maintenance-site-vpt ▸ Driveline - Active Issues… Question 9 Describe all modifications or changes made
All Documents

[redacted]

Type	Name	Modified	Modified By
	QJ 1-1359387371 AMT clutch disc spring worn or broken	4/10/2013 10:06 AM	Säfblad Katarina
	QJ 1-1334805167 432-218 AMT clutch cylinder control	4/9/2013 12:55 PM	Säfblad Katarina
	QJ 1-1345786621 AMT clutch cylinder bearing seized	4/9/2013 12:58 PM	Säfblad Katarina
	QJ 1-1413013293 AMT Clutch valve unit cables squeezed causing problems	4/9/2013 1:14 PM	Säfblad Katarina
	QJ 1-1480701871 Jerking when starting	4/10/2013 10:04 AM	Säfblad Katarina
	QJ 1-1491230931 CVU electric faults	4/10/2013 10:05 AM	Säfblad Katarina
	QJ 1-1491230955 AMT MID130 PSID27 FMI8 - frequent occurrence in UD and VTNA trucks	4/10/2013 10:05 AM	Säfblad Katarina
	QJ 431-698 AMT cylinder (clutch) worn guiding strips	4/9/2013 1:05 PM	Säfblad Katarina
	QJ items since 2007 for AMT concerning US	4/10/2013 10:37 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

QJ 1-1334805167

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1-1334805167 432-218 AMT clutch cylinder control
All Documents

[redacted]

Type	Name	Modified	Modified By
	Air leakage_DD	4/9/2013 1:06 PM	Säfblad Katarina
	Air leakage_SW improvements	4/9/2013 1:07 PM	Säfblad Katarina
	ER_6319141	4/11/2013 1:54 AM	Säfblad Katarina
	ER615784	4/11/2013 1:54 AM	Säfblad Katarina
	Internal notes QJ 432.218	4/9/2013 2:49 PM	Säfblad Katarina
	I-Shift_1_6_0_FH_FM_NH	4/9/2013 2:50 PM	Säfblad Katarina
	K-FMEA_2_090624	4/9/2013 2:50 PM	Säfblad Katarina

Add document

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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

Air leakage_DD

Short summary of changes

- Yellow warning if problem to disengage clutch or gear
  RED warning and buzzer if not possible to disengage the clutch
- Activate the disengage valves fully if air leakage
- Shift to neutral at stand still if air leakage
- Try to shift gearbox to neutral even if the clutch not is completely disengaged when standing still or before a stop
- Show current gear to the driver if the gear lever is in neutral ? To be checked with 3P and VTC
- No idle driving if there is a fault code for air leakage
- No I-roll if there is a fault code for air leakage

Small leakage in air supply

- Small leakage in the air supply the compressor will be able to maintain the air pressure

- No effect

Medium leakage in air supply

- Medium leakage in the air supply the compressor will not be able to maintain the air pressure for long time, the pressure will drop.
- This leakage will be noticed in following situation:
  - Change gears when driving
  - Stand still with gear engaged
- If normal position controller not is able to disengage the clutch:
  - Yellow warning for low air pressure
  - Red warning if not possible to disengage the clutch, applicable when driving
  - The gearbox is shifted to neutral if standstill with gearlever in A,M or R and engaged again when the driver press the accelerator pedal.
- Critical situations:
  - Not possible to disengage at stop if air pressure have dropped before
  - Maybe gear clash if the clutch position sensor is faulty
  - Not possible to engage any gear if air pressure dropped to much

Large leakage in air supply

- Large leakage in the air supply the compressor will not be able to maintain the air pressure, the pressure will drop quickly.
- This leakage will be noticed in following situation:
  - Change gears when driving
  - Stand still with gear engaged
- If normal position controller not is able to disengage the clutch:
  - Yellow warning for low air pressure
  - Red warning when try to disengage the clutch, applicable when driving
    - The gearbox is shifted to neutral if standstill with gearlever in A,M or R and engaged again when the driver press the accelerator pedal.
    - The gearbox will be shifted to neutral if possible even if the clutch not is fully disengaged.
- Critical situations:
  - If air supply not is enough to shift to neutral valid for 4 minutes after stop
  - Not possible to disengage at stop
  - Not possible to engage any gear

Small leakage in clutch system

- Not possible to stand at disengage position for long time due to maximum 10 % on the disengage valves
- This leakage will be noticed in following situation:
  - Gear lever in A, M or R
  - Vehicle is stand still with gear engaged
- If Disengage valves are used close to the maximum limit for more than about 3 seconds
  - Yellow warning
  - the gearbox is shifted to neutral if stand still with gearlever in A,M or R and engaged again when the driver press the accelerator pedal.

Medium leakage in clutch system, level as in US

- Medium leakage it is not possible to control the clutch with the normal control routine.
- This leakage will be noticed in following situation:
  - Change gears
  - Shift to neutral
  - Stand still with gear engaged
- If normal position controller not is able to disengage the clutch:
  - Yellow warning
  - Open disengage valves more, up to 100 % on both valves
    May result in that we disengage the clutch fully.
  - The gearbox is shifted to neutral if stand still with gearlever in A,M or R and engaged again when the driver press the accelerator pedal.
- Critical situations:
  - Maybe gear clash if the position sensor is faulty

Large leakage in clutch system

- Large leakage, the clutch will be engaged even if the disengage valves are fully open.
- This leakage will be noticed in all situation when we shall disengage the clutch.
  - Stand still with gear engaged
  - Disengage due to stop
- If not possible to disengage or stay disengage
  - Red warning and buzzer
  - Try to shift to neutral for a sort time even if clutch not disengaged if stand still or for stop
  - Activate disengage valves fully until neutral or engine not running
- Critical situations:
  - Not possible to disengage when stopping the vehicle
  - No gear shifts when moving, not even if driver request Neutral
  - Clutch is engaged if stand still without parking brake active and air leakage from zero to large quickly within 4 minutes from the parking brake was applied. (shift to neutral if stand still for more than 4 minutes)
  - Clutch is engaged if stand still with parking brake active and air leakage from zero to large quickly within 4 minutes from the parking brake was applied
  - Not possible to engage any gear

Remaining of critical situations whit air leakage

1. Driver in cab with fault engaged driveline
   - Red warning and buzzer to driver and driver can take action
2. Driver leaves cab with gear lever in A,M or R
   - Risk if large air leakage in clutch system or large air leakage in air supply within 4 minutes from stand still

Possible action for case 2:

- Evaluate if it possible to have this leakage in the clutch system
- Decrease the 4 minutes time when parking brake is active
- Turn of the engine

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

Air leakage_SW improvements

Summary of possible actions in TECU

- Yellow warning based on time limits for valves
- Yellow warning if the normal controller not able to control the position
- Red warning and a buzzer if not possible to disengage the clutch
- RED/Yellow warning standstill?? if we not are able to shift to neutral even if the clutch is disengaged. Improve today's warning.
- Increase the control signal to the disengage valves. For all modes. Increase if not correct after a short time. Not fully if standstill with gear in neutral and fully if gear engaged. Same for engagement ?
- Try to shift gearbox to neutral even if the clutch not is completely disengaged when standing still
- Shift to neutral if problem to keep the clutch disengaged even if gear lever is A,M or R at standstill
- If there has been a problem with air leakage the clutch is disengaged for a time and check that it is possible to stay disengaged before a gear is engaged, next time a gear shall be engaged. Alternative wait until the driver press the accellerator pedal and then engage the gear.
- Remove the maximal limit for uses of the disengage valves when stand still or disengage due to stop and instead disengage the gear or other action if not possible the valves can be destroyed.
- Keep maximal limit for uses of the disengage valves when moving
- No idle driving if there is a fault code for air leakage
- No I-roll if there is a fault code for air leakage
- Show current gear to the driver if the gear lever is in neutral ? To be checked with 3P

Problems / Questions part 1

- If we have air leakage and try to disengage the clutch by open the disengage valves extra we may disengage the clutch completely. Will we destroy the clutch, work more than 1000 times.
- Will we use the valves more than the limit in some situation will they be destroyed, this is only as the last solution.
- More warnings for problem to disengage, It will be in more cases compare to situations where we not can disengage the clutch today.
- Will we destroy the brass pads when we shift the gearbox to neutral without disengage the clutch ?
  Not stand still but there shall be a miximum limit when moving.
- Longer response time to engage a gear in some situations
- When can we not disengage the clutch with the changes in the TECU? Which faults ?
- Shall we turn off the engine and what are the risk with turn off the engine ?

Problems / Questions part 2

- It is possible to run without clutch position sensor but it has bad comfort.
  It is also possible to run with air leakage in the CCA.
  Shall we engage a gear if clutch position sensor is faulty and we knew that we have an air leakage?
  Engage the gear when the accelerator is pressed?
- Conditions for warnings/fault codes needs more details

Case: Standstill gearlever moved to neutral

- The clutch is controlled with normal control algorithm
- Show current gear to the driver instead of N ?
- If clutch not disengaged with help of the normal control within a max time
  - Yellow warning
  - The disengage valves open time are increased by a ramp
- If the limit for use of the disengage valves are passed
  Normal position control but not possible to control for long time
  - Yellow warning
- If the clutch still not disengaged
  - Red warning
  - Try to shift the gearbox to neutral even if not disengaged
  - If not possible to shift to neutral, ->Turn off the engine ?

Case: Standstill, gear engaged leakage gear lever in A,M or R

- The clutch is controlled with normal control algorithm
- If clutch not disengaged or position kept with help of the normal control
  - Yellow warning
  - The disengage valves open time are increased by a ramp
  - Shift to neutral when clutch disengaged and close clutch
  - Still shown the selected gear in the IC
  - The gear is engaged again when the driver press the accelerator pedal
- If the limit for use of the disengage valves are passed
  Normal position control but not possible to control for long time
  - Yellow warning
  - Shift to neutral when clutch disengaged and close clutch after
  - The gear is engaged again when the driver press the accelerator pedal

Continue

- If the clutch not possible to disengage
  - Red warning
  - Try to shift the gearbox to neutral even if not disengaged
  - Activate disengage valves fully until gear in neutral or engine stopped ,valve burned
  - If not possible to shift to neutral, ->Turn off the engine ?

ALT 1: Case: Stand still gear in neutral air leakage detected, gear lever moved to R,A or M
This is replaced with next slide

- Disengage the clutch
- Check that we can have the clutch disengaged for long time without pass the maximum limit for the disengage valves, done every time the driver moves the gearlever from N.
- If ok then engage the gear
- If not ok but possible to stay disengaged with normal controller
  - Yellow warning
  - Still shown the selected gear in the IC
  - engage the gear when the driver press the accelerator pedal. Increase the open time for the disengage valves by a ramp if necessary
- If not possible to disengage the clutch
  - Yellow warning
  - If possible to disengage the clutch, engage the gear when the driver press the accelerator pedal. Increase the open time for the disengage valves by a ramp if necessary

ALT 2: Case: Stand still gear in neutral air leakage detected, gear lever moved to R,A or M

- There is an active warning for air leakage
- Shown the selected gear in the IC but stay in neutral
- Engage the gear when the driver press the accelerator pedal. Increase the open time for the disengage valves by a ramp if necessary, not fully open
- If not possible to disengage the clutch
  - Yellow warning

Case: Shall disengage for stop, one gear is engaged driver wants to stop

- If clutch not disengaged with help of the normal control within a max time
  - Yellow warning
  - The disengage valves open time are increased by a ramp
- If the limit for uses of the disengage valves are passed, could happen after the clutch is disengaged.
  - Yellow warning
  - Shift to neutral and close clutch
  - Still shown the selected gear in the IC, not equal to neutral
  - The gear is engaged again when the driveline shall be closed
- If the clutch still not disengaged
  - Red warning, Buzzer
  - Try to shift the gearbox to neutral even if not disengaged, add maximal time
  - Lower idle speed to increase the possibility to shift to neutral ? If it can help.
  - Activate disengage valves fully until gear in neutral or valve faulty

Case: Gearshift when moving

- If clutch not disengaged with help of the normal control within a max time
  - Yellow warning
  - The disengage valves open time are increased by a ramp to fully open
- If not disengaged within a time, lower than the maximum limit for the valves but good margin from normal cases.
  - Stay on current gear
  - Maybe without torque from engine due to the gearshifts and limitation from TECU
  - Red warning

Case: Gearlever is moved to N when moving

- The clutch is controlled with normal control algorithm
- If clutch not disengaged with help of the normal control within a max time
  - Yellow warning
  - The disengage valves open time are increased by a ramp
- If the limit for use of the disengage valves are passed
  Normal position control but not possible to control for long time
  - Yellow warning
- If the clutch still not disengaged
  - Red warning

Case: known air leakage and fault on position sensor

- If we have a known air leakage and a fault on the clutch position sensor.
- Driver moves the gear lever to A,M or R
- Still shown the selected gear in the IC, not equal to neutral
- The driver press the accelerator pedal
- The TECU engage the gear and control the clutch without position sensor.

Option: Turn off engine not decided

- Conditions to turn off engine inside the TECU
  - TECU sends a signal to EMS if the conditions on next page is fulfilled
  - The message is send on PWT-CAN
  - The EMS receive the signal may check conditions on next side
  - The EMS turn off the engine

Option: Turn off engine, not decided
Conditions inside the TECU

- Conditions inside the TECU
  - It is not possible to disengage the clutch.
  - The TECU have tried to shift to neutral for a short time
  - One gear is engaged in the gearbox
  - A splitbox is not active.
  - The accelerator pedal is released
  - The vehicle is stand still, this shall be based on an internal sensor.
- Conditions in EMS TBD if necessary
  - Vehicle stand still, based on VP2 vehicle speed
  - Accelerator pedal not pressed

Component to be changed

- Software in the TECU
- Software/dataset in the instrument to show fault codes red or yellow
- Fault tracing information ?
- Software in EECU if we shall limit torque at idle speed or turn off the engine.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

ER615784

Volvo Powertrain Corporation

Engineering Report

ER-615784

Date: 2009-08-24 | Report Type: X Test | ☐ Calc. ☐ Design ☐ AE ☐ Misc.

Receiver (department, name, location)	Requisition/order no.	Project no.	Secrecy level
	4704-0384	QJ-432-218	T41
	Function group no.		Analysis no.
	4300		
	Ordered by (department., name, location)		
	91435 Lars Jacobsson O3		
	Issued by (department, name, location)		
	91435 Lars Simonsson O3		
	Approved by (department, name, location)		
	91435 Lars Jacobsson O3		
	Approval date	Date carried out: V933-4	No of Pages: 25 / No of Appendices: 0

Advanced Engineering Area	Key Technology Area	Property Area

Test of software Tecu R32SI03.1 in AMT-C and R09A#R09ESI#3, 3.1 in AMT-D. QJ-432-218.

Summary

No new failings in AMT-C and –D were discovered.

1 Prerequisite

Test of new software TECU R32_SI03.1 in FH13R TXA 754, AMT-C. Part no in appendix 1. TECU R09A#R09ESI#3 in FH16R-700 (111), AMT-D. Part no in appendix 3. TECU R09A#R09ESI#3.1 in FH16R-700 (111). Part no in appendix 4.

2 Performed test

Test code 4.4.5-361. Manual driving, economy-, power-, brake mode, kick down, +/- switch and cruise control.

3 Results

Calibration values in appendix 2.

R32_SI03.1

Truck 22,9ton FH13R TXA 754.

Error codes at test start:

ECU's Diagnostics 2009-08-13 08:11:35

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140 Instrument Cluster

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID214, Data Link, MID249, FMI:12, Active, Cnt=1

PSID205, Data Link, MID130, FMI:12, Active, Cnt=1

PSID206, Data Link, MID222, FMI:12, Active, Cnt=1

Dot 5.3. PTO not checked.

Dot 5.4. OK to select reverse high range.

Dot 6.1. Wide open throttle acceleration economy mode, plane surface. Took off on gear 4, shifted 7-9-11-12. OK. Log 090813_M000000_T000_L000.log. Below is shown the duration from that the clutch cylinder starts to move towards disengaged position until it starts to move engaged position after that it has been at slip point.
Also ”Definition Power Cut Off Time” (PCOT):
The clutch cylinder is above slip point or the gearbox is in neutral (split or base gear) => the clock starts.
The clutchs control point becomes engaged (and engine control goes to "limitation” instead of control) => the clock stops.
The signal is delivered in a debug message:
VP34_X_R: PcotMeas (mesured gear shift duration at latest gear shift).
Also pcotPred (predicted gear shift duration) is in message above.

Gear shift	Duration (sec)	PcotMeas (sec)
4 to 7	0,88	0,70
7 to 9	0,76	0,56
9 to 11	0,78	0,60
11 to 12	0,66	0,46
Totally	3,08	2,32

Dot 6.2. Wide open throttle acceleration economy mode, down hill. Took off on gear 5, shifted 8-11-12. OK. Log 090813_M000001_T000_L000.log.

Dot 6.3. Manual mode. Checked that no up shift occurs and that disengagement gets when engine speed is below 500rpm. No new gear is selected if the speed is low enough. OK.

Dot 6.4. Checked Limp Home. After disabeling Limp Home "NOT POSSIBLE TO START GEARBOX NOT IN NEUTRAL" was shown in the display for a while. Disappeared by it self. Log 090813_M000002_T000_L000.log.

Dot 6.5. OK to marshalling when connecting trailer.

Truck and trailer (S014) 56,3ton FH13R TXA 754.

