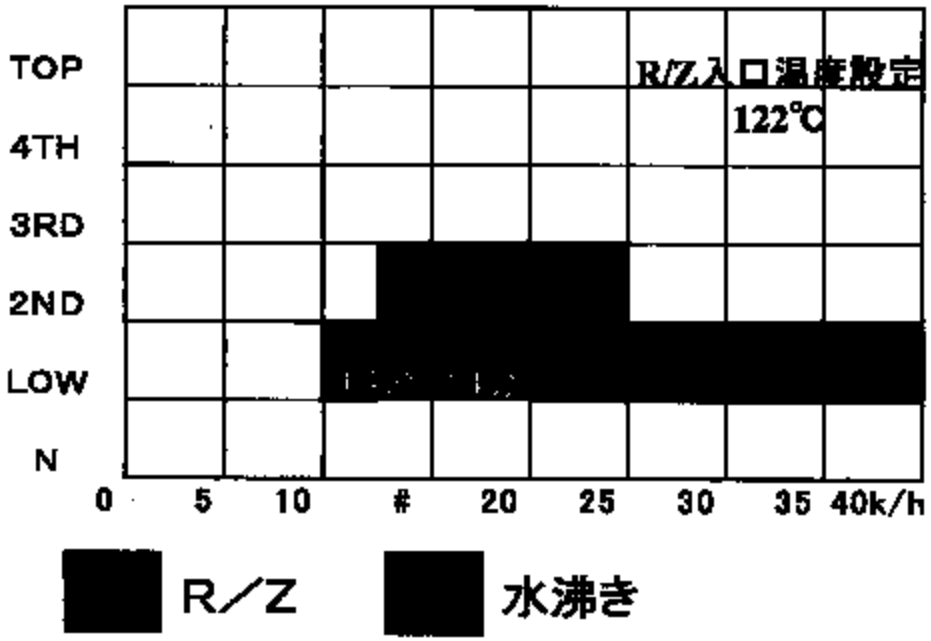
[redacted]

04 'YM 03 '仕様継続

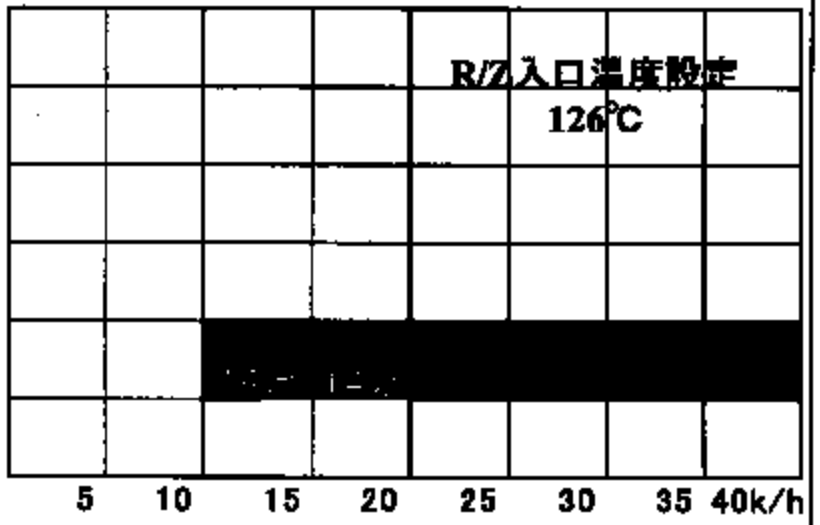
GL1800(MCA)　3-2.低速時の冷却不足

《R/Z入口温度変更時の効果》　条件:外気35℃連続走行　平坦路ギヤ固定　水温100℃スタート

01YM、02YM



03YMの対応



＋

2ndｷﾞﾔﾎﾟｼﾞｼｮﾝを使う様

ｱﾄﾞﾊﾞｲｽする

3-3.低速時の冷却不足

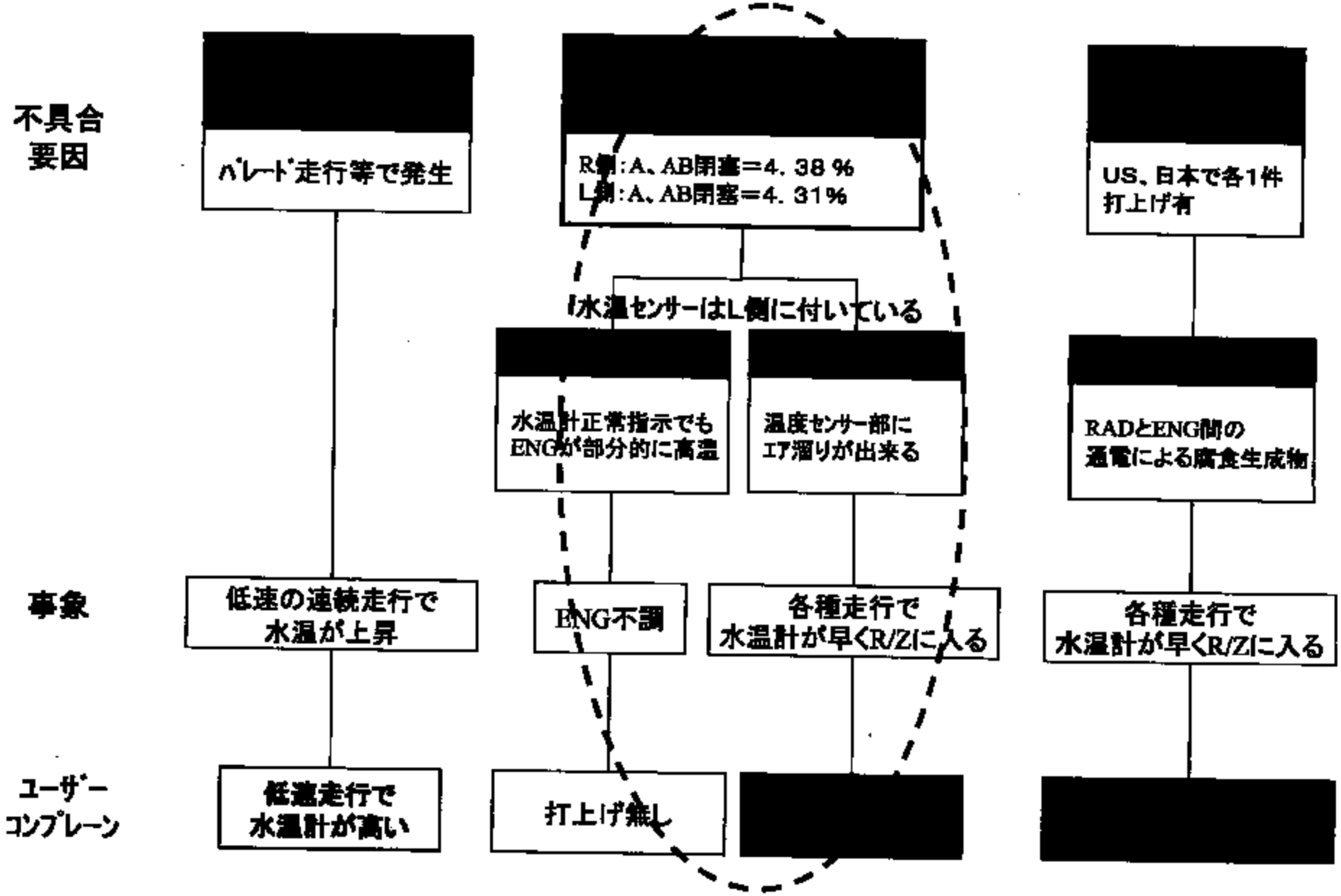
《05以降の冷却系仕様(JBP)》

下記諸元にて目標達成可能と判断する。

		JBP	MCAA (01`～04`)	ﾍﾞｰｽ比
RAD放熱量		32.2kw	26.4kw	1.22倍
FAN	ﾌﾛｰ	外引	内引	風量 2.7倍
	径	φ210	φ157	
ﾓｰﾀｰ回転数		3700rpm	3350rpm	