Dot 7.1. Wide open throttle acceleration manual shifting, plane surface. Took off on gear 1 and selected each gear. OK. Log 090813_M000003_T000_L000.log.

Gear shift	Duration AMT-C (s)	PcotMeas (s)	Duration 4200 (s)
1 to 2	0,44	0,54	0,28
2 to 3	0,52	0,82	0,40
3 to 4	0,44	0,66	0,30
4 to 5	0,62	0,80	0,44
5 to 6	0,60	0,62	0,44
6 to 7	0,68	0,82	0,52
7 to 8	0,58	0,62	0,42
8 to 9	0,74	0,86	0,56
9 to 10	0,70	0,66	0,54
10 to 11	0,76	0,80	0,58
11 to 12	0,66	0,70	0,50
Totally	6,74	7,90	4,98

Dot 7.2. Wide open throttle acceleration economy mode, plane surface. Took off on gear 1, shifted 4-7-9-10-11-12. OK. Log 090813_M000005_T000_L000.log.

Gear shift 4206	Duration (sec)	PcotMeas (sec)
1 to 4	0,80	0,62
4 to 7	0,96	0,76
7 to 9	0,76	0,60
9 to 10	0,70	0,56
10 to 11	0,76	0,58
11 to 12	0,70	0,52
Totally	4,68	3,64

Dot 7.3. Wide open throttle acceleration in an up hill, economy mode. Pulled for a long time in gear 9. Not logged.

Dot 7.4. Wide open throttle acceleration in an up hill, power mode. Took off on gear 1. Shifted 3-5-6-7-8-7-8-4-5-3. Far too big down shift 8-4. Log 090813_M000006 och 7_T000_L000.log.

Dot 7.5. Selected power mode before an up hill. Shifted 12-11-10-9. OK. Log 090813_M000009_T000_L000.log.

Dot 7.6. Wide open throttle acceleration in an up hill, power mode. Took off on automatic selected gear. Took off on gear 1. Shifted 2-3-5-6-7-8. Scraping shift 1-2 and pulled for a long time in gear 7. Log 090813_M000010_T000_L000.log.

Dot 7.7. Up shift in brake mode. Shifted 8-9 at 2265rpm engine revs. Log 090813_M000008_T000_L000.log.

Dot 7.8. Wide open throttle acceleration in an up hill. Took off on automatic selected gear, economy mode. Took off on gear 1. Shifted 2-3-4-5. Slip duration on the clutch at take off, 3,0sec. OK. Log 090813_M000004_T000_L000.log.

Dot 8.1. Driving in a queue. OK.

Dot 8.2. Kick down. OK.

Dot 8.3. Checked cruise control, economy mode, plane surface. OK, not logged.

Dot 8.4. Checked cruise control, power mode, plane surface. Not checked.

Dot 8.5. Crusing on gear 12 (70km/) in automatic mode. Brakes to approx. 40km/h. Engage acceleration pedal and brake pedal still engaged. Checked that appropriate gear is selected. OK.

Dot 8.6. Crusing on gear 12 (70km/) in manual mode. Brakes to approx. 40km/h. OK, do not engage the clutch.

Dot 8.7. Marshalling. OK.

Error codes at test end:

ECU Software and Hardware Configuration 2009-08-13 15:08:43

VIN: A 630012

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140 Instrument Cluster

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID214, Data Link, MID249, FMI:12, Active, Cnt=1

PSID205, Data Link, MID130, FMI:12, Active, Cnt=1

PSID206, Data Link, MID222, FMI:12, Active, Cnt=1

R09A#R09ESI#3

Truck 24,3ton FH16R-700 (111).

Error codes at test start:

ECU's Diagnostics 2009-08-17 13:11:34

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150 Air Suspension ECS

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID8, Load Indicator, FMI:13, Active, Cnt=1

Dot 5.3. PTO not checked.

Dot 5.4. OK to select reverse high range.

Dot 6.1. Wide open throttle acceleration economy mode, plane surface. Took off on gear 4, shifted 7-9-11-12. OK. Log 090817_M000000_T000_L000.log. Below is shown the duration from that the clutch cylinder starts to move towards disengaged position until it starts to move engaged position after that it has been at slip point.
Also ”Definition Power Cut Off Time” (PCOT):
The clutch cylinder is above slip point or the gearbox is in neutral (split or base gear) => the clock starts.
The clutchs control point becomes engaged (and engine control goes to "limitation” instead of control) => the clock stops.
The signal is delivered in a debug message:
VP34_X_R: PcotMeas (mesured gear shift duration at latest gear shift).
Also pcotPred (predicted gear shift duration) is in message above.

Gear shift	Duration (sec)	PcotMeas (sec)
4 to 7	1,08	0,92
7 to 9	0,80	0,62
9 to 11	0,74	0,56
11 to 12	0,66	0,48
Totally	3,28	2,58

Dot 6.2. Wide open throttle acceleration economy mode, down hill. Took off on gear 4, shifted 8-11-12. OK. Log 090817_M000001_T000_L000.log.

Dot 6.3. Manual mode. Checked that no up shift occurs and that disengagement gets when engine speed is below 500rpm. OK.

Dot 6.4. Checked Limp Home. OK.

Dot 6.5. OK to marshalling when connecting trailer.

Truck and trailer (S014) 57,7ton FH16R-700 (111).

Dot 7.1. Wide open throttle acceleration manual shifting, plane surface. Took off on gear 1 and selected each gear. OK. Log 090817_M000002_T000_L000.log.

Gear shift	Duration AMT-D (sec)	PcotMeas (sec)	Duration 4200 (sec)
1 to 2	0,48	0,30	0,54
2 to 3	0,56	0,40	0,82
3 to 4	0,40	0,24	0,66
4 to 5	0,64	0,52	0,80
5 to 6	0,46	0,30	0,62
6 to 7	0,62	0,50	0,82
7 to 8	0,54	0,34	0,62
8 to 9	0,60	0,48	0,86
9 to 10	0,54	0,42	0,66
10 to 11	0,58	0,46	0,80
11 to 12	0,72	0,56	0,70
Totally	6,14	4,52	7,90

Dot 7.8. Wide open throttle acceleration in an up hill. Took off on automatic selected gear, economy mode. Took off on gear 1. Shifted 2-3-4-5-6. Slip duration on the clutch at take off, 2,8 sec. OK. Log 090817_M000003_T000_L000.log.

Dot 7.2. Wide open throttle acceleration economy mode, plane surface. Took off on gear 1, shifted 4-7-9-10-11-12. OK, but somewhat rough disengagement of the clutch shifting 1-4. Log 090817_M000004_T000_L000.log.

Gear shift 4505	Duration (sec)	PcotMeas (sec)
1 to 4	0,84	0,66
4 to 7	1,04	0,86
7 to 9	0,82	0,64
9 to 10	0,82	0,62
10 to 11	0,84	0,66
11 to 12	0,70	0,52
Totally	5,06	3,96

Dot 7.3. Wide open throttle acceleration in an up hill, economy mode. OK.

Dot 7.4. Wide open throttle acceleration in an up hill, power mode (P+). Took off on 1. Shifted 3-5-6-7-8-9-8-6. OK. Ought to have been P. Log 090817_M000005_T000_L000.log.

Dot 7.5. Selected power mode before an up hill. Shifted 12-11-10. OK. Log 090817_M0000006_T000_L000.log.

Dot 7.6. Wide open throttle acceleration in an up hill, power mode. Took off on automatic selected gear. Took off on gear 1. Shifted 3-4-5-6-7-8-9. OK. Log 090817_M000007_T000_L000.log.

Low revs after shifting 1 to 4, 760rpm. Log 090817_M000008_T000_L000.log.

Dot 7.7. Not checked.

Dot 8.1. Not checked.

Dot 8.2. Kick down. OK.

Dot 8.3. Checked cruise control, economy mode, plane surface. Shifted 7-9-10-11-12. OK. Log 090817_M000009_T000_L000.log.

Dot 8.4. Not checked.

Dot 8.5. Crusing on gear 12 (70km/) in automatic mode. Brakes to approx. 40km/h. Engage acceleration pedal and brake pedal still engaged. Checked that appropriate gear is selected. OK.

Dot 8.6. Crusing on gear 12 (70km/) in manual mode. Brakes to approx. 40km/h. OK, appropriate gear selected.

Dot 8.7. Marshalling. OK.

Error codes at test end:

ECU Software and Hardware Configuration 2009-08-17 18:50:24

VIN: A 639111

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150 Air Suspension ECS

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID8, Load Indicator, FMI:13, Active, Cnt=1

R09A#R09ESI#3.1

Truck 24,3ton FH16R-700 (111).

Error codes at test start:

ECU's Diagnostics 2009-08-21 08:37:06

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140 Instrument Cluster

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID214, Data Link, MID249, FMI:12, Active, Cnt=1

PSID211, Data Link, MID219, FMI:12, Active, Cnt=1

PSID201, Data Link, MID144, FMI:12, Active, Cnt=1

---

150 Air Suspension ECS

PID Diagnostics:

No Faults

PPID Diagnostics:

PSID8, Load Indicator, FMI:13, Active, Cnt=1

Dot 5.3. PTO not checked.

Dot 5.4. OK to select reverse high range.

Dot 6.1. Wide open throttle acceleration economy mode, plane surface. Took off on gear 4, shifted 7-9-11-12. OK. Log 090821_M000000_T000_L000.log. Below is shown the duration from that the clutch cylinder starts to move towards disengaged position until it starts to move engaged position after that it has been at slip point.
Also ”Definition Power Cut Off Time” (PCOT):
The clutch cylinder is above slip point or the gearbox is in neutral (split or base gear) => the clock starts.
The clutchs control point becomes engaged (and engine control goes to "limitation” instead of control) => the clock stops.
The signal is delivered in a debug message:
VP34_X_R: PcotMeas (mesured gear shift duration at latest gear shift).
Also pcotPred (predicted gear shift duration) is in message above.

Gear shift	Duration (sec)	PcotMeas (sec)
4 to 7	1,08	0,88
7 to 9	0,68	0,50
9 to 11	0,66	0,50
11 to 12	0,74	0,54
Totally	3,16	2,42

Dot 6.2. Wide open throttle acceleration economy mode, down hill. Took off on gear 4, shifted 8-11-12. OK. Log 090821_M000001_T000_L000.log.

Dot 6.3. Manual mode. Checked that no up shift occurs and that disengagement gets when engine speed is below 500rpm. OK.

Dot 6.4. Checked Limp Home. OK.

Dot 6.5. OK to marshalling when connecting trailer.

Dot 7.1. Wide open throttle acceleration manual shifting, plane surface. Took off on gear 1 and selected each gear. OK. Log 090821_M000002_T000_L000.log.

Gear shift	Tid 4505 (sec)	PcotMeas (sec)	Tid 4200 (sec)
1 to 2	0,44	0,26	0,54
2 to 3	0,72	0,58	0,82
3 to 4	0,48	0,28	0,66
4 to 5	0,74	0,58	0,80
5 to 6	0,48	0,30	0,62
6 to 7	0,76	0,58	0,82
7 to 8	0,54	0,42	0,62
8 to 9	0,70	0,58	0,86
9 to 10	0,58	0,44	0,66
10 to 11	0,62	0,50	0,80
11 to 12	0,58	0,38	0,70
Totally	6,64	4,90	7,90

Dot 7.8. Wide open throttle acceleration in an up hill. Took off on automatic selected gear, economy mode. Took off on gear 2. Shifted 3-5-6-7. Slip duration on the clutch at take off, 1,4 sec. OK. Log 090821_M000003_T000_L000.log.

Dot 7.3. Wide open throttle acceleration in an up hill, economy mode. OK.

Dot 7.4. Wide open throttle acceleration in an up hill, power mode (P+). Took off on 2. Shifted 4-6-7-8-9-10-11-10-9. OK. Ought to have been P. Log 090821_M000004_T000_L000.log.

Dot 7.6. Wide open throttle acceleration in an up hill, power mode. Took off on automatic selected gear. Took off on gear 1. Shifted 2-4-6-7-8-9-10. OK. Log 090821_M000005_T000_L000.log.

Dot 8.2. Kick down. OK.

Dot 8.3. Checked cruise control, economy mode, plane surface. Shifted 6-9-11-12. OK. Log 090821_M000006_T000_L000.log.

Dot 8.5. Crusing on gear 12 (70km/) in automatic mode. Brakes to approx. 40km/h. Engage acceleration pedal and brake pedal still engaged. Checked that appropriate gear is selected. OK.

Dot 8.6. Crusing on gear 12 (70km/) in manual mode. Brakes to approx. 40km/h. OK, appropriate gear selected.

Dot 8.7. Marshalling. OK.

Error codes at test end:

ECU Software and Hardware Configuration 2009-08-21 13:14:08

VIN: A 639111

---

140 Instrument Cluster

PID Diagnostics:
  No Faults

PPID Diagnostics:
  PSID214, Data Link, MID249, FMI:12, Active, Cnt=1

  PSID211, Data Link, MID219, FMI:12, Active, Cnt=1

  PSID201, Data Link, MID144, FMI:12, Active, Cnt=1

---

150 Air Suspension ECS

PID Diagnostics:

  No Faults

PPID Diagnostics:

  PSID8, Load Indicator, FMI:13, Active, Cnt=1

Appendix 1

ECU Software and Hardware Configuration 2009-08-13 08:11:35

VIN: A 630012

---

128 Engine ECU

SW: 21247403P01*21247409P01*21247424P01*

HW: VOLVO*20814604P02*06362372:2006-09-07

---

130 Transmission ECU

SW: 21413694P01*21035941P01*20976706P01*

HW: VOLVO*20817640P06*00018253:2008-04-07

---

136 ABS

SW: 21101513P01*21142599P01*21135725P01*

HW: VOLVO*20589475P01*00000001:1986-05-03

---

140 Instrument Cluster

SW: 21404650P01*21003731P01*21349947P01*

HW: VOLVO*21015784P04*08434282:2008-10-24

---

144 Vehicle ECU

SW: 21187006P01*21187008P01*21187024P01*

HW: VOLVO*20758890P01*06190760:2006-05-13

---

146 Electronic Climate Control

SW: 20512392P01

HW: VOLVO*20508582P01*00142934:2006-08-27

---

150 Air Suspension ECS

SW: 21088956P01*21088957P01*21088961P01*

HW: VOLVO*20569213P04*06230564:2006-06-06

---

163 Immobilizer

SW: 20392427P02*03987653P01*03987654P01*

HW: VOLVO*20392425P06*00178557:2006-07-28

---

214 Burglar Alarm ECU, AECU

SW: 20741072P01*20456642P01*20456643P01*

HW: VOLVO*20728850P02*00925400:

---

216 Lamp Control Module

SW: 21140079P01*20978209P01*21103855P01*

HW: VOLVO*20815236P03*00000073:2006-07-13

220

SW: 20728037P02*20728038P02*20728039P02*

HW: VOLVO*20728036P02*00328940:

---

222 Retarder ECU

SW: 21413694P01*21035941P01*20976706P01*

HW: VOLVO*20817640P06*00018253:2008-04-07

---

223 GearShift ECU

SW: 20912124P01*20714902P01*20923521P01*

HW: VOLVO*20848526P02*06354163:2006-08-31

---

249 Body-Builder Module

SW: 21094206P01*21075967P01*21094211P01*

HW: VOLVO*20758812P01*06190760:2006-05-13

Appendix 2

Calibration values FH13R TXA 754 R32_SI03.1.

Split	12.0	21.6	33.1
1:st and reverse	7.0	19.1	30.7
2:nd and 3:rd	10.4	21.4	32.3
Range	6.1		32.9
Actual engaged position	23.0		
Actual slip point	28.5		

Logs available in \\vcn.ds.volvo.net\vpt-got\proj01\003187\61_PM-Testing\Vehicle\FH-72\R32_SI03.1.

Calibration values FH16R-700 (111) R09A#R09ESI#3.

Split	12.0	21.6	33.0
1:st and reverse	7.7	18.7	30.6
2:nd and 3:rd	10.2	21.2	32.6
Range	6.2		32.7
Actual engaged position	25.4		
Actual slip point	32.7		

Logs available in \\vcn.ds.volvo.net\vpt-got\proj01\003187\61_PM-Testing\Vehicle\FH-111_FH16R\R09A#R09ESI#3.

Calibration values FH16R-700 (111) R09A#R09ESI#3.1.

Split	12.0	21.6	32.7
1:st and reverse	7.0	18.7	30.6
2:nd and 3:rd	9.2	21.2	32.9
Range	5.7		32.8
Actual engaged position	25.8		
Actual slip point	33.3		

Logs available in \\vcn.ds.volvo.net\vpt-got\proj01\003187\61_PM-Testing\Vehicle\FH-111_FH16R\R09A#R09ESI#3.1

Appendix 3

ECU Software and Hardware Configuration 2009-08-17 13:11:34

VIN: A 639111

---

128 Engine ECU

SW: 3160E08D.13*21275404P01*21408623P01*

HW: VOLVO*20977019B02*06394315:2006-11-02

---

130 Transmission ECU

SW: 21419143P01*21154381P01*21136068C01*

HW: VOLVO*21068211P03*00000000:2007-10-05

---

136 ABS

SW: 21101513P01*21142599P01*21135726P01*

HW: VOLVO*20589476P01*1S97ZXPL:2006-12-20

---

140 Instrument Cluster

SW: 21267647P01*21003731P01*21270386P01*

HW: VOLVO*21015794B01*07262129:2007-06-26

---

144 Vehicle ECU

SW: 21187006P01*21187008P01*21187024P01*

HW: VOLVO*20758890P02*06420168:2006-10-19

---

146 Electronic Climate Control

SW: 20512392P01

HW: VOLVO*20508582P01*00161658:2007-01-09

---

150 Air Suspension ECS

SW: 20911542P01*20911543P01*20911545P01*

HW: VOLVO*20569213P05*06430932:2006-10-26

---

163 Immobilizer

SW: 20392427P02*03987653P01*03987654P01*

HW: VOLVO*20392425P06*00187756:2006-11-06

---

216 Lamp Control Module

SW: 20806885P01*20429474P01*20738576P01*

HW: VOLVO*20815236P03*00000133:2006-12-27

---

219 ACC

SW: ***

HW: TRW **

220

SW: 20879738P01*20879739P01*20879740P01*

HW: VOLVO*20879737P01*00494229:

---

222 Retarder ECU

SW: 21419143P01*21154381P01*21136068C01*

HW: VOLVO*21068211P03*00000000:2007-10-05

---

223 GearShift ECU

SW: 20912124P01*20714902P01*20923521P01*

HW: VOLVO*20848526P02*07032073:2007-01-16

---

232 AirBag

SW: 20452787P01*20452779P01*20452783P01*

HW: VOLVO*20452786P01*00001213:2006-10-17

238

SW: 21273240P01*21273241P01*21273243P01*

HW: VOLVO*21273463C02*08290163:2008-07-18

---

249 Body-Builder Module

SW: 20883892P01*20750991P01*20750993P01*

HW: VOLVO*20758812P02*06420168:2006-10-19

Appendix 4

ECU Software and Hardware Configuration 2009-08-21 08:37:06

VIN: A 639111

---

128 Engine ECU

SW: 3160E08D.13*21275404P01*21408623P01*

HW: VOLVO*20977019B02*06394315:2006-11-02

---

130 Transmission ECU

SW: 21419143P01*21154381P01*21136068C01*

HW: VOLVO*21068211P03*00000000:2007-10-05

---

136 ABS

SW: 21101513P01*21142599P01*21135726P01*

HW: VOLVO*20589476P01*1S97ZXPL:2006-12-20

---

140 Instrument Cluster

SW: 21267647P01*21003731P01*21270386P01*

HW: VOLVO*21015794B01*07262129:2007-06-26

---

144 Vehicle ECU

SW: 21187006P01*21187008P01*21187024P01*

HW: VOLVO*20758890P02*06420168:2006-10-19

---

146 Electronic Climate Control

SW: 20512392P01

HW: VOLVO*20508582P01*00161658:2007-01-09

---

150 Air Suspension ECS

SW: 20911542P01*20911543P01*20911545P01*

HW: VOLVO*20569213P05*06430932:2006-10-26

---

163 Immobilizer

SW: 20392427P02*03987653P01*03987654P01*

HW: +++ NO DATA RECEIVED +++

---

216 Lamp Control Module

SW: 20806885P01*20429474P01*20738576P01*

HW: VOLVO*20815236P03*00000133:2006-12-27

---

219 ACC

SW: ***

HW: TRW **

220

SW: 20879738P01*20879739P01*20879740P01*

HW: VOLVO*20879737P01*00494229:

---

222 Retarder ECU

SW: 21419143P01*21154381P01*21136068C01*

HW: VOLVO*21068211P03*00000000:2007-10-05

---

223 GearShift ECU

SW: 20912124P01*20714902P01*20923521P01*

HW: VOLVO*20848526P02*07032073:2007-01-16

---

232 AirBag

SW: 20452787P01*20452779P01*20452783P01*

HW: VOLVO*20452786P01*00001213:2006-10-17

238

SW: 21273240P01*21273241P01*21273243P01*

HW: VOLVO*21273463C02*08290163:2008-07-18

---

249 Body-Builder Module

SW: 20883892P01*20750991P01*20750993P01*

HW: VOLVO*20758812P02*06420168:2006-10-19

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

ER-631014

Volvo Powertrain

VOLVO

ER-631914

Engineering Report

Date 2009-07-31 | Report Type ☑ Test ☐ Calc. ☐ Design ☐ AE ☐ Misc.

Receiver (department, name, location)			Requisition/order no.	Project no.	Secrecy level
BF 63450	Lars Jacobsson	O3	4704-0384	4206	SG2
BF 63420	Gunilla Elderblad	O3			
BF 63000	Olivier Ferlin	BC2			
BF 63300	Henrik Lindeberg	BC3			
BF 63400	Göran Lejonbäck	BC3			
BF 68300	Sven-Erik Tibb	O3			
BF 68000	Åke Zander	O3			
BF 69322	Mats Tobiasson	BC			

Function group no.	Analysis no.
4300	

Ordered by (department., name, location)		
BF 63450	Lars Jacobsson	O3

Issued by (department, name, location)		
BF 63450	Mikael Larsson	O3

Approved by (department, name, location)		
BF 63450	Lars Jacobsson	O3

Approval date	Date carried out	No of Pages	No of Appendices

Advanced Engineering Area	Key Technology Area	Property Area
Transmission		L

QJ 432-218, verification test of software TECU R32 SI03.1 in AMT-C, FH-72.

Summary

If the clutch cylinder or the air supply has a severe leakage the control of the gearbox is not sufficient enough. This has raised QJ 432-218. It was decided to make improvements for the software.

The test was performed in order to verify R32 SI03.1 in AMT-C during different leakage cases and for AMT-D.

The software for AMT-C and AMT-D work properly and take care of different leakage during seven varying cases.

No new failing were discovered.

	Verification test Si03.1 Leakage from air supply side		Verification test Si03.1 Leakage internal clutch system (from CCA side)	
Case	Medium	Large	Medium	Large
1	✓	✓	✓	✓
2	✓	✓	✓	✓
3	✓	✓	✓	✓
4	✓	✓	✓	✓
5	✓	✓	✓	✓
6	✓	✓	✓	✓
7	✓	✓	✓	✓

Content

1 Introduction

1.1 Background

When the clutch cylinder or the air supply has a severe leakage the gearbox control might not prevent the vehicle from moving. This has raised OJ 432-218.

1.2 Earlier ER

615202 – Test of software Tecu R32 SI03 in AMT-C, FH-372. QJ-443-218

615784 – Test of software Tecu R32 SI03.1 in AMT-C and R09A#R09ESI#3, 3.1 in AMT-D. QJ-432-218

2 Objectives

2.1 Purpose

The test was performed in order to verify R32 SI03.1 in AMT-C during different leakage cases.

2.2 Target

The target of the test is to see that the gearbox control affect ability to supply the clutch system with air in order to keep the position disengaged or put the gearbox in neutral if air leakage appears.

2.3 Demand

K-FMEA_2_090624\ Shut of engine

2.4 Test truck

Vehicle: FH-72 D13A480

Chassis Type/No: A-630012

Engine: D13A480

Gearbox: AT2512C

Vehicle Specification (see appendix1)

Figure1. Photo of FH-72

3 Analysis and result

3.1 Method

The tests were performed in FH-72. A test setup to simulate leakage was mounted on the outside of the truck (see appendix2, figure 2). The setup was partially automatized and hand-operated (see figure 3). Four different sorts of leakages were tested. Medium and large leakage from air supply side and medium and large leakage from the internal clutch system (between CVU and CCA).
Definition of medium leakage: Pressure kept in short time (system state possible to change once); over time will compressor not keep pressure.
Definition of large leakage: System pressure will be lost immediately and not recovered by compressor.

Figure2. Test setup.

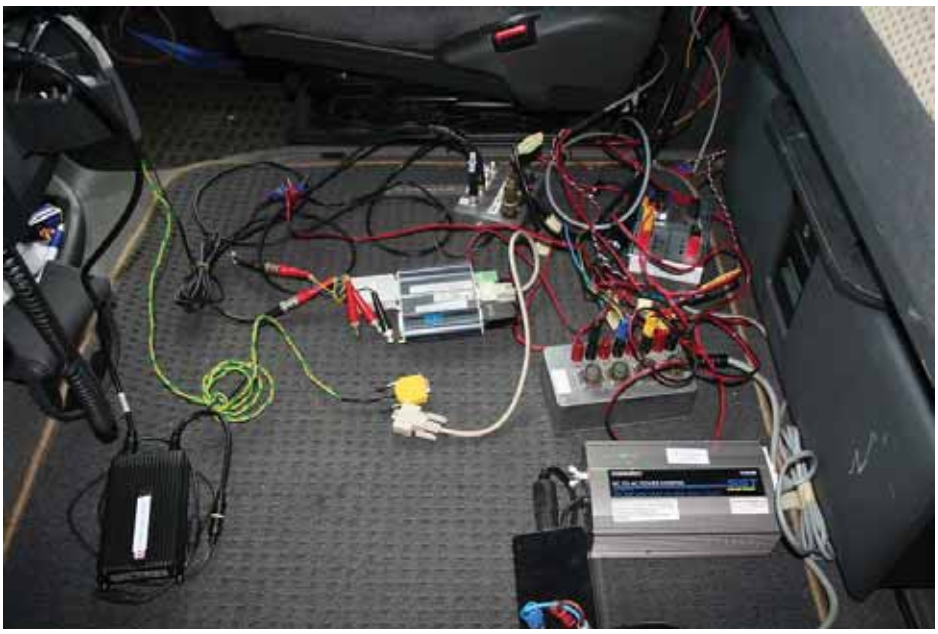


Figure3. Setup control.

3.2 Performed test

The measurements collected data from the gearbox CAN1, from two pressure sensors (supply side and CCA side) and from J1587 during seven different drive cases. (see appendix 3). Every drive case were verified with four different leakages. The test matrix was loged with CANalyser and with Navigator. Every test was analyzed in CANgraph. All fault codes and warnings (yellow and red symbol lit) from MID 130 were visualized in Navigator (ECU Status Check) during every test.
The first leakage (medium leakage from air supply side) was simulated by controlling the air supply pressure and the PWM pulse (from CVU) that the compressor could not compensate air pressure during time.
The second leakage (large leakage from air supply side) was carry through by cutting off the air supply before the gearbox and at the same time evacuate remaining air from the gearbox system.
The third leakage (medium leakage from the internal clutch system, between CVU and CCA) was simulated by controlling the pressure with a governor that the disengage valves opened more than threshold.
The last leakage (large leakage from the internal clutch system ,between CVU and CCA) was accomplish by open the venting plug on the CVU.
The test for AMT-D were performed by L Jacobsson and T Niklasson.

3.3 Test equipment

Data logger: Cansas ISO8	OMF 32366
Pressure sensors:	GTI 31699 GTI 31690
Measuring devices:	J1587 Navigator and CANalyzer

3.4 Result of performed tests

The software work properly and take care of different leakage during seven varying cases.

Leakage definitions:	Medium: Pressure kept in short time (system state possible to change once), over time will compressor not keep pressure	Large: System pressure will be lost immediately and not recovered by compressor			
	Verification test Si03.1 Leakage from air supply side		Verification test Si03.1 Leakage internal clutch system (from CCA side)		
	Medium	Large	Medium	Large	Removal
General	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit).	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit).	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold.	Even with fully open disengagment valves the clutch close or can not be disengaged	
Case 1: Standstill, gearlever in A, M or R, gear engaged.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gearbox shifted to neutral.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit).The TECU tried to disengage the clutch and shift the gearbox to neutral due to the yellow warning.	System compensates air leakage and activate disengage valve. Disengage valves opened more than threshold => => FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). The gearbox shifted to neutral.	System compensates air leakage and activate disengage valve. Disengage valves opened more than threshold =>FC PSID27 FMI 8, PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox did not shift to neutral.	The truck moves 2 [cm] (large leakage from CCA side) at start gear 1 and 4 with parking brake and 50 [cm] at start gear 1 and 4 without parking brake. The truck dose not move during the other leakages.

Case 2: Standstill (idle and veh. speed = 0) gearlever moved from A, R or M (gear engaged) to neutral. Driver moves gearlever.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gearbox shifted to neutral.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit).The TECU tried to disengage the clutch and shift the gearbox to neutral due to the yellow warning.	System compensates air leakage and activate disengage valve. Disengage valves opened more than threshold => => FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). The gearbox shifted to neutral.	System compensates air leakage and activate disengage valve. Disengage valves opened more than threshold =>FC PSID27 FMI 8, PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox did not shift to neutral.	The truck dose not move.
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal (TECU has already detected an air leakage in clutch air system, fault code set "leakage in clutch air system").	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gearbox remained in neutral.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gearbox remained in neutral.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). Gearbox remained in neutral.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). Gearbox remained in neutral.	The truck dose not move.
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver press accelerator pedal (TECU has already detected an air leakage in air system, fault code set "leakage in clutch air system").	Pressure sensor in gearbox detected too low pressure => FC PID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gear was engaged and the clutch closed.	Pressure sensor in gearbox detected too low pressure => FC PID37 FMI 1 was set => yellow warning in cluster (symbol lit). The gearbox remained in neutral.	FC PID27 FMI 8 was set => yellow warning in cluster (symbol lit). The gear was engaged and the clutch closed.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). Gearbox remained in neutral.	The truck dose not move.

Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal.	Equal with case2.	Equal with case2.	Equal with case2.	Equal with case2.	The truck dose not move.
Case 4: Shall disengage for stop, one gear is engaged driver wants to stop.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 and PSID27 FMI 8 were set => yellow warning in cluster (symbol lit). The cluth was disengaged during the stop.	Pressure sensor in gearbox detected too low pressure => FC FC PSID37 FMI 1, PSID27 FMI 8 and PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox did not shift to neutral.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). The cluth was disengaged during the stop.	FC PSID27 FMI 8, PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox shifted to neutral.	
Case 5: Gearshift when moving.	Pressure sensor in gearbox detected too low pressure =>FC PSID37 FMI 1 and PSID27 FMI 8 were set => yellow warning in cluster (symbol lit). The gearbox shifted gear.	Pressure sensor in gearbox detected too low pressure =>FC FC PSID37 FMI 1, PSID27 FMI 8 and PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox did not shift to neutral.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). The gearbox shifted gear.	FC PSID27 FMI 8, PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox remains in the actual gear.	
Case 6: Gearlever is moved to N when moving.	Pressure sensor in gearbox detected too low pressure => FC PSID37 FMI 1 and PSID27 FMI 8 were set => yellow warning in cluster (symbol lit). The cluth was disengaged when the gearlever was moved to neutral.	Pressure sensor in gearbox detected too low pressure => FC FC PSID37 FMI 1, PSID27 FMI 8 and PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox did not shift to neutral.	FC PSID27 FMI 8 was set => yellow warning in cluster (symbol lit). The cluth was disengaged when the gearlever was moved to neutral	FC PSID27 FMI 8, PSID27 FMI 14 were set => yellow and red warning in cluster (symbol lit). The clutch did not disengaged (solenoids 100% activated) and the gearbox remains in the actual gear	

Case 7: Known air leakage and fault on position sensor (vehicle standstill, gearlever moved to A,R or M)	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning.	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral.	Gearbox remained in neutral.	Gearbox remained in neutral.	The truck dose not move.

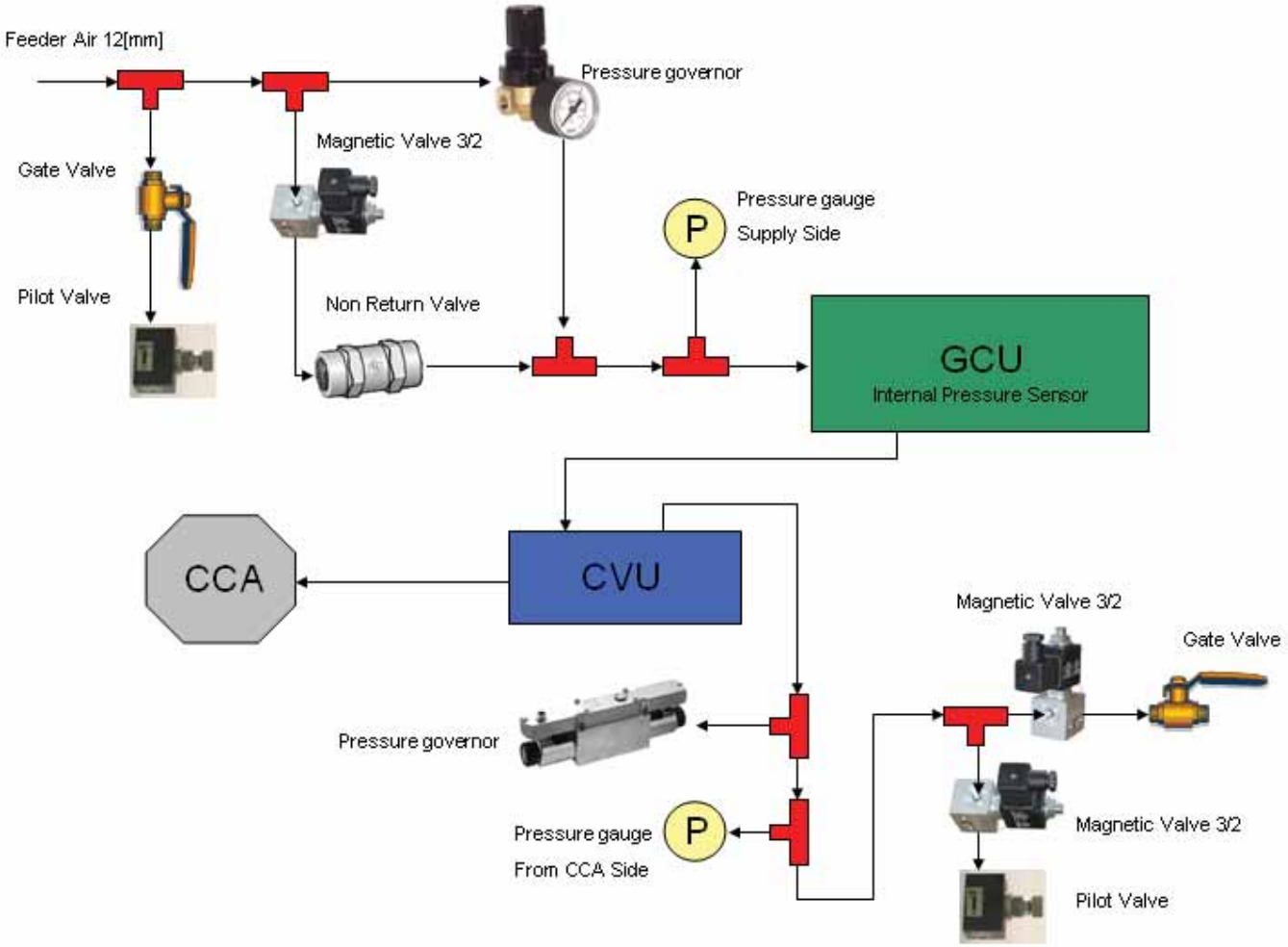
Appendices

Appendix1: VDA-Vehicle Specification (1 sheet).