外観変更一覧表

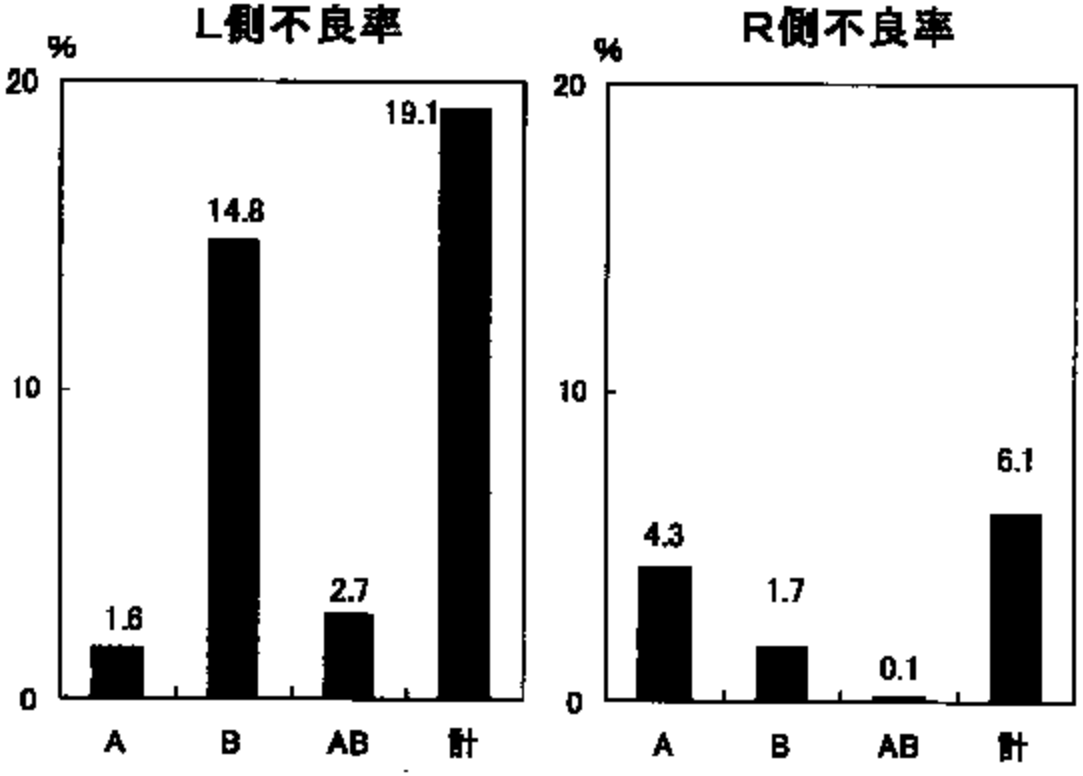
GL1800(MCA)　不具合全体概要

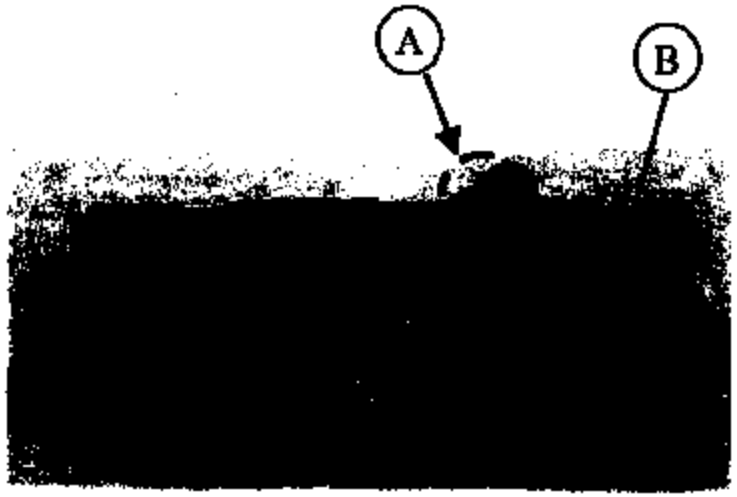


4-1. ヘッド閉塞出発点のQ/C

	1件目 (02YM)	2件目 (03YM)
QIC番号	M2M115	M3M011
QIC発行日	2002年9月3日	2002年9月6日
登録日	未販売	2002年8月23日
発生日	2002年6月11日	2002年9月5日
走行距離	20マイル (32km)	447マイル (719km)
フレームNo.	1HFSC47092A110786	1HFSC47073A202304
事象	数分間の走行後、どのスピードでも水温計がR/Zに入る。	スピードにかかわらず水温計が高温を示す。
調査結果	事象再現できた。 外観での違いなし。	アイドリング時にファンが止まらない。

4-2. シリンダーヘッドW／J閉塞推定不良率





	単品検査個数	不良個数
R側	5,544個	337個
L側	5,318個	1,016個
TOTAL	10,862個	1,353個

熱的影響の大きいA+ABの発生 （%）

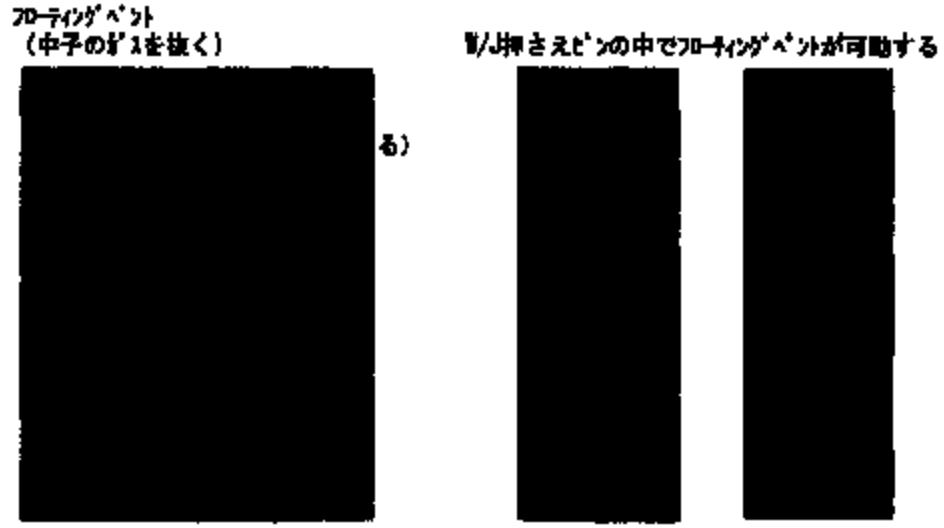
	A	AB	計
L	1.60%	2.71%	4.31%
R	4.29%	0.09%	4.38%

GL1800(MCA)　4-3. ヘッドW/J閉塞

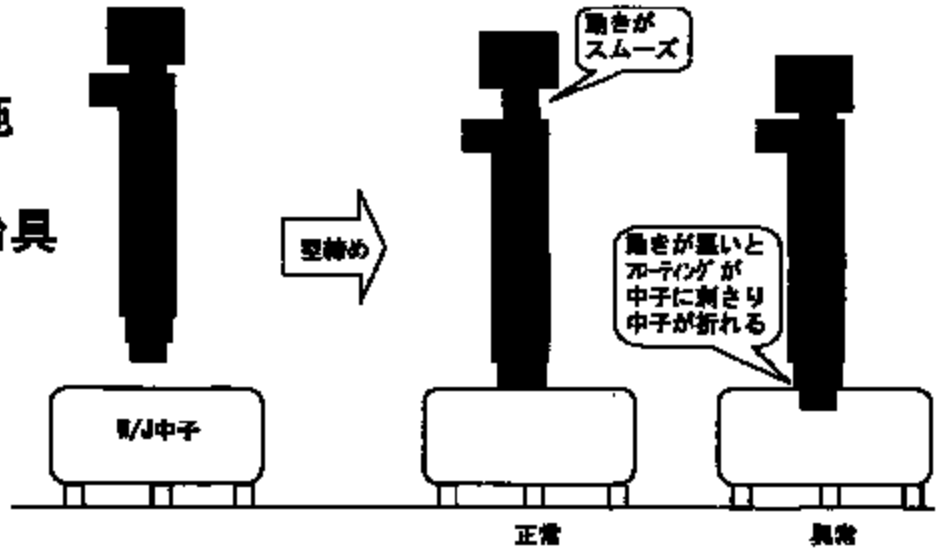
・フローティングの不具合によるW／J折れのメカニズム

フローティングベット初ロット(01'YM～)より変化点なし

不良品特定できない



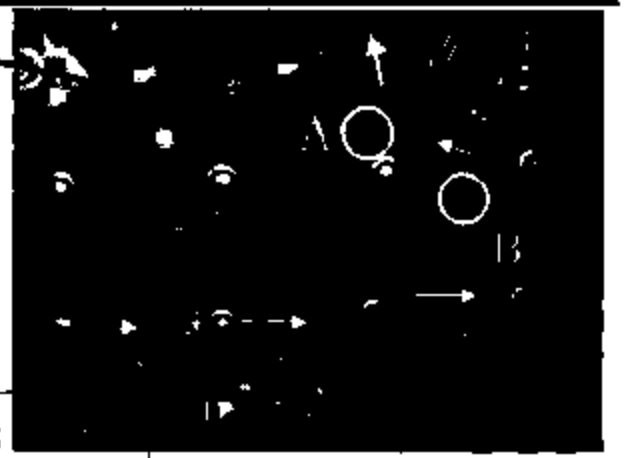
・作業標準表　9月12日から実施
旧:不具合発生時治具点検
⇒ 新:毎ショット型開き時治具点検