Appendix2: Test Setup (1 sheet).

Appendix3: Drive Cases (1 sheet).

04-TLV	FH 62R B	TYPE-FH	6*2	RIGID	CONC-BAS	VERSION2
TC-LONGD	RC-ROUGH	VAL-BAS3	T-PFLAT	VERS-BAS	GCW56.0	EDS2
UEGR	ENG-VE13	FAL9.0	RAL19	STWPOS-L	WB4600	FFL1295
RAP7640	FAP3040	VW2600	CHH-STD	VH4.0	UADR	NR-80EC
UENG-GEN	D13A480	VOLENG	ETOR2400	EAP-BAS	OILS-PL	FUELSE2W
ULFUEL	RFUEL530	FUELTS71	TNK-SING	FTANK-AL	FCAP-L	FUELTFIL
UFUFIWH	AF-E	UFUELFP	TURB-B	EXHP-SAC	MUF-HOR	EXD-VERR
EXSH-ST	EXSTH40	EBR-VEB	UEBRAS	EM-EC06	UADTL	RAG-ADBL
ADTM-PL	ADTP-MR	ADTS71	ADTR60	EAS-SCR	ACL1ST	AIRIN-HI
AIRRI-D	CCV-O	COOLC48	RADI-WID	BUGNET	CHOSE-RU	FAN-VISE
USPLIMS	USPEEDDU	SPEED90	UACC	UPTOM	UPTOR	ENGPROT
UISD	24V	2BATT225	BATTD128	BBOX-L	BBOXC-BA	TAS-DIG
24ALT-XB	UALTTR	SMCONT	EST-AID	LOWB-DAY	HL-ASYMR	RLIGHT-W
IDLAMP	HL-HID	UHLADJ	URPLCR	TL-BAS	TLB-BAS	INLI-BAS
MARKL-SR	UFLASHL	UWPREBOC	UWLAMP	BEACONA2	FOGL-WC	DRIVL2EC
USPOTP	TD-BAS	HORN-ELS	HORN-JER	HL-CLEAN	SWS-RP	DOL24S12
MAINSW-M	ALARM-B	IMMOBIL	DETECT-S	ULOADIND	ELCE-CK	CIRCP-F
AUXSW-6	URTOLL	INST-HIG	DIFL-SWE	DISL-ENG	MSW-BAS	TEMP-AMB
TEMP-TRA	GAUGE-AM	SPG-KM	SI-GRAF	1DAY-STD	CALI-DIG	UBUPALAR
UAMPL	AUD-MED2	BUPMON	PHONE	TRANSF-H	ANT-CBPK	SPK-DDR
TWEETER	UCOMEQ	TIS-ASB	UTISLP	TIS-MAP	TIS-TMC	KEYB-SWE
CS43B-O	CLUT-BAS	AMSO-AUT	TP-FUEC	APF-ENH	MECHTRAN	AT2512C
TRAN-V	TRAP-BAS	GSS-AGS	PSM-GKN	PROP-STD	PSBR1-11	UPSBRKT2
PSBP1-R2	UPSBP2	PROPS-L	PLF1550	UPLS	PLM1225	MPRO-FXS
SRED-V	RS1356SV	GENRAX	RACAS-CA	RAT3.10	DL-FULL	UPTOTRA
UPTOTR	EPTT650	PTER-DIN	PTOENG-R	UPTOENGS	UPTOESID	UPTOF
UPTOFLYW	UCOOLPTO	TC-MWO	BSYS-EBS	BRAD-BAS	BRAKE-DV	FBRA-D43
BF-DIBAS	SBCC-B	BRADJ-A	RBRA-D43	DBRDUST	BR-DIBAS	TBRA-D41
BT-DIBAS	BRV-V1	BRCYL-V1	ASCOP120	AIRDRY-E	2COM1080	ATANK-V1
ATNK-GEN	UAUXATNK	UATNKRUB	FBREG-E	SIL-BRV	LOADSV	TRBRAKE1
TRBR-EBS	UTECABLE	TBC-DUO	TREL14	UTBHOSE	TCP-OM	UTECTYPE
UHOSEH	RET-TH	EBS-MED	ABS-EBS	ABSM-GEN	FRAX-UNI	FATYPE90
FAA10	FA-HIGH	STW-D450	STG26.2	UPSCOOL	PSS-SING	RADT-A8
RAA21T	BSR1370	TAD-HD	TA-FIXED	UPAXLE	URSTS	URSTL
BOGLIFT	TRAL75	RALIM15	LIFT-BAS	RF-STRAI	FRAME77	FRAMEHIG
RFL2545	ULINER	URUPP	UACMR	U1ACM	U2ACM	USPWCAT
USPWCARR	USPWCAD	UGUARD	URUP	SUP-BAS	FUP-X2	RSAP-BAS
FST-PAR	RST-AIR2	FSS-LEAF	RSS-AIR	UFAS	FRH-240	UWEDGE
RRH-240	RSHABS	FSTAB3	RSTAB3	UFALIM	SUSPL-EC	USPWT
WTT-DUAL	WTD-DUAL	WTDF22.5	WTF-D335	WMF-ST	WDF1175	WTDD22.5
WTD-D335	WMD-ST	WDD900	WTDT22.5	WTT-D335	WMT-ST	WDT900
UWCAP	TTF-RIB1	TF385-65	TMF-MICH	TF-BASIC	TTD-LUG2	TD315-80
TMD-MICH	TD-BASIC	TT-ENVI	TTT-RIB1	TT315-80	TMT-MICH	WSTUD-S
WPRING-P	UINFLAHO	UTIREPM	2601BLUE	PAICS-C	CAB-WIDE	L2H1
CABS-REA	CTILTP-E	GR-STD	USIDESTP	FMUDE-TW	LOCK-REM	WLIFT-EB
RHATCH	LUGOP-BS	MIRR12C1	AMIR-WB	UAMIRF	REFL-EC	GLAS-TIN
UAWINDR	UAWINDS	MIR-ELOP	AMIR-S30	UROSIL	EMBL-MO	UCABSIGN
TRIM-PLU	CITC-YEL	DPAN-IAT	CPAN-MF	DST-LUX1	PST-LUX1	SEAT-VOL
SUPH-PL	ARMRE-BB	MAT-INS	XINS-CAB	MAT-GREY	MAT-RUB	BUNK70
MATT-PRE	UOFFICE	UCGUARD	UGUARDW	BUMP-S	UBUMPSP	FMUD-AS
CU-ECC	PH-ENGCA	220EBH15	SAFEKIT	WARNVEST	DASH-YEL	WRITEPAD
SLCP-LUX	BOTTLEH	UDASHBBX	UDASHPBX	UIDLMPSW	SAFE	RSH-RAST
UOBSTOR	UETSBOX	BUNKBOX	CURT-WB	SBD-BLAC	SBP-BLAC	BEDNET
UAIRBAG	SEATBRIA	USBPREDS	USBPREPS	UREFRIG	UFLARE	CABPT-R1
UADH	ULADDER	ISUNV-S	SUNV-RL	SUNV-SMO	ESUNV2P	ISUNF-B
UADROOF	UADSIDE	UADCHAS	ACCBRKTR	TOWF-NO1	FIREXT3S	JACK-12T
TOOLKIT	UTBL	UTBR	PUBL-SWE	TELECARD	LANG-SF	CERT-EC
USIGNSWC	DIMPLATE	SERVM-B	WARR300	UHPG	HPE-F101	UPSCAT
UWHCHOCK	RFLI-F	RMUDF-AS	RFEND-B	TOWT-ECF	TOWMBRL1	C-VBG750
UTOWR	TMPFO141	RFE-T	UCBRKTOW	UCBRKT	TIPP-PRE	ULCHF
ULCL	ULSE	UBODATT	HBAT-CF	UCROSSRE	ULUBCENT	PROPCALC
UFROCALC	8SI	REARC-OK	FACT-SE1			


Feeder Air 12[mm]
Pressure governor
Magnetic Valve 3/2
Gate Valve
Pressure gauge
Supply Side
P
Pilot Valve
Non Return Valve
GCU
Internal Pressure Sensor
CCA
CVU
Magnetic Valve 3/2
Gate Valve
Pressure governor
Pressure gauge
From CCA Side
P
Magnetic Valve 3/2
Pilot Valve

Case 1: Standstill, gearlever in A, M or R, gear engaged.

Case 2: Standstill (idle and veh. speed = 0) gearlever moved from A, R or M (gear engaged) to neutral. Driver moves gearlever.

Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal (TECU has already detected an air leakage in clutch air system, fault code set "leakage in clutch air system").

Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver press accelerator pedal (TECU has already detected an air leakage in air system, fault code set "leakage in clutch air system").

Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal.

Case 4: Shall disengage for stop, one gear is engaged driver wants to stop.

Case 5: Gearshift when moving.

Case 6: Gearlever is moved to N when moving.

Case 7: Known air leakage and fault on position sensor (vehicle standstill, gearlever moved to A,R or M).

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

Internal notes QJ 432.218

- t053866, Katarina Säfblad
  - 2009-04-21 13:59:57

New QJ item opened as a follower to QJ 431-713, opened at Hagerstown i US.
Both items have the same content but informing different markets and handling different vehicle plants.
The reason for the first item was opened in Hagerstown is that the first failure occured there and is related to safety.
Work has been done to understand if the different vehicles have any influence regarding this failure. So is not the case.

- t053866, Katarina Säfblad
  - 2009-04-27 10:37:01

Check list uploaded under documents

- T0C4806, Gunilla Eldeblad
  - 2009-05-06 08:04:23

Kick-off meeting 2009-04-29

Participants:
Gunilla Eldeblad
Katarina Säfblad
Marie-Louise Andersson
Lars Karlsson
Mats Tobiasson
Lars Jacobsson
Ivana Trogrlic
John Weibull

QJ-Team:
PMQ: Gunilla Eldeblad
Case manager: Katarina Säfblad
Design responsible: Mats Tobiasson
Technical service VTC: Christer Gustavsson / Björn Jonsson
Technical service VBC: Mats Gustavsson
General case manager VTC: John Weibull
Parts responsible: Ivana Trogrlic
3P responsible: Kristina Nilsson and Attila Berenyi

Account number: [redacted] (W10-00246-00-05)
Object number: QJ432219

Notes:
Work has been started in QJ 431-713.
Both QJ-items are facing the same basic problem with a leakage in the CCA, but they are handling different markets.

In the system today we use the normal controller to reach and to keep the wanted position. This means that we do not use the disengage valves fully in this case. This can mean that the clutch can be unintentional engaged, for example when a gear is engaged and the vehicle is standing still. There is no warning in the display to the driver for this.

Below a short summary of planned changes:
- Yellow warning if problem to disengage clutch or gear. RED warning and buzzer if not possible to disengage the clutch
- Activate the disengage valves fully if air leakage
- Shift to neutral at stand still if air leakage
- Try to shift gearbox to neutral even if the clutch not is completely disengaged when standing still or before a stop
- Show current gear to the driver if the gear lever is in neutral? To be checked with 3P and VTC
- No idle driving if there is a fault code for air leakage
- No I-roll if there is a fault code for air leakage

The changes will affect all AMT-C/D gearboxes.

Different between AMT-B and AMT-C/D:
For AMT-C/D we have two ways to disengage the clutch.
- Quick disengagement
- Comfort disengagement

For the quick disengagement the TECU open the disengage valves more. This also means that we can control bigger air leakage. They are used in different situations. For example the TECU will use the quick disengagement to shift gears but the comfort disengagement to shift the gearbox to neutral if the driver moves the gear lever to neutral when standing still.
This means that it will be possible to move the truck even if it not will be possible to shift the gearbox to neutral at stand still.

For AMT-B we always use the same control signal, at least after a short time. This means that it will be the same level for the leakage for moving the vehicle and to shift to neutral at stand still. It will be very clearly noticed by the driver.

See uploaded documents, please.
“QJ 431-713 action plan and time plan XX”
“Kick_off air leakage”
“I-Shift _1_6_0_FM_FH_NH”

Actions:
See uploaded action plan and time plan, please.

- T0C4806, Gunilla Eldeblad
- 2009-05-06 08:06:27

Design review 090504

Participants: Gunilla Eldebad, Sami Aho, Roger Bergstrand, Lars Jacobsson, Jörgen Kjellberg, Mats Tobiasson, Jenny Gustafsson, Tobias Niklasson, Katarina Säfblad, Fredrik Wattwil, Björn Brunskog, Christophe Grivet, Stefan Carlsson, Petter Frejinger (partly), Åke Zander (partly)

Internal design review for the SW-changes in Gothenburg.
All people agreed to the suggested SW-changes and for the critical situations below with air leakage, the recommendation from the team are:
1. Driver should take the decision
2. Turn of the engine

See also the uploaded document “Air leakage_DD”

Critical situations with air leakage:
1. Driver in cab with fault engaged driveline
Red warning and buzzer to driver and driver can take action

2. Driver leaves cab with gear lever in A,M or R
Risk if large air leakage in clutch system or large air leakage in air supply within 4 minutes from stand still
Possible action for case 2:
- Evaluate if it possible to have this leakage in the clutch system
- Decrease the 4 minutes time when parking brake is active
- Turn of the engine

- t053866, Katarina Säfblad
- 2009-05-08 08:20:48

Estimated warranty cost/day: 74 euro

- T0C4806, Gunilla Eldeblad
- 2009-05-14 10:48:53

Follow-up meeting 2009-05-13

Participants:
Gunilla Eldeblad, Katarina Säfblad, Jenny Gustafsson, Lars Karlsson, Mats Tobiasson, Lars Jacobsson, Mikael Larsson, Sami Aho, Ivana Trogrlic, Kristina Nilsson, Attila Berenyi, Yasin Ahmed, Anders Cullbrand

Notes:
TECU SW is ready for testing.
Cluster SW will be component tested at v.20:5.
Vehicles FH-72 and VNL-47 are booked for this QJ-item.
Common verifying between VPT and 3P will be started in FH-72 w.21:2, ready W.22:5.
Changes in Guided Diagnostics are done, will be MR v.923. VTNA has reviewed the changes = OK.

See uploaded action plan and time plan, please.

Actions:
- New cluster SW in vehicle FH-72. Resp. Yasin, w.921:1
- Book a high specified vehicle from the vehicle pool, AMT-C gearbox. Resp. Yasin, w.920
- Prioritize the QJ-item at Renault and VTNA ASAP. Resp. Jenny, w.920
- Initiate an internal campaign, VTC, RT, VBC. Resp. Katarina, w.920
- Initiate an internal campaign, VTNA. Resp. Agnes / Jenny, w.920
- Coordination meeting for releases and final verification. Resp. Jenny, w.920:5
- SW council, all brands. Resp. Mats
- Test plan including done / ongoing / coming testing. Resp. Mats, w.920:5

- T0C4806, Gunilla Eldeblad
- 2009-05-25 11:03:30

Follow-up meeting 2009-05-20

Participants:

Gunilla Eldeblad, Katarina Säfblad, Lars Karlsson, Mats Tobiasson, Lars Jacobsson, Ivana Trogrlic, Yasin Ahmed, Tobias Niklasson

Notes:
TECU SW is delayed due to integration problems and more implementation work than scheduled.
The SW will be ready week 924 for external testing.

See uploaded action plan and time plan, please.

Actions:
- Book a global meeting regarding cluster verification. Resp. Jenny, w.922
- Define the engine torque at idle speed. All variants, Resp, Mats, w.922
- Initiate an internal campaign, VTC, RT, VBC. Resp. Katarina, w.922
- Initiate an internal campaign, VTNA. Resp. Agnes / Jenny
- Coordination meeting for sw releases. Resp.Jenny, w.922
- SW council, VTNA & RT. Resp. Mats
- Test plan including done testing, ongoing testing and coming testing VPT. Resp. Jenny,

- T0C4806, Gunilla Eldeblad
- 2009-05-27 13:51:18

Follow-up meeting 2009-05-27

Participants:
Gunilla Eldeblad, Katarina Säfblad, Lars Karlsson, Yasin Ahmed, Jenny Gustafsson, Marie-Louise Andersson, Mats Tobiasson

Notes:
The software development for TECU and EMS US07 is following the plan.
The open items are:
- Agreement on engine shut down conditions.
- Agreement on new SW functionality with all brands
- Date for release of VCADS
- Need of FST?
- Internal campaign for SW
- Verification for the brands

Action plan is set
DES = w.924
DCN = w.927
OK, MR = w.937

See updated action plan and time plan, please.

- T0C4806, Gunilla Eldeblad
- 2009-06-03 14:16:30

Follow-up meeting 2009-06-03

Participants:
Gunilla Eldeblad, Katarina Säfblad, Lars Karlsson, Yasin Ahmed, Jenny Gustafsson, Mats Tobiasson, Tobias Niklasson, Lars Jacobsson, Ivana Trogrlic

Notes:
See updated action and time plan, please

- T0C4806, Gunilla Eldeblad
- 2009-06-11 07:31:55

Follow-up meeting 2009-06-10

Participants:
Gunilla Eldeblad, Katarina Säfblad, Mats Tobiasson, Lars Jacobsson, Yasin Ahmed, Dan Blomberg, Tobias Niklasson (partly)

Notes:
The software development for TECU is following the plan.
During the internal testing with Si02 some fault has been detected and corrected to the freeze of Si03.
A separate global verification meeting will be hold week 25.

See updated action plan and time plan, please.

- t053866, Katarina Säfblad
- 2009-06-22 14:15:12

NFF MQR connected. TR has to handle test methode at TMA. To be included in MR criteria

- T0C4806, Gunilla Eldeblad
- 2009-06-25 14:18:12

Global verification sum-up meeting 2009-06-17

Participants:
Gunilla Eldeblad, Dan Blomberg, Lars Karlsson, Lars Jacobsson, Yasin Ahmed, Tobias Niklasson, Karim Sahli, Joshua Kerlin, Agnes Ritchey, Walter Edwards, Sami Aho, John Bartel, Björn Brunskog, Anders Nobelius, Henrik Ryberg, Oscar Klintenberg

Notes:
Review of the test results per leak zone from each site.
All tests without one (to long response time) is OK in the yellow area (back up mode, small and medium leakage) but no tests in the red area (buzz warning + limp home mode, large leakage) is OK.
The cluster is working according to expectation, verified in FH-FM with OK result.

The Recommendation from the meeting is:
- Correct detected problems.
- Release updated SW.
- Repeat verification.

Impact on time schedule
Scenario 1: New SW-version that will give green check mark at all leakage levels. Frozen SW for external verification ready at end of w.927, DCN delayed from w.928 to w.935

Scenario 2: Internal testing of the present software that solves the "yellow" area but not the "red". Original time plan, DCN w.928.

- T0C4806, Gunilla Eldeblad
- 2009-06-25 14:18:41

Follow-up meeting 2009-06-24

Participants:
Gunilla Eldeblad, Dan Blomberg, Lars Karlsson, Lars Jacobsson, Katarina Säfblad, Lars Zetterstrand, Mats Tobiasson

Notes:
Scenario 1 has been accepted by all brands.
Time plan will be changed.
DES = w.934
DCN = w.935
OK, MR = w.943

Estimated time plan for new SW-version:
Si02 ready, w.926:5
Internal testing with all functionality, w927:1-w927:5
Function freeze, Si03, to PD Got, w927:5
Verification testing, PD Got, w.928:1-W.928:5
Si03 to the brands w.928:4

If the return valve not working and we have a large leakage on other components, this is a double fault and will not be handling by the software.

The page "shut off engine" in the FMEA has been updated, news in light yellow.

- T0C4806, Gunilla Eldeblad
- 2009-06-30 06:56:39

ER report 615202 " Test of software TECU R32 SI03 in AMT-C, FH-372" according to test method 4.4.5-361 is released in RAPID.

- T0C4806, Gunilla Eldeblad
- 2009-07-01 15:22:08

Follow-up meeting 2009-07-01

Participants:
Gunilla Eldeblad, Dan Blomberg, Katarina Säfblad, Mikael Larsson, Mats Tobiasson

Notes:
The new SW development for TECU is following the new time plan with DCN = w.935
See updated action plan and time plan, please.

Conditions for setting the yellow leakage warning:

PSID 27 FMI 8 is set if any of the below conditions is fulfilled:
a) It takes more than 1.4 s to reach a changed clutch position set point
b) If the actual clutch position falls out of position for more than 0.2 s when the set point is stable.
c) If the mean activation of the slow clutch disengagement valve during 2.5 s is above 20%
- the fault is not set due to this condition during the first 5 s after a change of the clutch position set value

PSID 27 FMI 8 is reset if all the below checks is passed: (performed when gear is in neutral)
a) The clutch can be disengaged with the "slow control algorithm"

b) The clutch can be disengaged with the "fast control algorithm"
c) A disengaged clutch not moves more than 0.5 mm during a 5 s check without valve usage.

- t053866, Katarina Säfblad
- 2009-07-06 15:15:54

2009-07-06

Meeting regarding conditions for yellow lamp warning compared to demands in the technical regulation.
Participants:
Sven-Erik Tibb, Lars Karlsson, Henrik Ryberg, Mats Tobiasson, Lars Jacobsson, Mikael Larsson, Dan Blomberg, Katarina Säfblad

According to analyse the conditions for the yellow lamp is well set to fulfil the TR without getting warnings to early.
The only remark is the at very low temperatures, (-40C), the warning might occur without having any leakage problem on the CCA.

We agreed to introduce this solution without any further vehicle tests (before release)

- T0C4806, Gunilla Eldeblad
- 2009-08-19 07:59:21

Design decision meeting 2009-08-17

Participants: Gunilla Eldeblad, Dan Blomberg, Katarina Säfblad, Lars Jacobsson, Mats Tobiasson

The verification and release work ongoing according to the plan.

Design Decision:
The new agreed software changes are OK to implement.

MR-criteria:
New SW for TECU implemented in production and for the aftermarket.
Engine shut-down is not included in the MR-criteria.

Actions:
Production introduction plan from all BA. Resp. Dan, w.934

- T0C4806, Gunilla Eldeblad
- 2009-08-26 12:38:06

ER-report 615784 "Test of software TECU R32 SI03.1 in AMT-C and AMT-D" according to test method 4.4.5-361 is released in RAPID.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

I-Shift_1_6_0_FH_FM_NH(1)

FH/FM/NH Trucks

PID/PPID SID/PSID	FMI	Lamp	Content	Icon	Text	Telltale	Saved	Counter	Timestamp	Sound	Comment1	Category	Comment2 (Note)	Comment3 (Consequences)	Modify date	Project/ PMR
RECU:											**MID 222**					
PID110	0	CHECK	Engine coolant temperature		-	No	Yes	Yes	Yes	No	-	6A	Remains	Reduced ret. Power		
PID110	4	CHECK	Engine coolant temperature	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A	Remains	Reduced ret. Power to 50%	12/28/2004	
PID110	5	CHECK	Engine coolant temperature	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A	Remains	Reduced ret. Power to 50%	12/28/2004	
PID120	0	CHECK	Hydraulic retarder oil temperature		-	No	Yes	Yes	Yes	No	-	6A	Remains			
PID120	2	CHECK	Hydraulic retarder oil temperature	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A			3/25/2008	P4505
PID120	4	CHECK	Hydraulic retarder oil temperature	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A	Remains		12/28/2004	
PID120	5	CHECK	Hydraulic retarder oil temperature	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A	Remains		12/28/2004	
PID158	0	None	ECU battery potential	No	-	No	Yes	Yes	Yes	No	-	4B	Deleted			
PID158	1	None	ECU battery potential	No	-	No	Yes	Yes	Yes	No	-	4B	Deleted			
PPID31	0	CHECK	Retarder air pressure	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	4A	Remains	Brake on?	12/28/2004	
PPID31	2	CHECK	Retarder air pressure	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	3/25/2008	P4505
PPID31	3	CHECK	Retarder air pressure	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID31	5	CHECK	Retarder air pressure	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID54	0	CHECK	ECU +5V output	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID54	1	CHECK	ECU +5V output	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID55	0	None	ECU temperature	No	-	No	Yes	Yes	Yes	No	-	4B	Deleted	-		
PPID210	3	CHECK	Retarder output status	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID210	5	CHECK	Retarder output status	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PPID210	6	CHECK	Retarder output status	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
SID2	3	CHECK	Retarder modulation solenoid valve	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
SID2	4	CHECK	Retarder modulation solenoid valve	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
SID2	5	CHECK	Retarder modulation solenoid valve	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
SID2	6	CHECK	Retarder modulation solenoid valve	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
SID2	14	CHECK	Retarder modulation solenoid valve	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
SID231	2	CHECK	SAE J1939 Data Link	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
SID240	2	CHECK	Programme memory	No	Check Retarder System at next stop	No	No	No	No	No	Boot	3	Remains	No brake available	12/28/2004	
SID253	2	CHECK	Calibration memory	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
SID253	13	CHECK	Calibration memory	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	

PID/PPID SID/PSID	FMI	Lamp	Content	Icon	Text	Telltale	Saved	Counter	Timestamp	Sound	Comment1	Category	Comment2 (Note)	Comment3 (Consequences)	Modify date	Project/ PMR
PSID201	9	CHECK	SAE J1939 Data Link, MID144	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PSID204	9	CHECK	SAE J1939 Data Link, MID136	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3	Remains	No brake available	12/28/2004	
PSID211	9	CHECK	SAE J1939 Data Link, MID219	No	Check Retarder System at next stop	No	Yes	Yes	Yes	No	-	3		No brake available	12/28/2004	
PSID254	3	CHECK	DIEE signal	No	Check Retarder System at next stop	No	No	No	No	No	Boot	3	Remains	No brake available	12/28/2004	

RECU is using PPID208

All requirements in the minimum spec is fulfilled.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1334805167

K-FMEA_2_090624(1)

Leakage definitions:
Small: Compressor manages to keep pressure over time
Medium: Pressure kept in short time (system state possible to change once), over time will compressor not keep pressure
Large: System pressure will be lost immediately and not recovered by compressor

	Leakage from air supply side			Leakage internal clutch system (from CCA side)		
	Small	Medium	Large	Small	Medium	Large
General	System compensates air leakage, due to compressor capacity larger than estimated leakage	Gradual pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Compressor can´t compensate leakage over time	Immidiate pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit).	System compensates air leakage by activate disengage valves	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold.	Even with fully open disengagment valves the clutch close or can not be disengaged
Case 1: Standstill, gearlever in A, M or R, gear engaged	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Case 1.1: P-brake activated After 4 min with gear engaged will try to move the gearbox to neutral => this will fail => red warning lamp Case 1.2 Small air leakage after non return valve => clutch engaged + red warning lamp	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit). Case 1.1: P-brake activated After 4 min with gear engaged will try to move the gearbox to neutral => this will fail => red warning lamp Case 1.2 Small air leakage after non return valve => clutch engaged + red warning lamp	No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail
Case 2: Standstill (idle and veh. speed = 0) gearlever moved from A, R or M (gear engaged) to neutral. Driver moves gearlever	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Neutral gear will be engaged, once	TECU will try to move the gearbox to neutral => this will fail => red warning lamp. Case 1.2 Small air leakage after non return valve => clutch engaged + red warning lamp	No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal (TECU has already detected an air leakage in clutch air system, fault code set "leakage in clutch air system")	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Red warning lamp lit Gear will remain in neutral
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver press accelerator pedal (TECU has already detected an air leakage in air system, fault code set "leakage in clutch air system")	Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	Gear will be engaged and clutch closed	Yellow warning Gear will be engaged and clutch closed	Red warning lamp lit Gear will remain in neutral
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	No effect	Yellow warning Gear will be engaged and clutch closed	Red warning lamp lit Gear will remain in neutral
Case 4: Shall disengage for stop, one gear is engaged driver wants to stop.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged (solenoids 100% activated) - red warning	No effect	Yellow warning Clutch disengaged (valves 100 % activated)	Red warning lamp lit Attempt to engage N (will probably fail)
Case 5: Gearshift when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning	No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear
Case 6: Gearlever is moved to N when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning	No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear
Case 7: Known air leakage and fault on position sensor (vehicle standstill, gearlever moved to A,R or M)	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will be engaged and clutch closed: TBD!!!	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	No effect	Yellow warning, gear engaged ? Gear clash?	Solenoids activated, engage gear, fails - gear clash, yellow warning (position sensor)

Leakage definitions:
Small: Compressor manages to keep pressure over time

Medium: Pressure kept in short time (system state possible to change once), over time will compressor not keep pressure

Large: System pressure will be lost immediately and not recovered by compressor	Leakage from air supply side		
	Small	Medium	Large
General	System compensates air leakage, due to compressor capacity larger than estimated leakage	Gradual pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Compressor can´t compensate leakage over time	Immidiate pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit).
Case 1: Standstill, gearlever in A, M or R, gear engaged	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit). The TECU will try to disengage the clutch and shift the gearbox to neutral due to the yellow warning Not possible to disengage => red warning lamp

Case 2: Standstill (idle and veh. speed = 0) gearlever moved from A, R or M (gear engaged) to neutral. Driver moves gearlever	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	TECU will try to move the gearbox to neutral => this will fail => red warning lamp. Case 1.2 Small air leakage after non return valve => clutch engaged + red warning lamp
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal (TECU has already detected an air leakage in clutch air system, fault code set "leakage in clutch air system")	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver press accelerator pedal (TECU has already detected an air leakage in air system, fault code set "leakage in clutch air system")	Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal	No effect	Gear will ramin in neutral untill the driver press the accelerator pedal due to the warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral

Case 4: Shall disengage for stop, one gear is engaged driver wants to stop.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged (solenoids 100% activated) - red warning
Case 5: Gearshift when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning
Case 6: Gearlever is moved to N when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning
Case 7: Known air leakage and fault on position sensor (vehicle standstill, gearlever moved to A,R or M)	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral

Leakage internal clutch system (from CCA side)		
Small	Medium	Large
System compensates air leakage by activate disengage valves	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold.	Even with fully open disengagment valves the clutch close or can not be disengaged
No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail

No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail
Gear will remain in neutral	Gear will remain in neutral	Red warning lamp lit Gear will remain in neutral
Gear will be engaged and clutch closed	Yellow warning Gear will be engaged and clutch closed	Red warning lamp lit Gear will remain in neutral
No effect	Yellow warning Gear will be engaged and clutch closed	Red warning lamp lit Gear will remain in neutral

No effect	Yellow warning Clutch disengaged (valves 100 % activated)	Red warning lamp lit Attempt to engage N (will probably fail)
No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear
No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear
No effect	Yellow warning, gear engaged ? Gear clash?	Solenoids activated, engage gear, fails - gear clash, yellow warning (position sensor)

Large: System pressure will be lost immediately and not recovered by compressor	Leakage from air supply side			Leakage internal clutch system (from CCA side)		
	Small	Medium	Large	Small	Medium	Large
General	System compensates air leakage, due to compressor capacity larger than estimated leakage	Gradual pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Compressor can´t compensate leakage over time	Immidiate pressure drop on supply side. Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit).	System compensates air leakage by activate disengage valves	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold.	Even with fully open disengagment valves the clutch close or can not be disengaged
Case 1: Standstill, gearlever in A, M or R, gear engaged	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => warning in cluster (symbol lit). The TECU will try to disengage the clutch and shift the gearbox to neutral due to the yellow warning Not possible to disengage => red warning lamp=> Shift to neutral => turn off engine	No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail => Turn off engine

Case 2: Standstill (idle and veh. speed = 0) gearlever moved from A, R or M (gear engaged) to neutral. Driver moves gearlever	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	TECU will try to move the gearbox to neutral => this will fail => red warning lamp.=> turn off the engine Case 1.2 Small air leakage after non return valve => clutch engaged + red warning lamp	No effect	System compensates air leakage by activate disengage valve Disengage valves opened more than threshold => yellow warning symbol lit and gear shifted to N	Red warning lamp lit and clutch will be engaged. TECU will try to move gearbox to N, this will fail => Turn off engine
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal (TECU has already detected an air leakage in clutch air system, fault code set "leakage in clutch air system")	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Gear will remain in neutral	Yellow warning lamp lit Gear will remain in neutral
Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver press accelerator pedal (TECU has already detected an air leakage in air system, fault code set "leakage in clutch air system")	Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will be engaged and clutch closed	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	Gear will be engaged and clutch closed	Yellow warning Gear will be engaged and clutch closed	Yellow warning lamp lit Gear will remain in neutral

Case 3: Standstill gear in neutral, driver moves gear lever to R, A or M, driver does not press accelerator pedal	No effect	Gear will ramin in neutral untill the driver press the accelerator pedal due to the warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	No effect	Yellow warning Gear will be engaged and clutch closed	Yellow warning lamp lit Gear will remain in neutral
Case 4: Shall disengage for stop, one gear is engaged driver wants to stop.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged (solenoids 100% activated) - red warning. Turn off engine	No effect	Yellow warning Clutch disengaged (valves 100 % activated)	Red warning lamp lit Attempt to engage N (will probably fail) Turn off engine
Case 5: Gearshift when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning	No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear

Case 6: Gearlever is moved to N when moving.	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch disengaged, if not succeed try to disengage gear - red warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Clutch not disengaged - red warning	No effect	Yellow warning, clutch disengaged	Red warning lamp lit, remains in the actual gear
Case 7: Known air leakage and fault on position sensor (vehicle standstill, gearlever moved to A,R or M)	No effect	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). The gearbox will be shifted to neutral due to the yellow warning	Pressure sensor in gearbox will detect too low pressure => FC PID37 FMI 1will be set => yellow warning in cluster (symbol lit). Gear will remain in neutral	No effect	Yellow warning, gear engaged ? Gear clash?	Solenoids activated, engage gear, fails - gear clash, yellow warning (position sensor)

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1345786621

1345786621 DD CCA seized bearin 0945

QJ 1-1345786621 CCA Seized bearing

Current week: **w951**

Current age: 8 weeks

Background

We have found a high amount of seized bearing. We have had sezed bearing for quite some time but these has been denied from ZF Sachs as overheated clutch, This due to that in the previous cases the clutch was also overheated.