GL1800(MCA)　4-4. ヘッドW/J閉塞

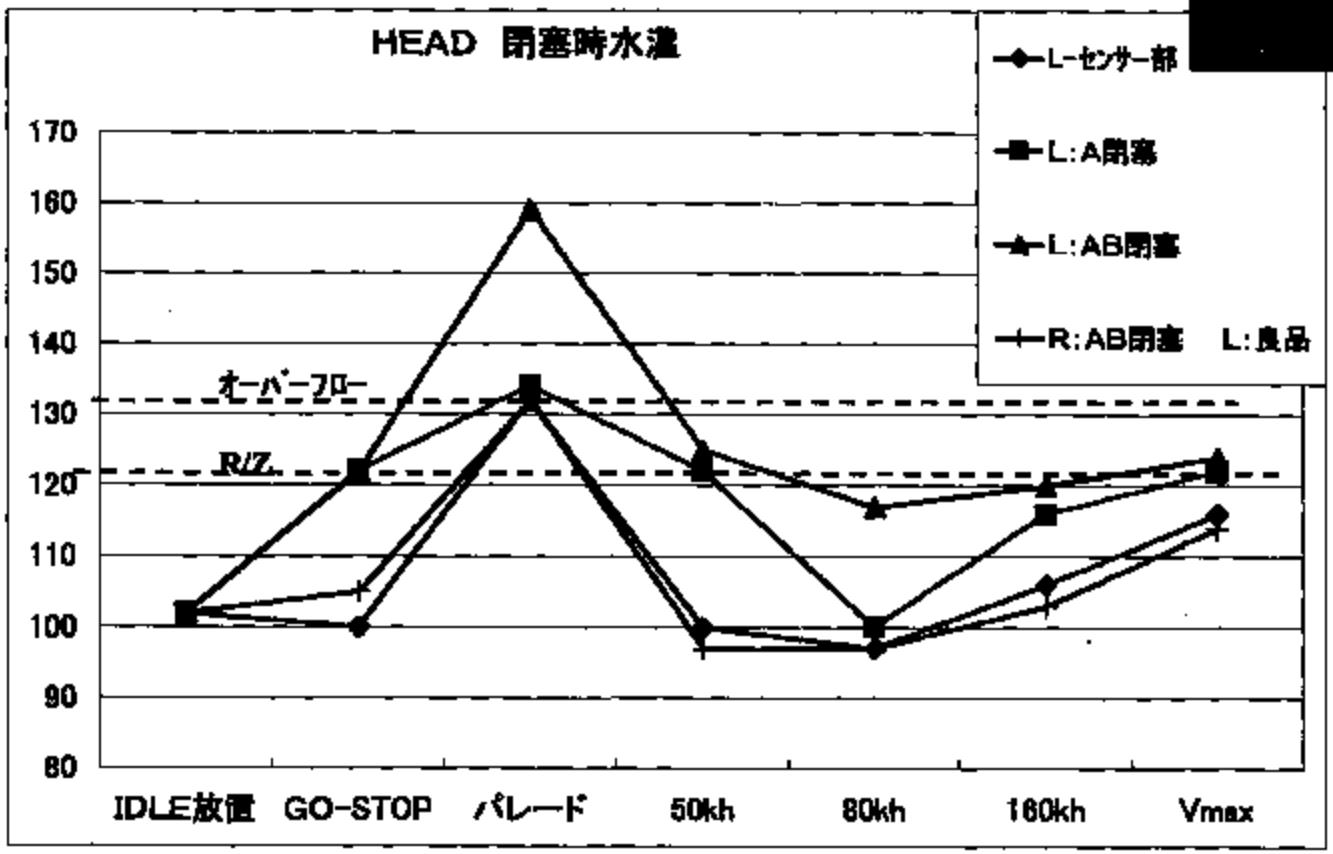
W/Jが閉塞した場合の不具合

水温センサー



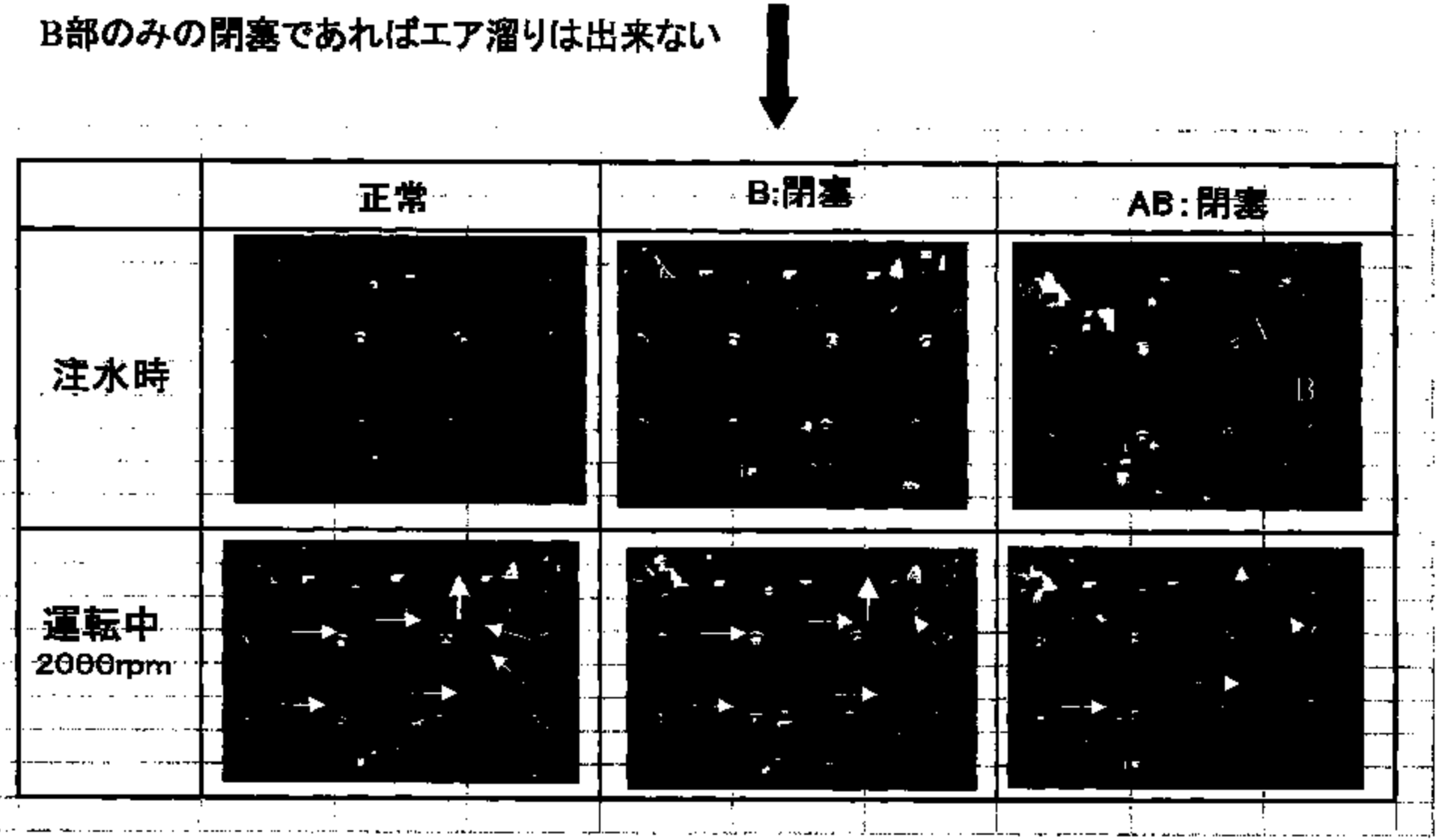
・LHﾍｯﾄﾞ閉塞は水温センサー部が、エアー溜りになり、R/Zに入りやすい。

・RHﾍｯﾄﾞ閉塞は水温センサーが無い為、水温計は正常に見えるが
LHﾍｯﾄﾞ閉塞と同様の状態になっている。



4-5. W/J閉塞時の冷却水の状態

B部のみの閉塞であればエア溜りは出来ない



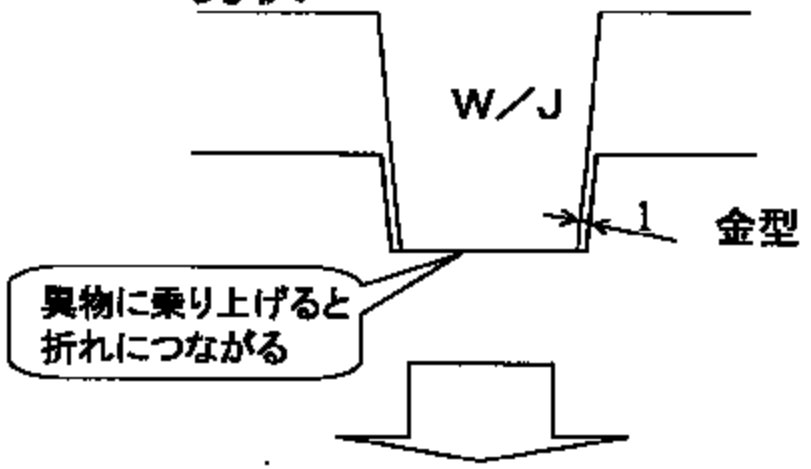
GL1800(MCA)　4-6. ヘッドW/J閉塞

・折れた中子が幅木から離脱する様にした。

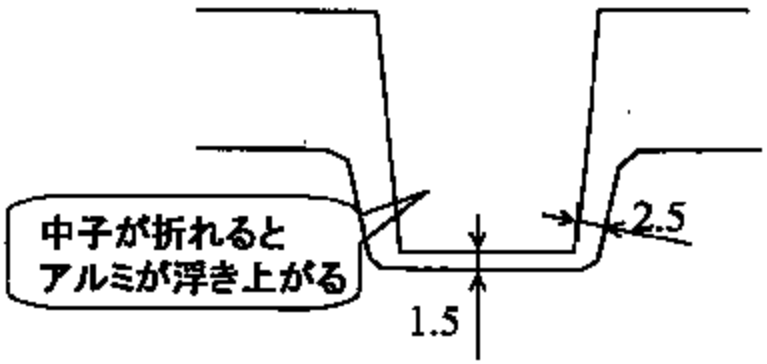
・折れ部にある足2箇所(a)がバリ等の異物に乗り上げないようにした。

8月29日より流出防止実施

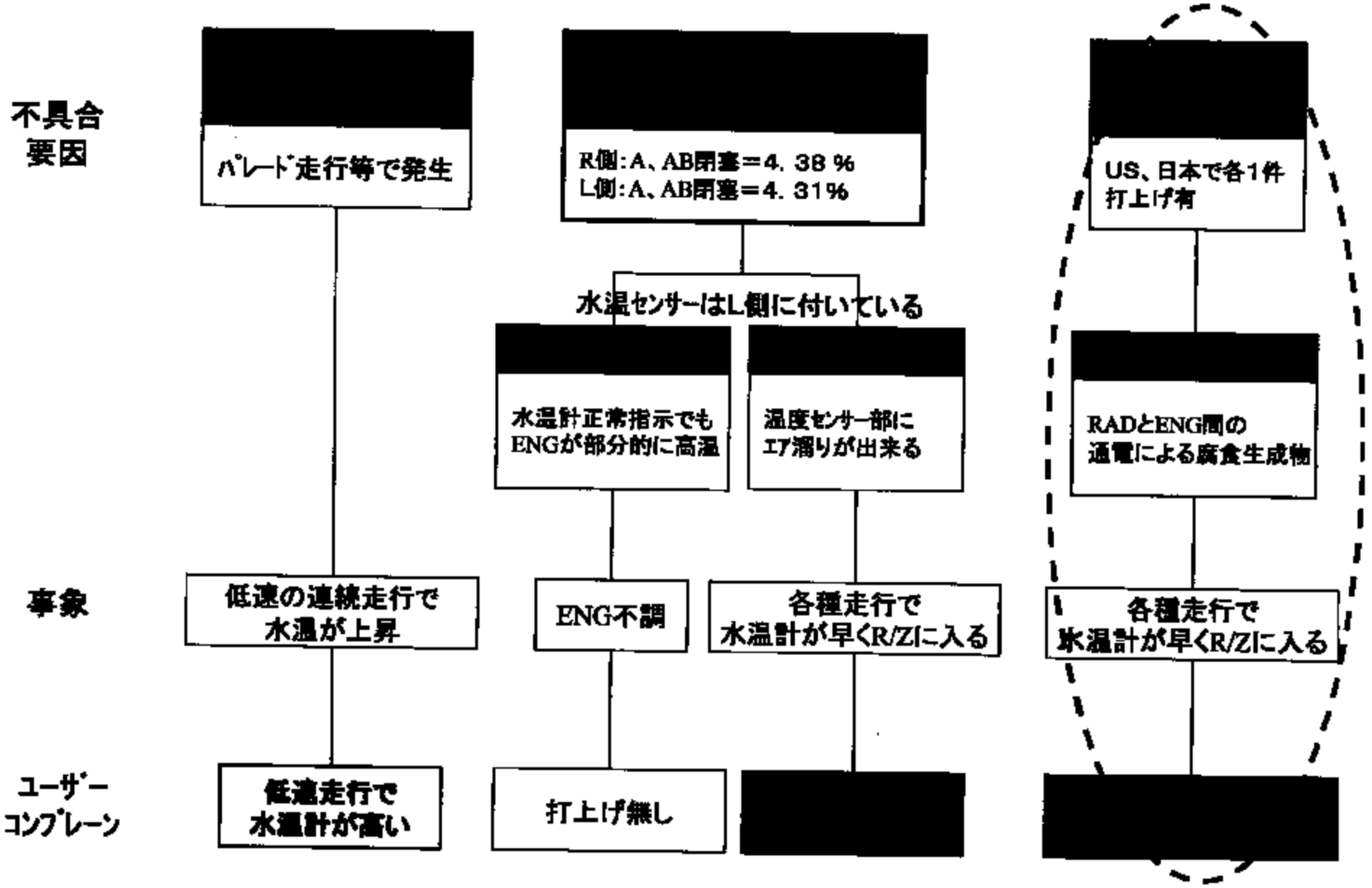
現状



対策



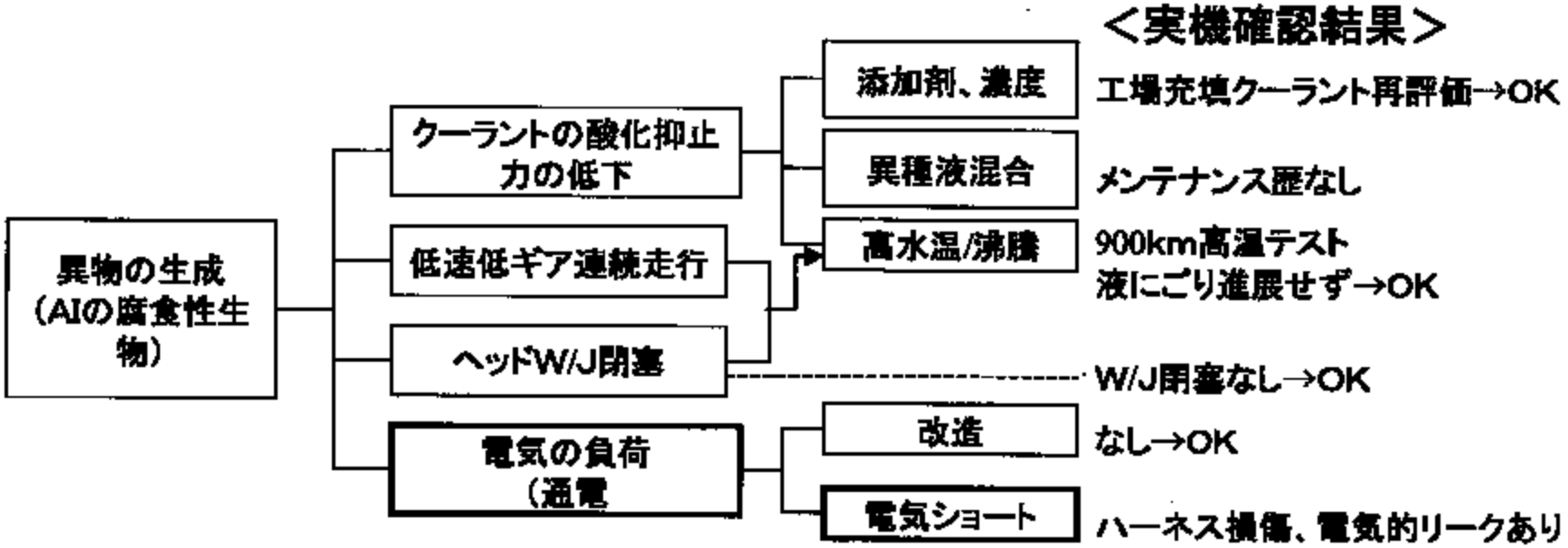
GL1800(MCA)　不具合全体概要



GL1800(MCA)　5-1. ラジエーター閉塞

ラジエター内異物によるオーバーヒートの概要(発生2件)

	1件目(日本)	2件目(USA)
発生日	2002年 7月23日	2002年 9月9日
登録日	2002年 2月22日(02'YM)	2001年 9月9日(02'YM)
走行距離	2566km	8000mile(12800km)
Frm No	SC47－1000157	1HFSC47092A101134