But now we have 14 cases in a very short time that doesn't show any trace of overheat on the clutch , only a seized bearing.

TMA analyze of Seized CCA bearings:

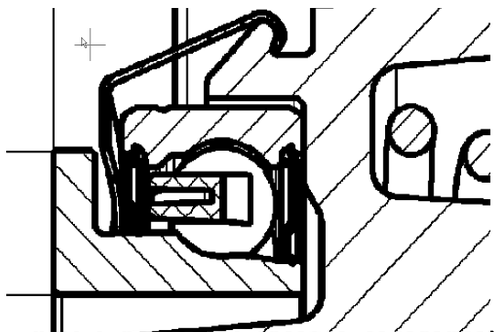
Scored conacts

QJ 1-1345786621 CCA Seized bearing

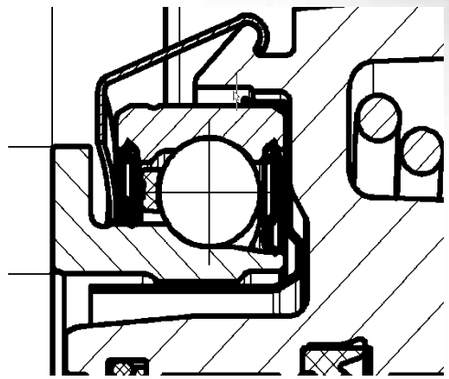
solutions for the claimed material

Solution:

Today's production



New



– MR ready date approx. w1015

- Block-paste of the bearing, see presentation “CCA Bearing block-paste". This will also reduce the dust impact.

Testing

CCA bearing Block-paste

- Preliminary cost : part cost 0 Euro, tooling 35 KEuro
- Reman of CCA still to be discussed

QJ 1-1345786621 CCA Seized bearing

- Time plan
  - Commercial agreement Volvo/Sachs: OK
  - DCN D-14185-97
    - New part no OK
    - Release of Drawing and models OK

    K-DCN OK

    DCN release OK
  - DVP sachs OK
  - Tooling and modification of production line: 2010w05
  - Initial samples PPAP: 2010w07
  - - SOP: 2010w09
    - Deviation Duro plastic rot. Lock for use up at supplier

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1345786621

Acrobat Document 2

Driveline and Chassis Technology

Releaser Changes for SMT
- New Outer and Inner Ring
- Block paste

ZF Sachs AG

Implementation Background
New Outer Ring

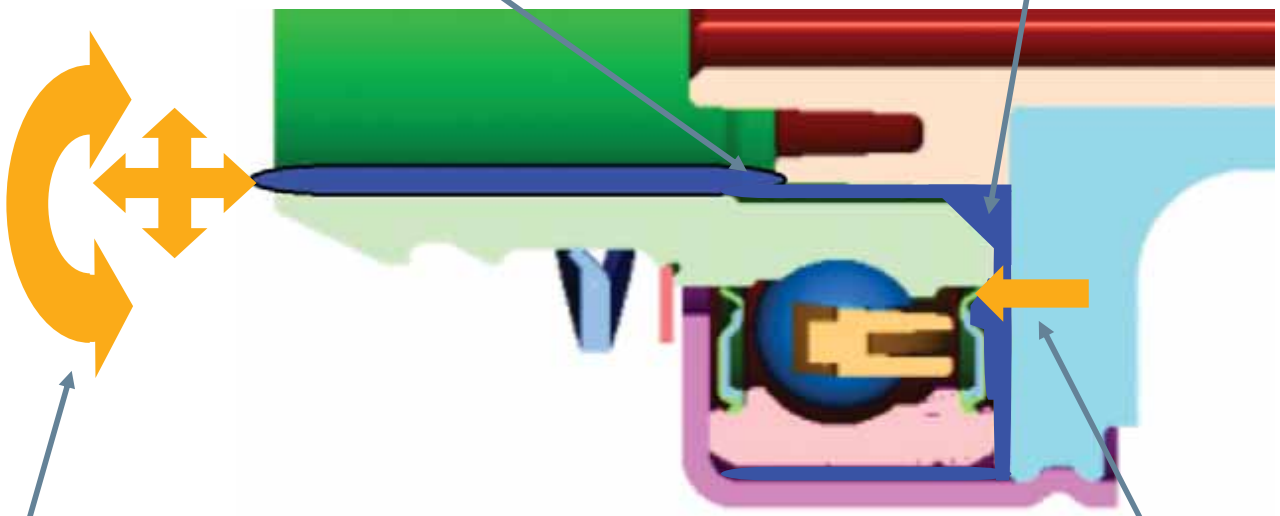
- During the autumn ZF Sachs will alternatively introduce block paste
- The block paste will protect against dust and give longer releaser life-time
- To be able to introduce the block paste all releaser-bearings will be changed due to unification and simplification of ZF Sachs products

Sept. 2008

Background to Block Paste

2. Dust on inner ring is conveyed in between bearing and sliding sleeve: **„Dust trap“**

3. „Coarse“ particles were collected and packed **„vibratory roller“**, beginning on the bottom, fine dust is distributed on circumference

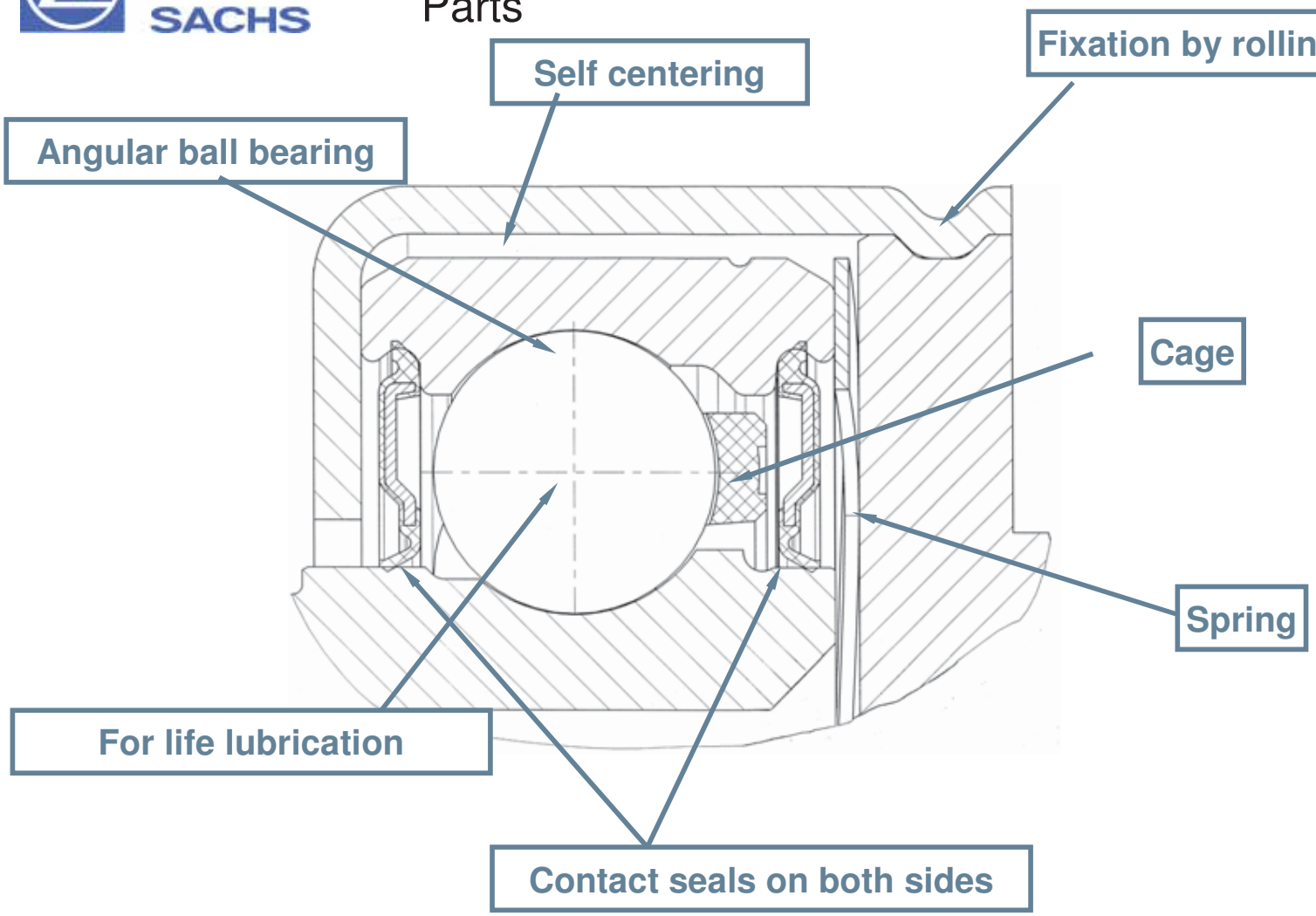


1. rotating inner ring is being vibrated via the diaphragm spring (axial-, radial- and wobbling vibration)

4. Sealing lip can‘t withstand the violent dust load and lets dust into the bearing
→ **bearing seize**

Today's Bearing Design

Parts

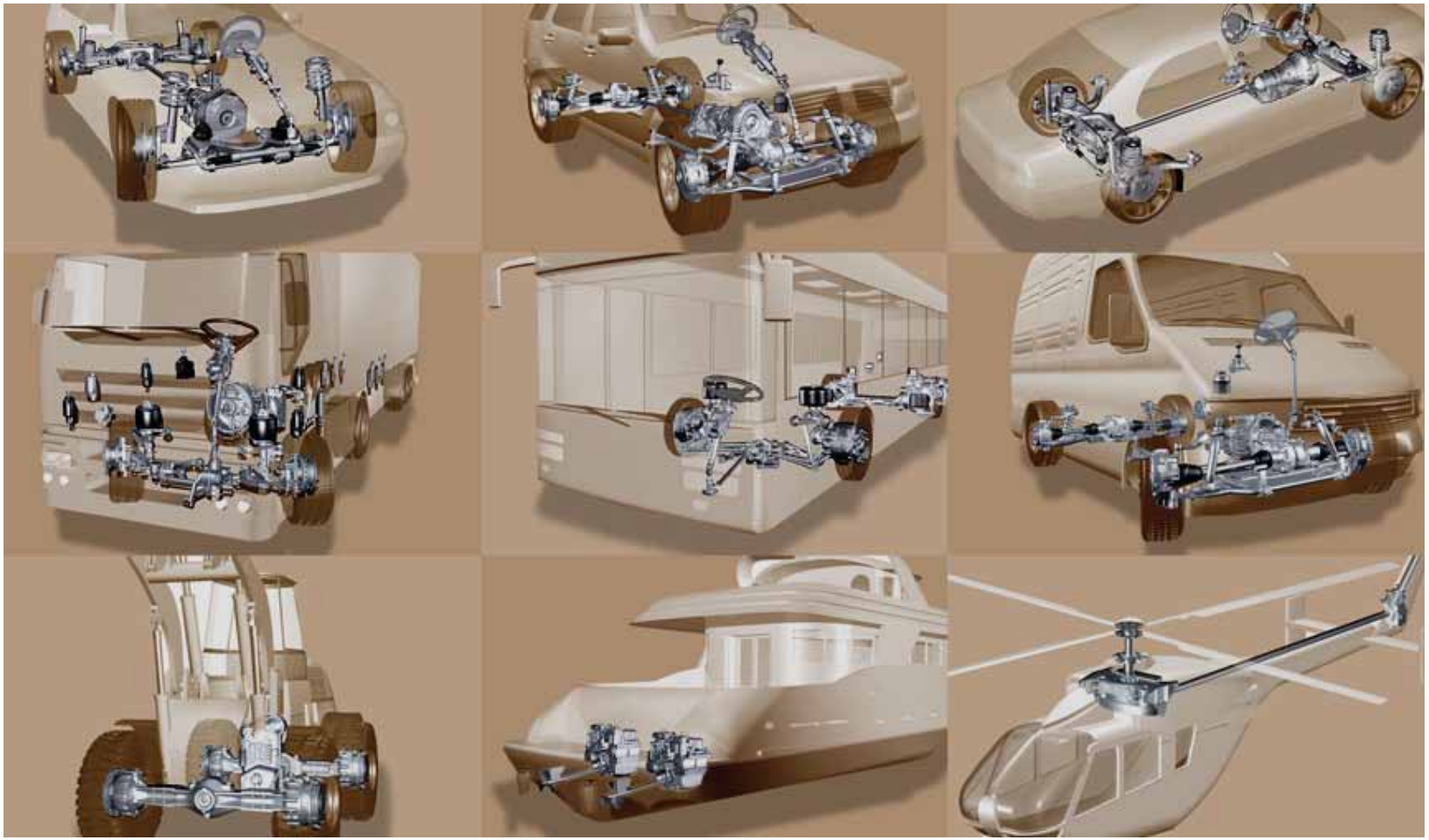


Sept. 2008

Next Steps?

- Bearing clearance will be decreased □ decreases axial movements
- Theoretically will the bearing temperature increase
  - Construction +0,20 K (by 90 K air temperature of the housing)
  - Long Haul + 0,05 K
- The change affects first of all KZISZ-5 bearings (Volvo: SMT-bearings)
- The change will be introduced in the part list
- The change of outer ring and inner ring will be introduced in one step
- The last change will be block paste and block paste holding disc
- The block paste will be introduced im Oktober 2008

Thank you very much for your attention!



Sept. 2008

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1345786621

Acrobat Document

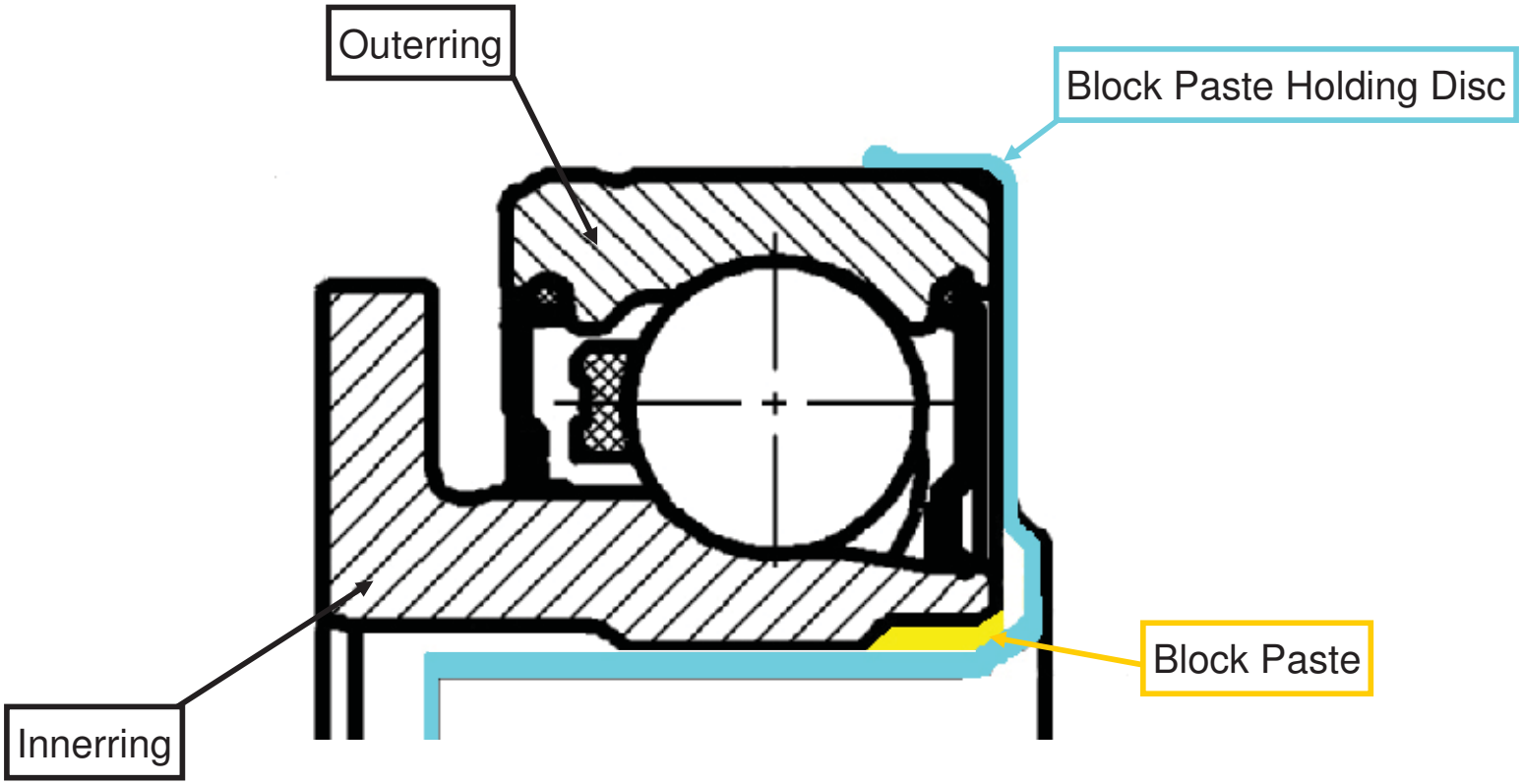
Driveline and Chassis Technology

Block paste for ConAct bearing

Performed testing

Alexander Moller
ZF Sachs AG

Bearing design



Performed tests on ConAct (6 size bearing)

- Functional testing (5000 cycles): test dust was blown towards the bearing. ➔ no dirt introduction in the bearing. Test was **passed**!