訴え事象	オーバーヒート 走行していると水温計が振りきれる	20分間ハイウェイスピードで走行すると 水温計がレッドゾーンに入る
確認結果	左ラジエターに異物が詰まっていた	赤外線温度計でラジエターを測ると 左:38℃　右:92℃ ラジエターを外すと異物が詰まっていた
過去のメンテ歴	クーラントのメンテ歴なし	メンテ歴なし



GL1800(MCA)　5-2. ラジエーター閉塞

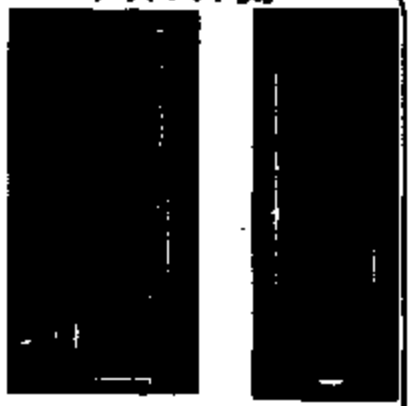
《ラジエター現品の調査結果》　特徴:パイプ部への堆積、腐食が激しい

USの事例

日本の事例

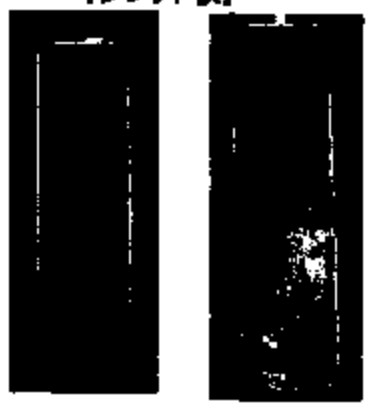
発生:02年7月23日(日本)、走行2566km

アウトレット側



洗浄後

インレット側



洗浄後

GL1800(MCA)　5-3. ラジエーター閉塞

ラジエター内異物調査結果

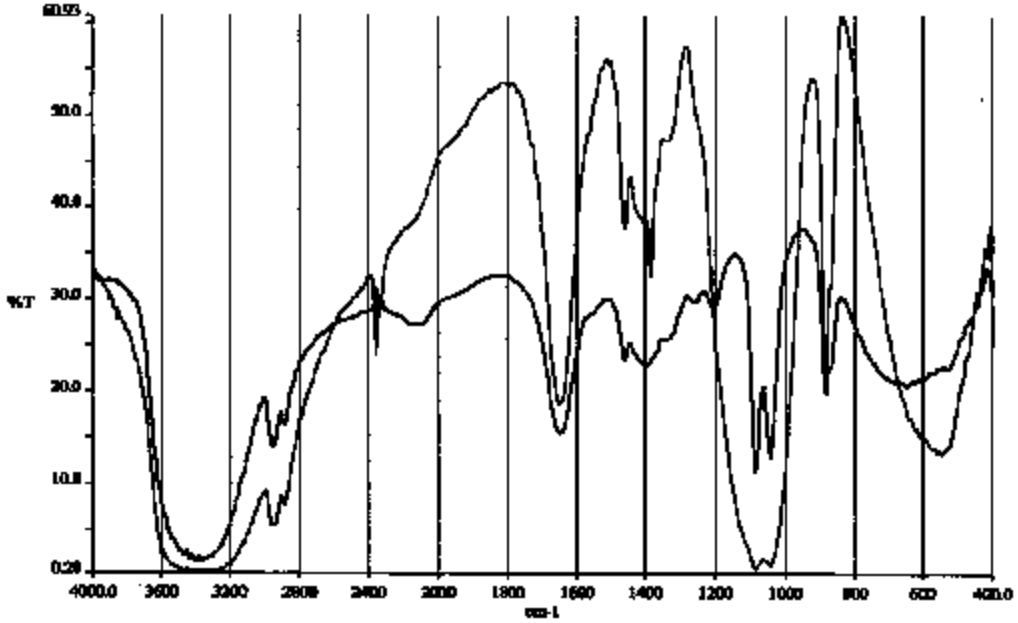
[redacted]

クーラントに含まれる成分と
アルミ酸化物が検出。

FT-IR分析結果

異物は、クーラントとほぼ同様のピークを示す。

ー異物
ークーラント



EDS分析結果

C	33. 97	%
O	34. 17	
Na	2. 67	
Al	11. 92	
Si	1. 73	
P	9. 34	
S	0. 72	
K	4. 30	
Mo	1. 17	

5-4. RAD内異物の実車再現テスト結果

PART-1　高エンジン温の影響

・ﾍｯﾄﾞ:R側AB閉塞、L側OK　・ﾓｰﾄﾞ:LOW15km/hの連続(風量調節)

①0～300km　クーラントに濁りが発生
②300～600km　進展無し
③600～900km　進展無し

➡ 異物生成の原因ではない

PART-2　(PART-1 ＋ 電気負荷12V)

①0～300km(追加)　ﾗｼﾞｴﾀｰﾊﾟｲﾌﾟ、及びﾎｰｽの内側に、ゲル状の異物が発生

ラジエターパイプ(出口)

エア抜きパイプ

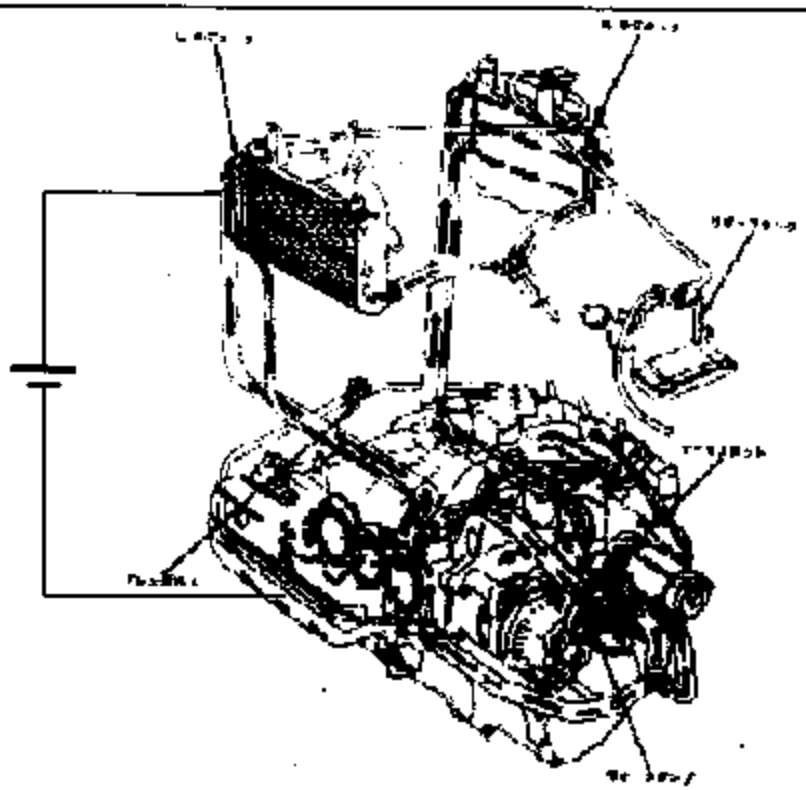
5-5. 事象車確認結果

テーピング剥離及びコード被覆傷付き
あり

RAD上部、前方のSUSクリップ端面
にエッジあり。

原因

ラジエターが誤配線による ワイヤーハネスの損傷により電荷され、
クーラントを電解液として、ラジエターとエンジン間の電気分解が発生した。



製造もしくは整備でのイレギュラーと判断する

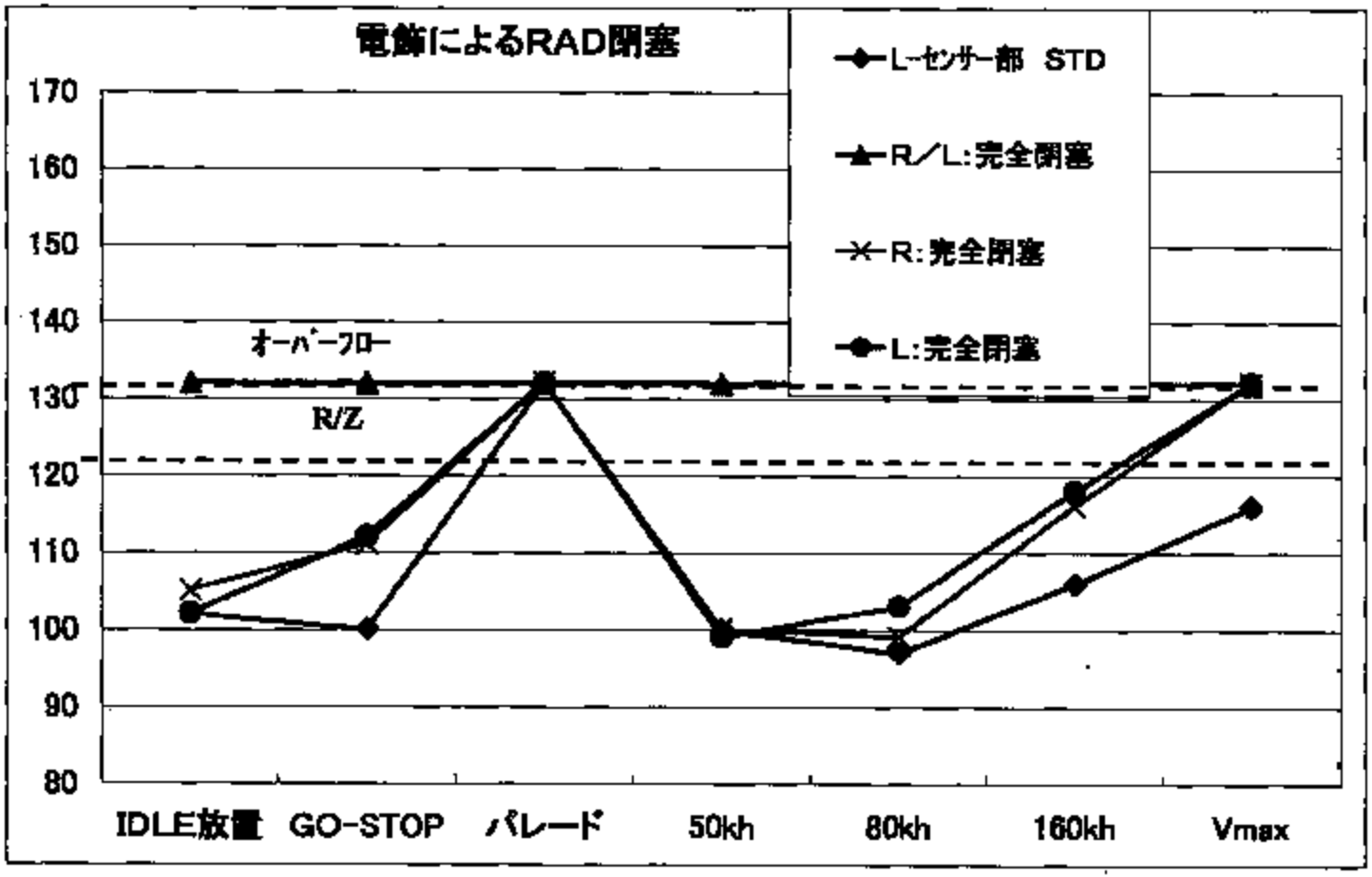
GL1800(MCA)　5-6. RAD閉塞

RADが閉塞した場合の不具合

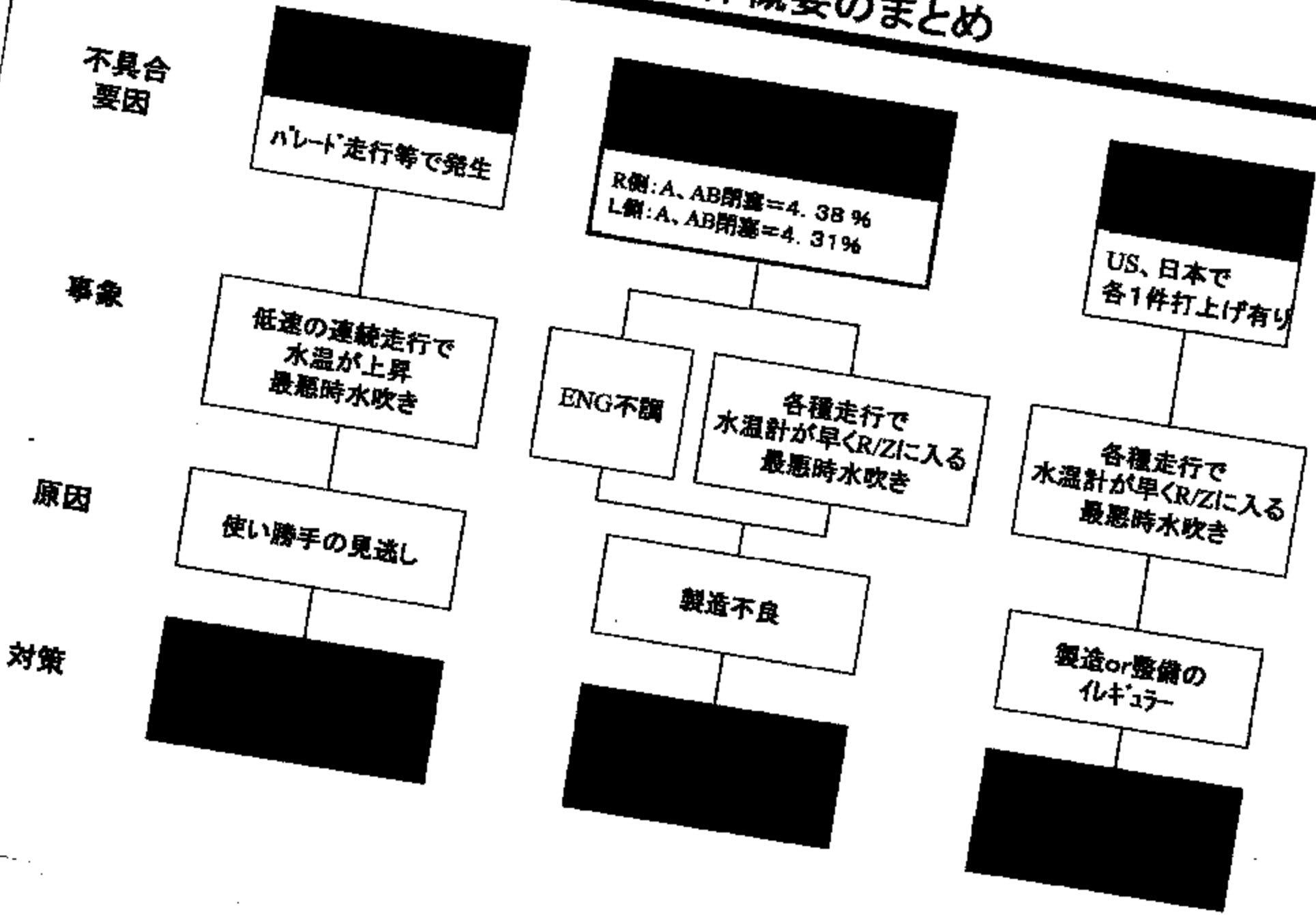
・R、L 片方のRADが閉塞した場合、高速域でR/Zに入りやすい。

・R、L 両方のRADが閉塞した場合、あらゆる走行でR/Zに入りやすい。

イレギュラーと判断
点検項目とする。

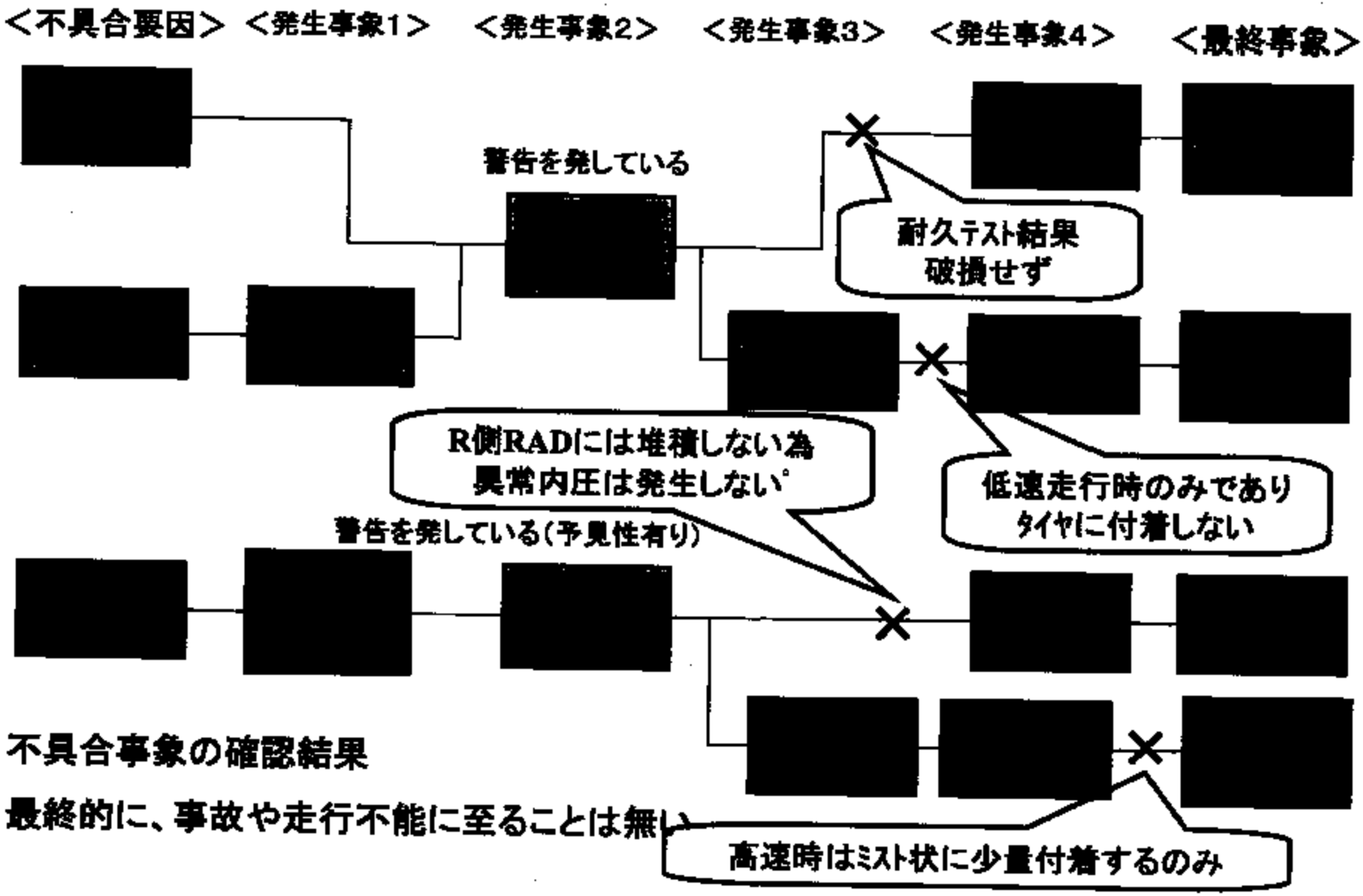


不具合全体概要のまとめ



6.安欠性要因分析

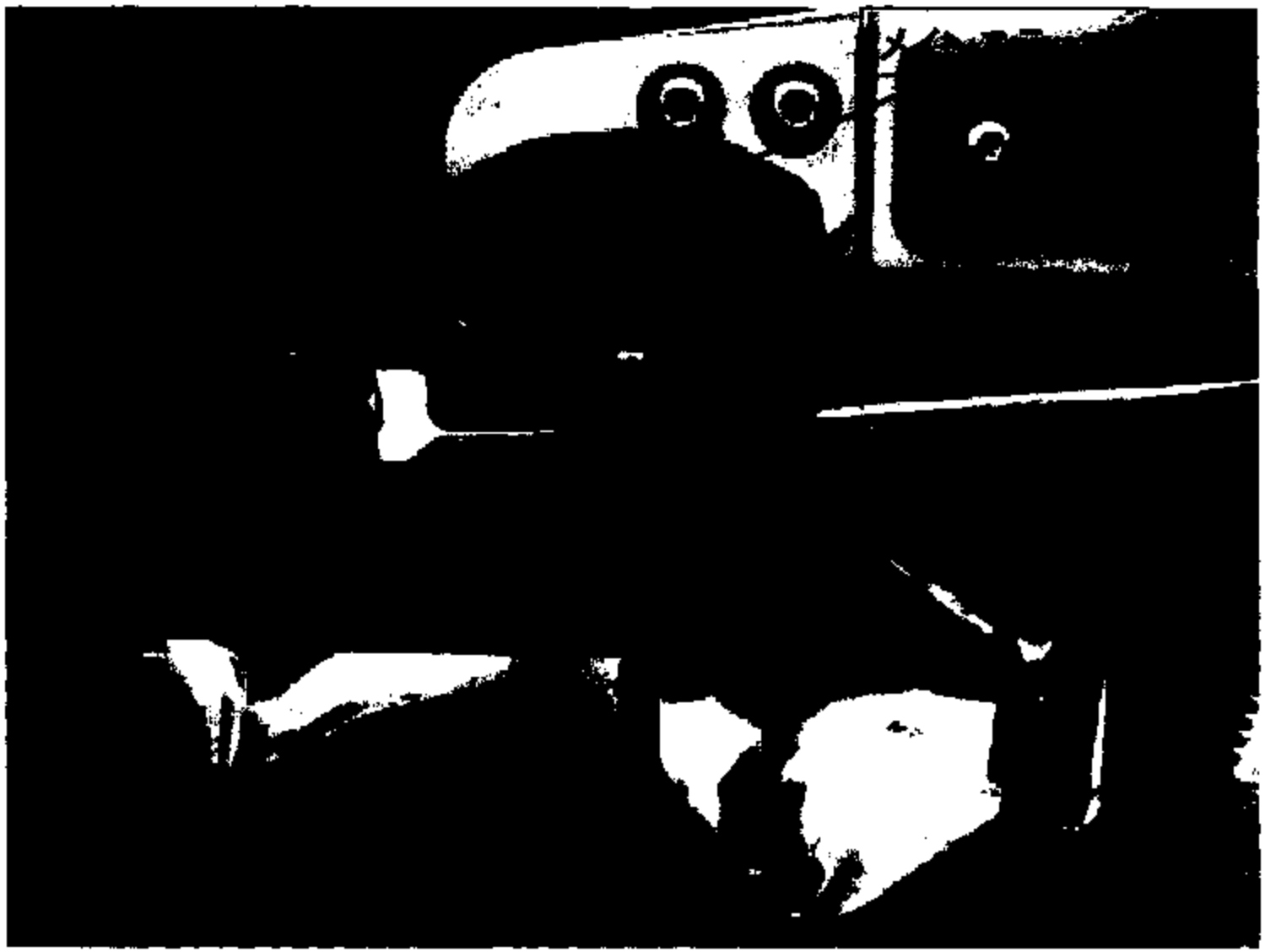
GL1800(MCA)　6-1.不具合事象確認結果



不具合事象の確認結果

最終的に、事故や走行不能に至ることは無い

6-2

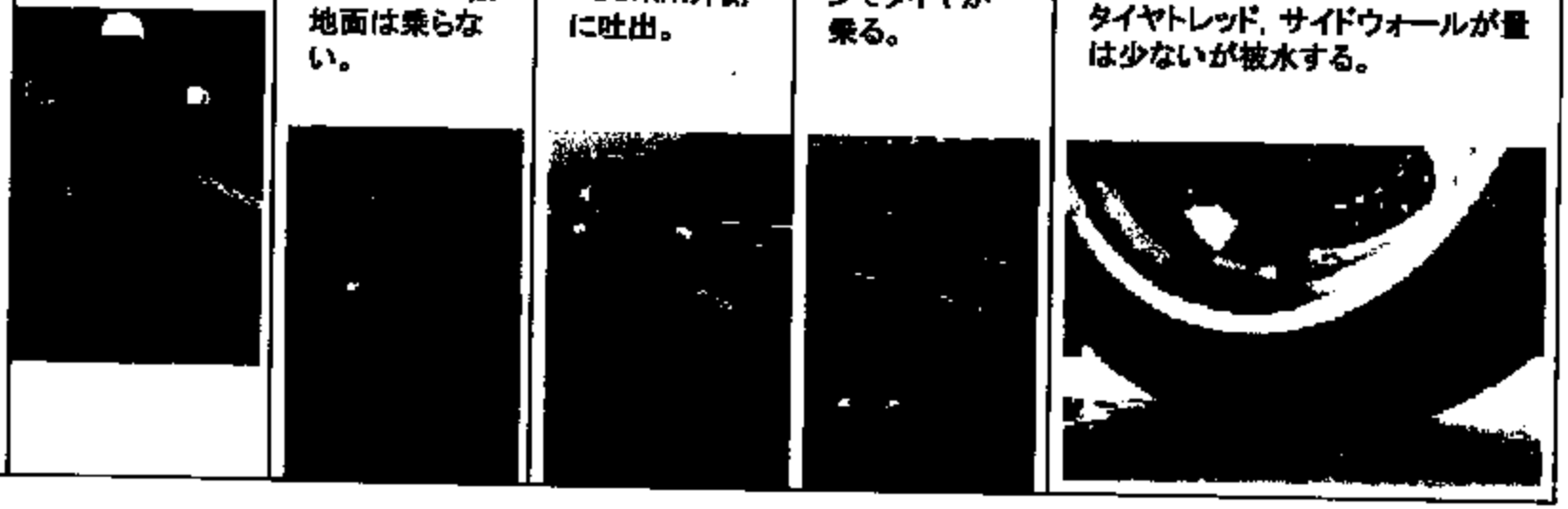


・ラジエタードレンチューブは、ライダーの足に冷却水が掛からない位置に設定されている。

GL1800(MCA)　6-3. 不具合事象確認結果

冷却水オーバーフロー吐出時のRrタイヤへの被水状況

走行条件	パレード走行		強制的(冷却風CUT)なオーバーヒートでの確認			
	20km/h走行		80km/h走行		120km/h走行	
	直進	スラローム	直進	スラローム	直進	スラローム
水付着タイヤに有無	無	無	無	有	有	有
状況	タイヤサイドから30mm外側に吐出。	路面上の吐出航跡に左ターンでもタイヤ接地面は乗らない。	20km/h同様にサイドから約30mm外側に吐出。	路面上の吐出航跡に左ターンでタイヤが乗る。	吐出水は走行風によりミスト状となり拡散。 タイヤトレッド，サイドウォールが量は少ないが被水する。	