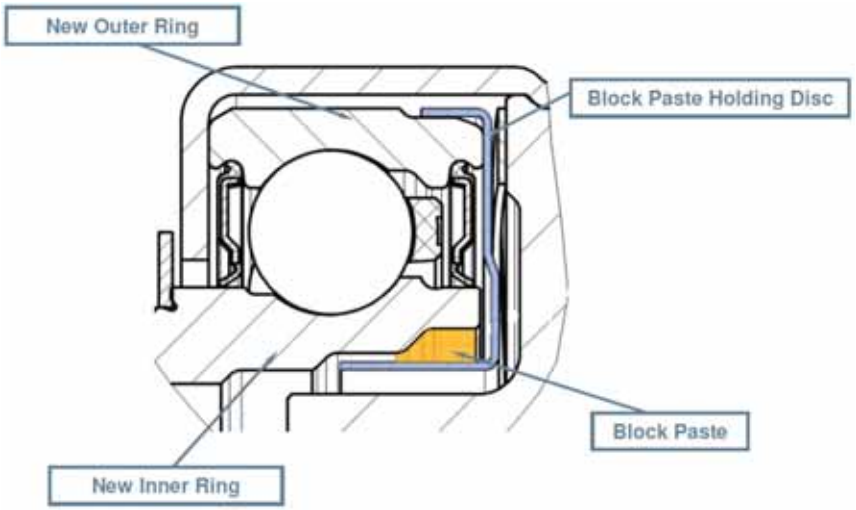
- Vehicle test with **212.000 km**: Block paste was still working, no entry of dirt into the bearing
- Vehicle test with **127.000 km**: Block paste was still working, no entry of dirt into the bearing
- Vehicle test with **109.000 km**: Block paste was still working, no entry of dirt into the bearing
- Vehicle test with **251.000 km**: Block paste was still working, no entry of dirt into the bearing

- 4 more vehicles are running! (current status: about 100.000 – 200.000 km)

- **➔ Confirmation of experiences out of 5 size bearing**

Series experiences with releaser (5 size bearing, pulled)

- Series design in production with several truck manufacturer
- First production October 2006
- Total produced amount up to now: 167.000
- Introduction with very high success



Thank you for your attention!

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1345786621

Cover QJ 1-1345786621

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1 -1345786621 AMT clutch cylinder bearing seized
All Documents

[redacted] Owner :

I Like It Tags & Notes

Type	Name	Modified	Modified By
	1345786621 DD CCA seized bearin 0945	4/10/2013 10:25 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1345786621

Presentation in 1345786621 DD CCA seized bearin 0945

Analysis
Scored clutch cylinders 090925

Examination of claimed Clutch cylinders arrived at TMA between week 28 and week 38

Conclusions

- Increasing nr of failed AMT-C releasebearings
- Pressureplates shows no signs of excessive heat that could explain bearing failures

B-496470

0001320 9930031684901

Claim info

Importer:	1320	Repair date:	2009-05-30
Dealer:	9930	Inspector report:	No
Reference no:	316849	SCC code:	
Job no:	1	SCC description:	
Return to dealer:	No		

Vehicle data

Chassis Id:	B-496470	Marketing type:	FM13 42T
Milage:	272443	Operating hours:	
Assembly date:	2007-11-21		
Age:	18	Delivery date:	2007-12-10

Analysis

Problem: Airleak clutch cylinder

Result: Airleak clutch cylinder , Release bearing scored

Dealer feedback: Approved

Root cause:

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	8.88	38.07	0

Decision and status

TMA decision: Approved

TMA status: Analysis pending

Third party analysis

Third party:

Third party decision:

Third party result:

Received causal part

Part number:	VO-20808451 CYLINDER	VO-20808451 CYLINDER	Part mileage:
Serial no:			Part age:
Supplier:	6992 ZF SACHS AG	6992 ZF SACHS AG	Part fitted date:
Func. group:	4312 housing; clutch casing	4312 housing; clutch casing	Defect code: 32
Func. area:	6 Transmission		

B-499831

0001320 9930031705701

Claim info
Importer: 1320 Repair date: 2009-07-01
Dealer: 9930 Inspector report: No
Reference no: 317057 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis Id: B-499831 Marketing type: FM13 42T
Mileage: 286857 Operating hours:
Assembly date: 2007-12-13
Age: 18 Delivery date: 2008-01-02

Cost summary (SEK)

Deb Code	Labour costs	Material costs	Other costs
18	27.40	38.32	0

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Pressureplate diaphragmspring tips badly worn

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER VO-20806451 CYLINDER
Serial no:
Supplier: 6992 ZF SACHS AG 6992 ZF SACHS AG
Func. group: 4312 housing; clutch casing 4312 housing; clutch casing
Func. area: 6 Transmission

Part mileage:
Part age:
Part fitted date:
Defect code: 32

B-480637

0001320 1183032239801

Claim info
Importer: 1320 Repair date: 2009-07-06
Dealer: 1183 Inspector report: No
Reference no: 322398 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis Id: B-480637 Marketing type: FH13 62T
Milage: 233673 Operating hours:
Assembly date: 2007-06-29
Age: 24 Delivery date: 2007-07-23

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	33.96	97.19	0

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Pressureplate diaphragmspring tips badly worn

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part

Part number:	VO-20806451 CYLINDER	VO-20806451 CYLINDER	Part mileage:
Serial no:			Part age:
Supplier:	6992 ZF SACHS AG	6992 ZF SACHS AG	Part fitted date:
Func. group:	4312 housing; clutch casing	4312 housing; clutch casing	Defect code: 43

A-650148

0001320 1184034189001

Claim info
Importer: 1320 | Repair date: 2009-08-10
Dealer: 1184 | Inspector report: No
Reference no: 341880 | SCC code:
Job no: 1 | SCC description:
Return to dealer: No

Vehicle data
Chassis Id: A-650148 | Marketing type: FH13 62T
Milage: 195066 | Operating hours:
Assembly date: 2007-07-09
Age: 24 | Delivery date: 2007-08-31

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	35.89	96.85	0

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Sensor failure
Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part

Part number:	VO-20806451 CYLINDER	VO-20806451 CYLINDER	Part mileage:
Serial no:			Part age:
Supplier:	6992 ZF SACHS AG	6992 ZF SACHS AG	Part fitted date:
Func. group:	4312 housing; clutch casing	4312 housing; clutch casing	Defect code: 32
Func. area:	6 Transmission		

Included material — Serial no | Quantity

B-486568

0001320 1072031292801

Claim info

Importer:	1320	Repair date:	2009-07-30
Dealer:	1072	Inspector report:	No
Reference no:	312928	SCC code:	
Job no:	1	SCC description:	
Return to dealer:	No		

Vehicle data

Chassis id:	B-486568	Marketing type:	FH13 62T
Milage:	270291	Operating hours:	
Assembly date:	2007-09-10		
Age:	22	Delivery date:	2007-10-15

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	34,35	97,08	0

Analysis

Problem: Sensor failure
Result: Sensor failure , releasebearing scored

Dealer feedback: Approved
Root cause:

Decision and status

TMA decision: Approved
TMA status: Analysis pending

Third party analysis

Third party:
Third party decision:
Third party result:

Received causal part

Part number:	VO-20806451 CYLINDER	VO-20806451 CYLINDER
Serial no:		
Supplier:	6992 ZF SACHS AG	6992 ZF SACHS AG
Func. group:	4312 housing; clutch casing	4312 housing; clutch casing
Func. area:	6 Transmission	

Part mileage:
Part age:
Part fitted date:
Defect code: 32

Included material

Rej	Rec	New	Prefix	Part number	Description	Serial no	Quantity

A649602

0000062 3303001527301

Claim info
Importer: 62 Repair date: 2009-07-21
Dealer: 330 Inspector report: No
Reference no: 3005273 SCC code:
Job no: 1 SCC description:
Return to dealer: Yes

Vehicle data
Chassis Id: A-649602 Marketing type: FH13 64R
Mileage: 298143 Operating hours:
Assembly date: 2007-07-02
Age: 21 Delivery date: 2007-11-02

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	6588.80	4439.12	0

Analysis
Problem: Releasebearing scored
Result: Releasebearing scored , cylinder repaired,Pressureplate damaged

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER VO-20806451 CYLINDER
Serial no:
Supplier:
Func. group: 4312 housing; clutch casing 4312 housing; clutch casing
Func. area: 6 Transmission
Part mileage:
Part age:
Part fitted date:
Defect code: 62

B-482695

0001320 1480030218901

Claim info
Importer: 1320 Repair date: 2009-04-07
Dealer: 1480 Inspector report: No
Reference no: 302189 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis id: B-482695 Marketing type: FM13 62R
Mileage: 155853 Operating hours:
Assembly date: 2007-07-12
Age: 16 Delivery date: 2007-12-17

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	30,92	105,12	0

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Pressureplate diaphragmspring tips badly worn

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER
Serial no:
Supplier: 6992 ZF SACHS AG

VO-20806451 CYLINDER
6992 ZF SACHS AG
4312 housing; clutch casing

Part mileage:
Part age:
Part fitted date:
Defect code: 11

B-479874

0001320 1486030082501

Claim info
Importer: 1320 Repair date: 2009-05-28
Dealer: 1486 Inspector report: No
Reference no: 300825 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis Id: B-479874 Marketing type: FM13 62R
Milage: 184000 Operating hours:
Assembly date: 2007-06-25
Age: 20 Delivery date: 2007-10-10

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	29.87	103.08	0

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Pressureplate diaphragmspring tips badly worn

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER VO-20806451 CYLINDER
Serial no:
6992 ZF SACHS AG 6992 ZF SACHS AG
Part mileage:
Part age:
Part fitted date:

E-739612 B-496608

Page 1 of 2

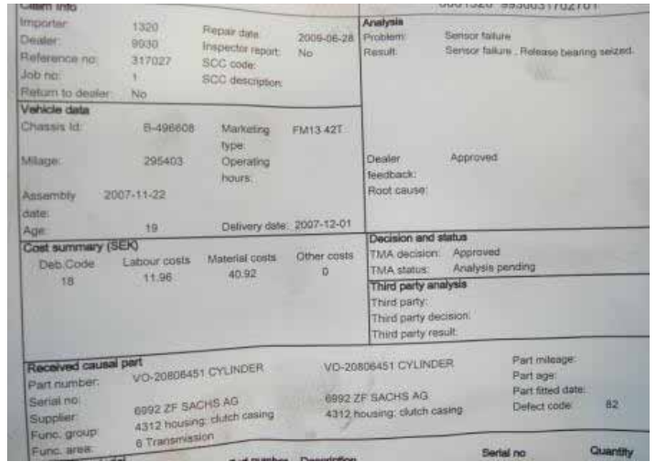
Claim job (7020-3251-76860-1)

Repair header

Importer:	7020 - VOLVO DO BRASIL		
Dealer:	3251 - Treviso Betim		
Reference no.:	76860 -1	Repair order no.:	3611351
Repair date:	11/05/09	Currency:	BRL (3.845)
Registration date:	29/05/09	Force header information:	
Delivering importer:	7020 - VOLVO DO BRASIL		
Delivering dealer:	3251 - Treviso Betim		
Reg. no:	730612		
Chassis id:	E-739612	Marketing type:	FM13 B4R
VIN:	93KASWDGX8E[redacted]	Company:	Volvo Truck Corporation
Delivery date:	23/05/08	Make:	Volvo
No vehicle:			
Mileage (km):	4680		
Age (m):	12		

Claim job information

Claim job status:	Credited	Forced:	
Claim job type:	Vehicle warranty claim job	Follow up code:	
Scenario code:	21 Dealer; no debit	MI name:	Send in TMA (Brazil)
Casual part (serial):	20806451 CILINDRO	Function group:	4312
New part:		Main operation:	4132000 Cilindro servo da embreagem, substituição. Caixa de mudanças removida
TMA decision:	Approved		
Problem:	No engage gear and noise gearbox		
Analysis:	Clogged and seized clutch servo bearing (MID 130 PID 33 FMI 12).		



Claim info

Importer:	1320	Repair date:	2009-06-28
Dealer:	9030	Inspector report:	No
Reference no:	317027	SCC code:	
Job no:	1	SCC description:	
Return to dealer:	No		

Vehicle data

Chassis Id:	B-496608	Marketing type:	FM13 42T
Milage:	295403	Operating hours:	
Assembly date:	2007-11-22		
Age:	19	Delivery date:	2007-12-01

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	11.96	40.92	0

Analysis

Problem: Sensor failure
Result: Sensor failure , Release bearing seized.

Dealer feedback: Approved
Root cause:

Decision and status

TMA decision: Approved
TMA status: Analysis pending

Third party analysis

Third party:
Third party decision:
Third party result:

Received causal part

Part number:	VO-20806451 CYLINDER	VO-20806451 CYLINDER	
Serial no:			Part mileage:
Supplier:	6992 ZF SACHS AG	6992 ZF SACHS AG	Part age:
Func. group:	4312 housing: clutch casing	4312 housing: clutch casing	Part fitted date:
Func. area:	6 Transmission		Defect code: 82

Serial no | Quantity

B-496599 A-646346

0001320 9930031694802

Claim info
Importer: 1320
Dealer: 9930
Reference no: 316948
Job no: 2
Return to dealer: No
Repair date: 2008-06-13
Inspector report: No
SCC code:
SCC description:

Analysis
Problem: Clutch cylinder stuck
Result: Clutchcylinder stuck

Vehicle data
Chassis id: B-496599
Milage: 288358
Marketing type: FM13 42T
Operating hours:
Assembly date: 2007-11-22
Age: 19
Delivery date: 2007-12-01

Dealer feedback: Approved
Root cause:

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	24.41	55.70	0

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER
Serial no: NONE
Supplier: 6992 ZF SACHS AG
Func. group: 4312 housing; clutch casing
Func. area: 6 Transmission

VO-20806451 CYLINDER
NONE
6992 ZF SACHS AG
4312 housing; clutch casing

Part mileage:
Part age:
Part fitted date:
Defect code: 32

0001320 1465030828201

Claim info
Importer: 1320
Dealer: 1465
Reference no: 308282
Job no: 1
Return to dealer: Yes
Repair date: 2009-07-29
Inspector report: No
SCC code:
SCC description:

Analysis
Problem: Sensor failure
Result: Sensor failure ; releasebearing scored as consequence.Dustcover loose

Vehicle data
Chassis id: A-646346
Milage: 284821
Marketing type: FH13 62T
Operating hours:
Assembly date: 2007-05-15
Age: 23
Delivery date: 2007-09-01

Dealer feedback: Approved
Root cause:

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	30.88	63.76	0

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

Received causal part
Part number: VO-20806451 CYLINDER
Serial no:
Supplier: 6992 ZF SACHS AG
Func. group: 4312 housing; clutch casing

VO-20806451 CYLINDER
6992 ZF SACHS AG
4312 housing; clutch casing

Part mileage:
Part age:
Part fitted date:
Defect code: 82

B-490664 A654191

0001320 1239032078901

Claim info
Importer: 1320 Repair date: 2009-07-09
Dealer: 1239 Inspector report: No
Reference no: 320789 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis id: B-490664 Marketing type: FM13 62T
Milage: 286621 Operating hours:
Assembly date: 2007-10-08
Age: 20 Delivery date: 2007-11-10

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	19.36	38.50	3.22

Received causal part
Part number: VO-20806451 CYLINDER VO-20806451 CYLINDER
Serial no:
Supplier: 6992 ZF SACHS AG 6992 ZF SACHS AG
Func. group: 4312 housing; clutch casing 4312 housing; clutch casing
Part mileage:
Part age:
Part fitted date:
Defect code: 21

Analysis
Problem: Release bearing seized
Result: Release bearing seized.Conact totally destroyed.Pressureplate diaphragmspring tips badly worn

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:

00014609025691 10051201

Claim info
Importer: 1480 Repair date: 2009-08-16
Dealer: 902569 Inspector report: No
Reference no: 1100512 SCC code:
Job no: 1 SCC description:
Return to dealer: No

Vehicle data
Chassis id: A-654191 Marketing type: FM13 64R
Milage: 190813 Operating hours:
Assembly date: 2007-10-04
Age: 19 Delivery date: 2007-11-28