尚、一連の実走確認を通して、ｱｽﾌｧﾙﾄ舗装路ではﾀｲﾔｽﾘｯﾌﾟを感じる事は無かった。

6-4.GL1800 路面μの影響(検討結果)

～1)路面μ違いでのﾊﾞﾝｸ可能角度

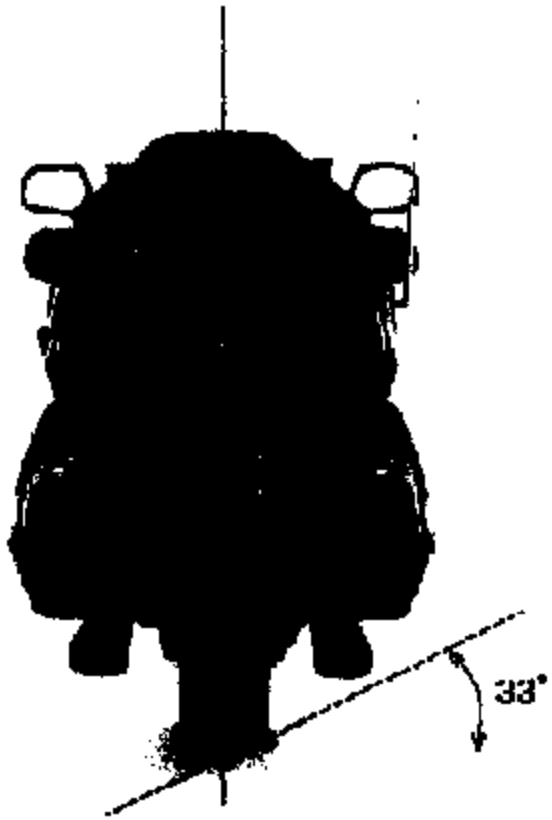
	路面μ	相当するﾊﾞﾝｸ角(deg)
DRY	0.95	43.5
WET	0.8～0.85	38.7～40.4

＊路面μ:制動Gから算出(HGP-T総合路)

～2)ﾚｲｱｳﾄ上のﾊﾞﾝｸ角度

1名乗車時:33deg

(右図参照)



上記～1)～2)より、仮に冷却水がﾀｲﾔに付着しても通常のｽﾗﾛｰﾑの範囲では問題無い。

GL1800(MCA)　6-5.不具合事象確認結果

CYLヘッドW/J閉塞でのENG耐久性

水吹き後、全開走行での事象確認(RL共にAB閉塞)

①パレード走行相当で水吹きさせる

・ﾊﾟﾚｰﾄﾞﾓｰﾄﾞでﾄｰﾀﾙ6．8Hr運転し、1．3Lの冷却水がｵｰﾊﾞｰﾌﾛｰした。

②その後、EH高耐実施(100Hr)

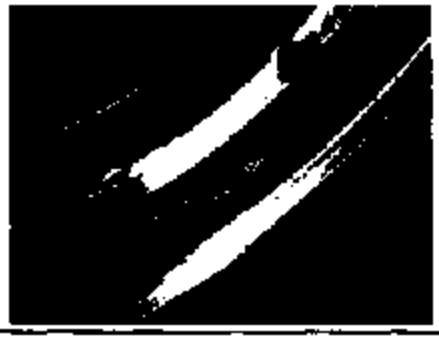
・100Hr運転後、破損、出力低下等の致命的な不具合は無し。

・分解結果、ﾌｧｲﾅﾙｷﾞﾔのﾋﾟｯﾁﾝｸﾞ、ﾋﾟｽﾄﾝﾄｯﾌﾟﾗﾝﾄﾞの強い当りが確認され、
更に進展すると、ENG異音につながると推定される。

	今回耐久時	正常時(開発時)
プラグ座温度(#1)	186～204℃	133～160℃
油温(ﾄﾞﾚﾝ部)	94～150℃	119～128℃
冷却水(ﾍｯﾄﾞ出口)	102～118℃	91～95℃

6-6. 耐久不具合項目

不具合	ファイナルギヤピッチング	#3ピストン トップランド当り	コンロッドメタル(#1～6) 当り強い
状態			
推定原因	高油温下での オイル潤滑性能劣化	冷却水減少による ピストン頭頂部の温度上昇	高油温下での オイル潤滑性能劣化

不具合	クランクジャーナルメタル (#1～4)当り強い	クランクジャーナル 当り強い	クランクピン(#1～6) 当り強い	タペットクリアランス 変化:大
状態				MAX +0.05mm (目標0.04mm以下)
推定原因	高油温下での オイル潤滑性能劣化	高油温下での オイル潤滑性能劣化	高油温下での オイル潤滑性能劣化	カーボン噛み

7-1.市場措置案提案

今回の冷却系不具合解析結果により、最終事象として冷却水の噴出しはあるものの転倒、火傷には至らない事が判明した。

従って、商品性問題と判断するが、冷却性能低下の一因に、製造不良（ヘッドWJ閉塞）も含まれている。

よって積極市場措置案を提案する。

1、措置に関しては、各国の実情に合わせて実施する。

2、既販車については、全ユーザーにレターを発行し
組替えを実施する

7-2.市場措置案提案

案 [redacted]

<措置方法>

ダイレクトメール案内

水温計に何らかの異常(R/Zに突入)が確認された方。

YES → ディーラーに来店

NO → そのまま走行

ディラーにて点検

ハード不備修正 ← → 安心対応付加

	ヘッド閉塞	RADリーク点検	センサー精度アップ128±2℃	2nd アドバイズ
01モデル	○ RH/LH	○	○	○
02モデル	○ RH/LH	○	○	○
03モデル	○ RH/LH	○	○	○

7-3.市場措置案提案

＜発生率＞

	NHTSA訴え数93件に対しMYが判明	TECH／CR QIC	AHが知っている件数	AH総数	発生率
01M	15台	129	144	8996	1. 60%
02M	36台	217	253	13519	1. 87%
03M	6台	19	25	1949	1. 28%
計	57台	365	422	24464	

＜想定される来店者数－全世界＞

01M　13914台 X 1. 60 ＝223台X3＝669台

02M　18100台 X 1. 87 ＝339台X3＝1017台

03M　 7240台 X 1. 28 ＝ 93台X3＝279台

655台　1965台

↓

2000台

＜必要ヘッド数＞

	R	L
01M	39234 X4. 31% ＝1691	39234 X4. 38% ＝1718
02M		
03M		
計	1691台	1718台

最終的には

R,L各2000台

GL1800(MCA)　7-4.措置費用概算

全世界TOTAL 39234台対象 [redacted]

ヘッドASSY供給個数

[redacted]

1. CYLヘッドASSY　14500円×4000個＝58000千円

＋

2. センサー　15, 000円×2000個＝30000千円

＋

3. 工賃　49, 823円×2000X1. 5＝149469千円

4. 投資額:　62200千円

・部品代:パーツ価格:70%設定

・部品代と工賃のみの概算

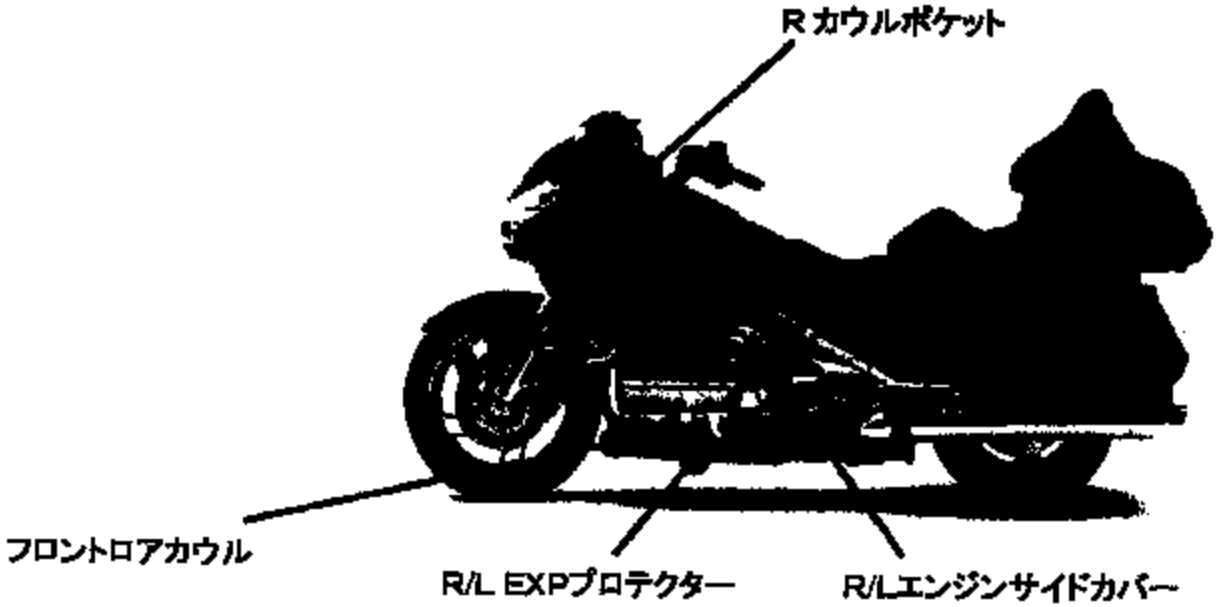
W/H改修費用・部品発送費用等は含まれていない。

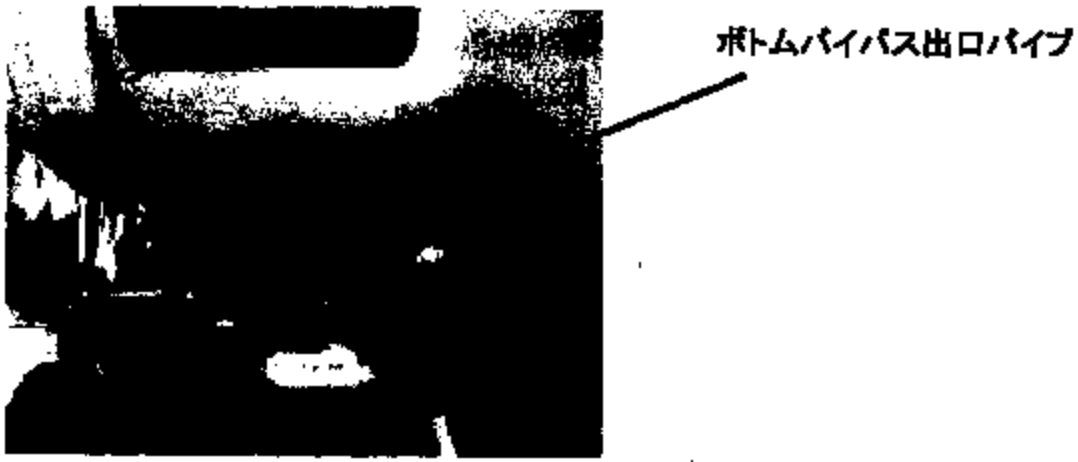
299669千円

＊2月末に1700セット(ASSY)完予定

7-5.GL1800-シリンダ・ヘッドW J点検方法　1／2

- **準備**





7-5.GL1800-シリンダ・ヘッドW J点検方法　2／2

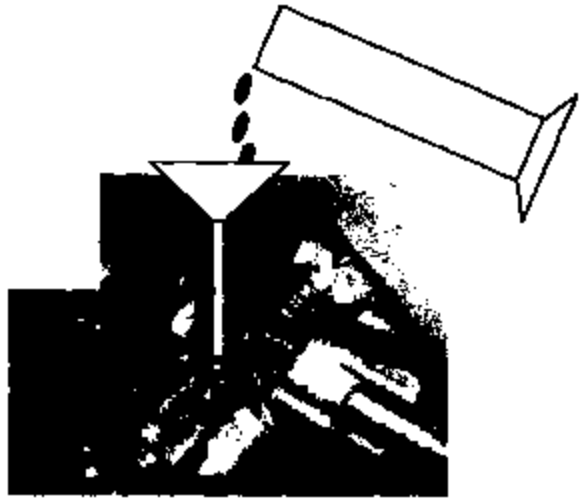
- **点検方法**

1. A部閉塞　ボトムバイパス出口からシリンダーW/J内に水を注入する。
A部が閉塞するとエア噛みが発生し注入量が減る。

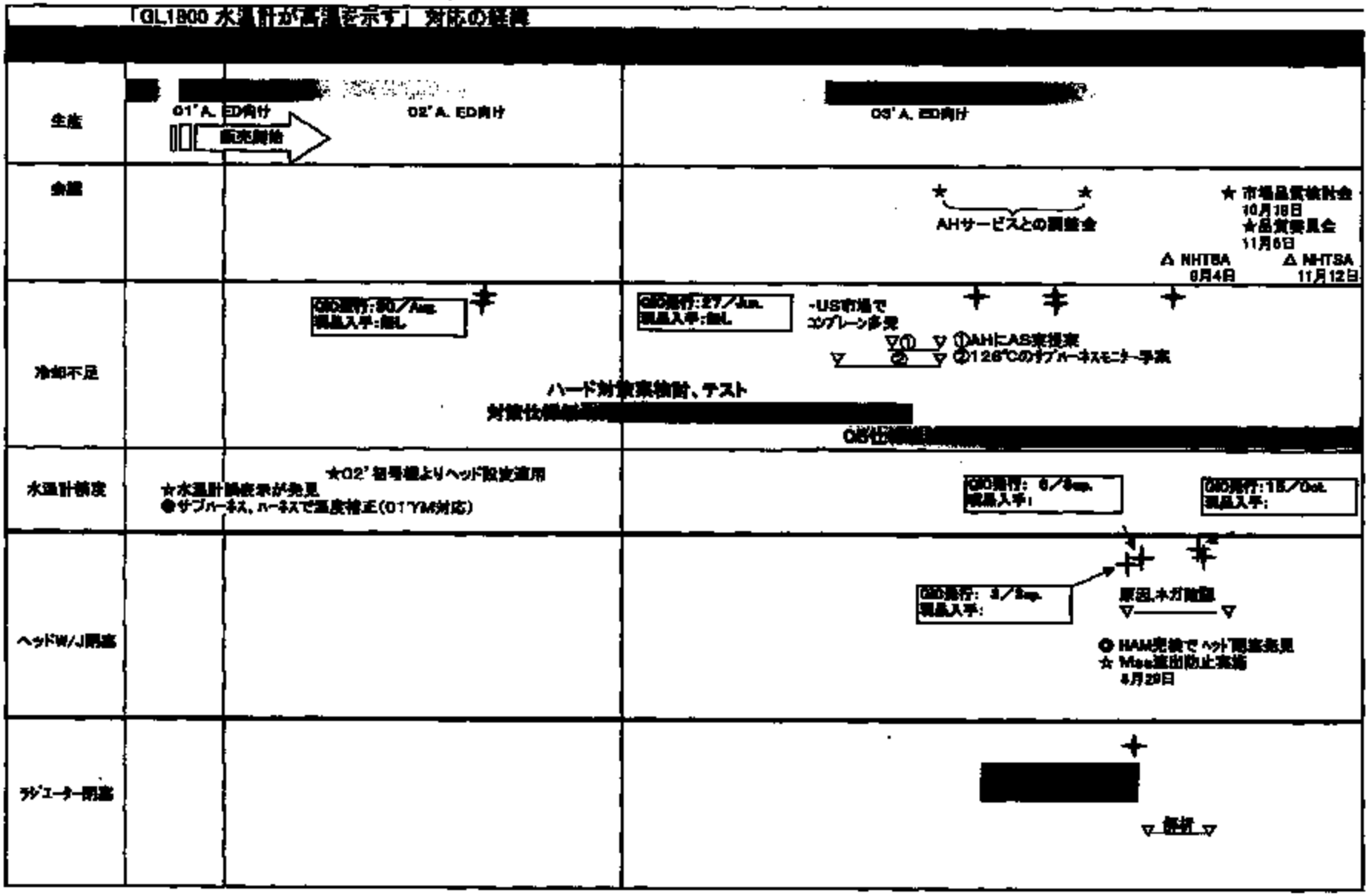
良品：(600cc)
閉塞：(500cc)

判定方法　:一定量(600cc)注入した時に

・オーバーフロー無し → 良品
・オーバーフロー有り → 閉塞品



8.対策経緯

「GL1800 水温計が高温を示す」対応の経緯

生産	[redacted] 01'A. ED向け 販売開始	02'A. ED向け	[redacted] 03'A. ED向け
会議			★ AHサービスとの調整会 ★ ★ 市場品質検討会 10月18日 ★品質委員会 11月6日 △ NHTSA 9月4日 △ NHTSA 11月12日
冷却不足	GIO発行:30/Aug. 現品入手:無し		GIO発行:27/Jun. 現品入手:無し -US市場でコンプレーン多発 ①AHにAS実提案 ②126℃のサブハーネスモニター手案
	ハード対策案検討、テスト 対策仕様[redacted]		05仕[redacted]
水温計精度	★02'初号機よりヘッド設定適用 ★水温計誤表示が発見 ●サブハーネス、ハーネスで温度補正(01'YM対応)		GIO発行: 6/Sep. 現品入手: GIO発行:15/Oct. 現品入手:
ヘッドW/J閉塞			GIO発行: 3/Sep. 現品入手: 原因,ネガ確認 ◎ HAM完検でヘッド閉塞発見 ☆ Mse流出防止実施 4月29日
ラジエーター閉塞			[redacted] 解析