Cost summary (SEK)

Deb.Code	Labour costs	Material costs	Other costs
18	95.95	99.07	0

Received causal part
Part number: VO-20806451 CYLINDRE VO-20806451 CYLINDRE
Serial no:
Supplier: 6992 ZF SACHS AG 6992 ZF SACHS AG
Func. group: 4312 housing; clutch casing 4312 housing; clutch casing
Func. area: 6 Transmission
Part mileage:
Part age:
Part fitted date:
Defect code: 32

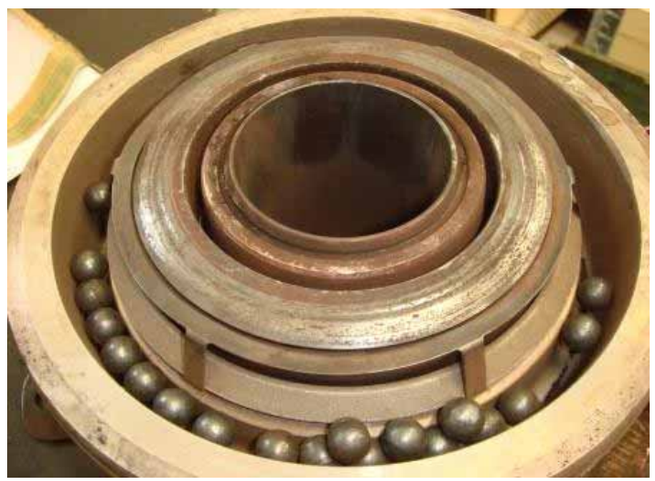
Included material
Ref. Part number Description Serial no Quantity

Analysis
Problem: Sensor failure
Result: Sensor failure , release bearing scored

Dealer feedback: Approved
Root cause:

Decision and status
TMA decision: Approved
TMA status: Analysis pending

Third party analysis
Third party:
Third party decision:
Third party result:



PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1359387371

cover sheet QJ1-1359387371

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1-1359387371 AMT clutch disc spring worn or broken
All Documents

Type	Name	Modified	Modified By
	1359387371 worn damper spring 10w25	4/10/2013 10:23 AM	Säfblad Katarina
	1359387371 Worn damper spring w1151	4/10/2013 10:24 AM	Säfblad Katarina
	AMT C clutch damper	4/10/2013 10:18 AM	Säfblad Katarina
	ER-618062	4/11/2013 1:55 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1359387371

1359387371 worn damper spring 10w25

QJ 1-1359387371 Worn clutch disc damper springs

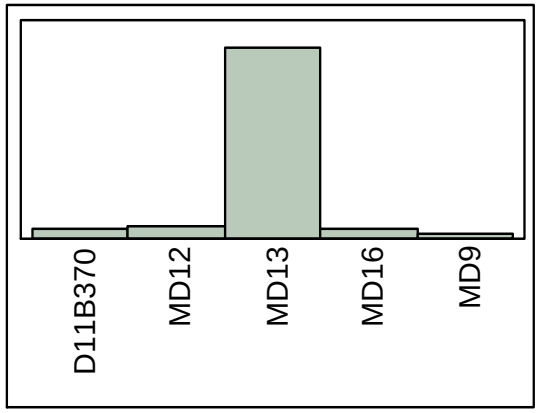
Background:

- Damper spring clutch disc worn, broken and spring window.
  - Approx: 23 MQR/DQR and QAG:s opened for worn or broken damper springs. 45 vehicles included in these reports + additional 15 vehicles from Qwat system.
  - Markets effected: Europe, Asia and US

MQR/DQR/QWAT Worn clutch analysis

- Total 60 vehicles identified in DQR, MQR, QWAT

Engine



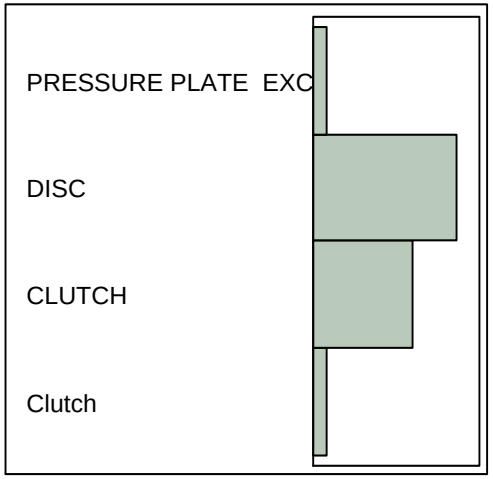
Frequencies

Level	Count	Prob
D11B370	2	0,03390
MD12	3	0,05085
MD13	51	0,86441
MD16	2	0,03390
MD9	1	0,01695
Total	59	1,00000

N Missing 0

5 Levels

Causal Part Name



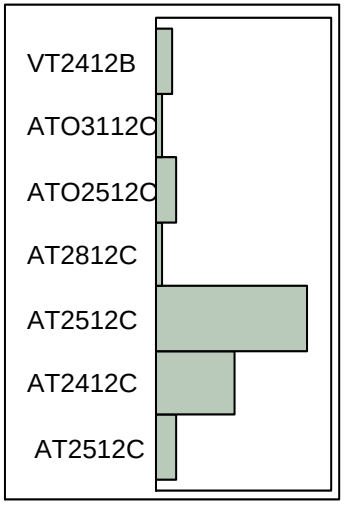
Frequencies

Level	Count	Prob
Clutch	1	0,05263
CLUTCH	7	0,36842
DISC	10	0,52632
PRESSURE PLATE EXCH	1	0,05263
Total	19	1,00000

N Missing 40

4 Levels

Gearbox



Frequencies

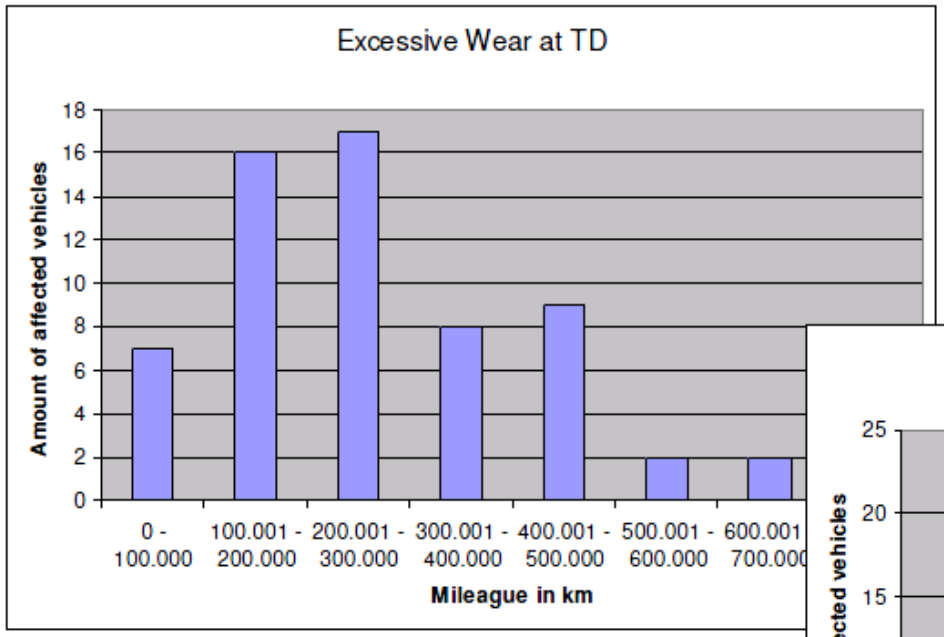
Level	Count	Prob
AT2512C	4	0,07018
AT2412C	15	0,26316
AT2512C	29	0,50877
AT2812C	1	0,01754
ATO2512C	4	0,07018
ATO3112C	1	0,01754
VT2412B	3	0,05263
Total	57	1,00000

N Missing 2

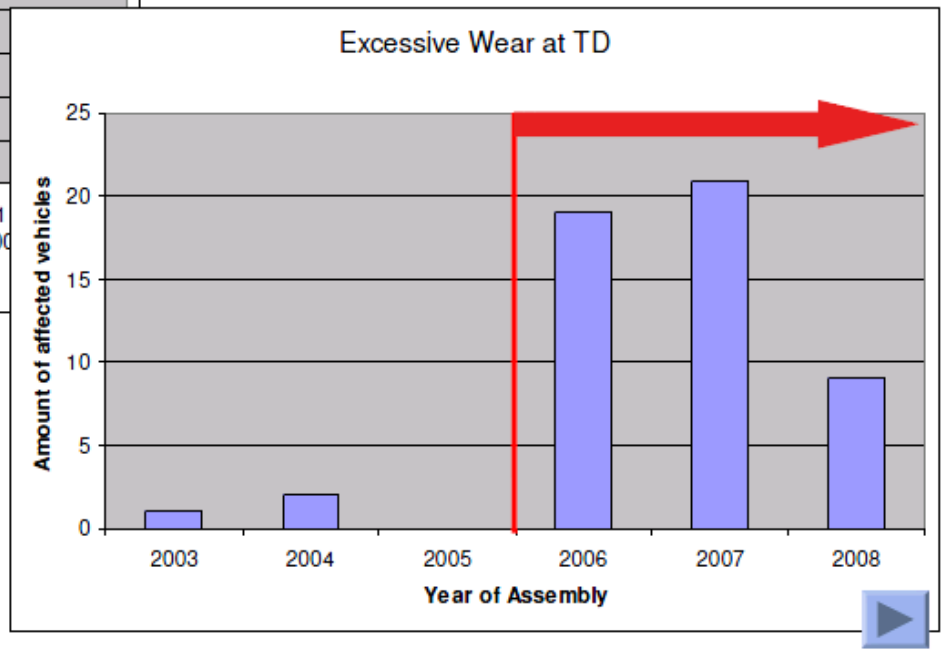
7 Levels

QJ 1-1359387371 Worn clutch disc damper springs

– Evaluation of claim list



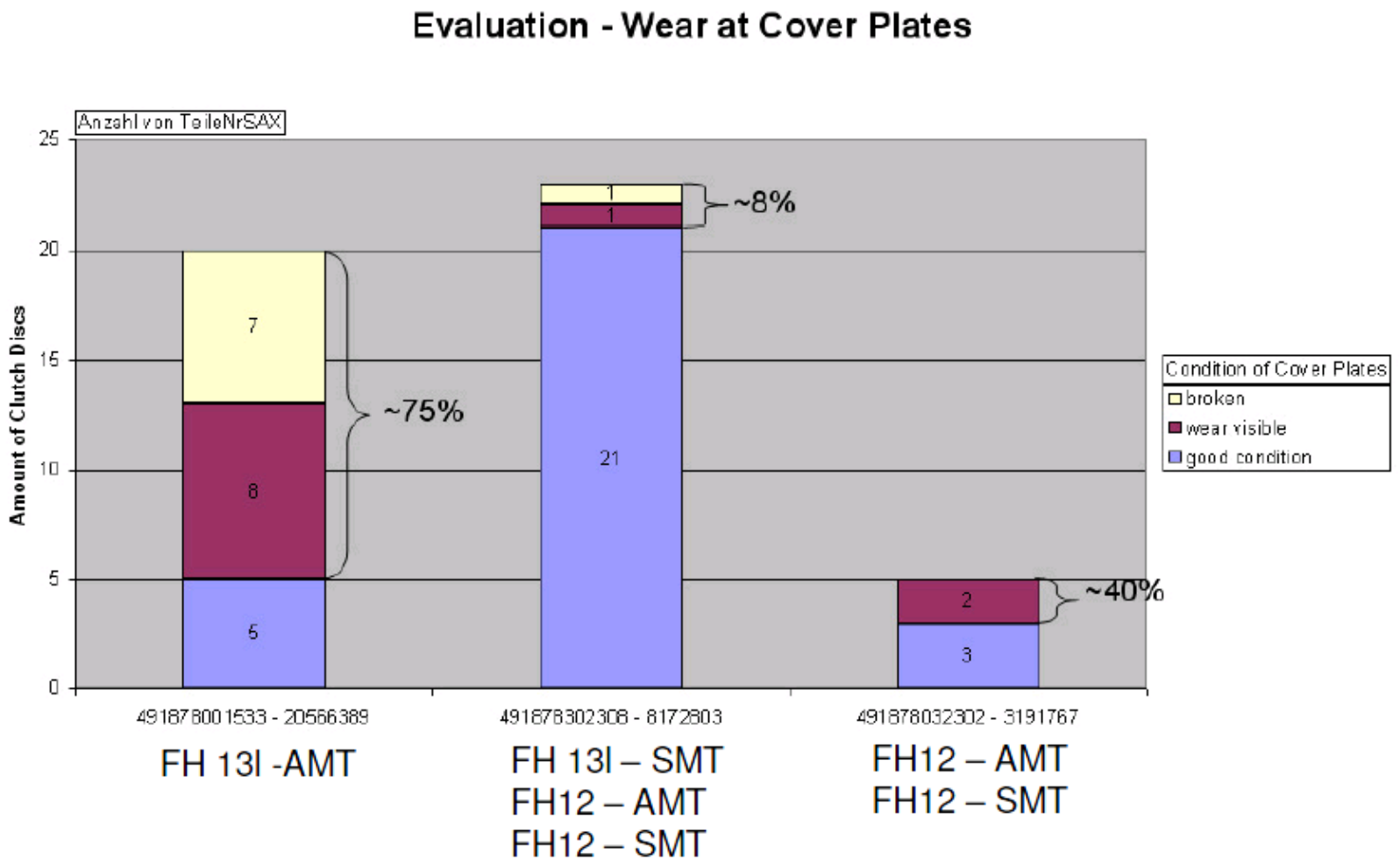
- Data of 72 cases provided by Volvo.



- Excessive wear mainly appears at vehicles assemblied in 2006 or later.

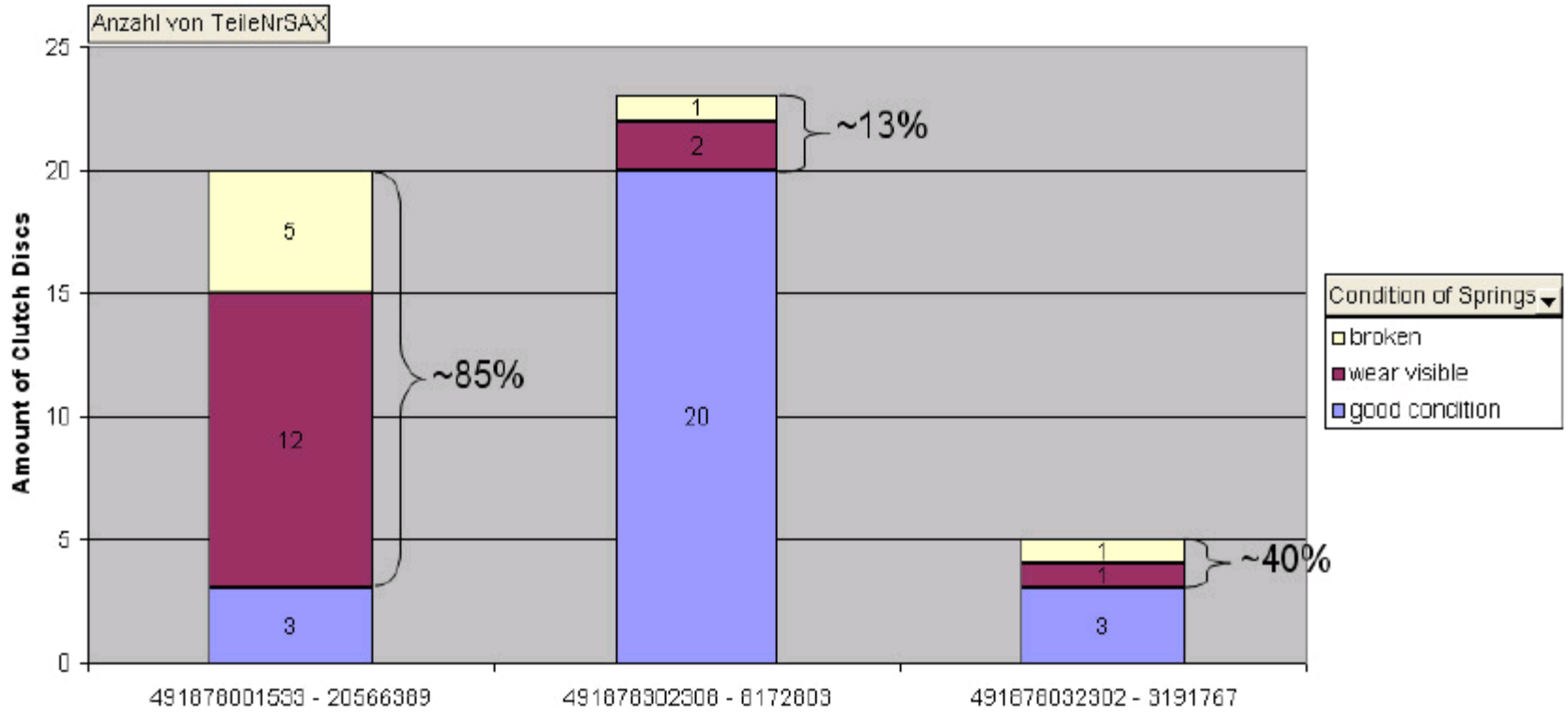
QJ 1-1359387371 Worn clutch disc damper springs

B4 – Investigation of 50 clutch discs from Bielefeld

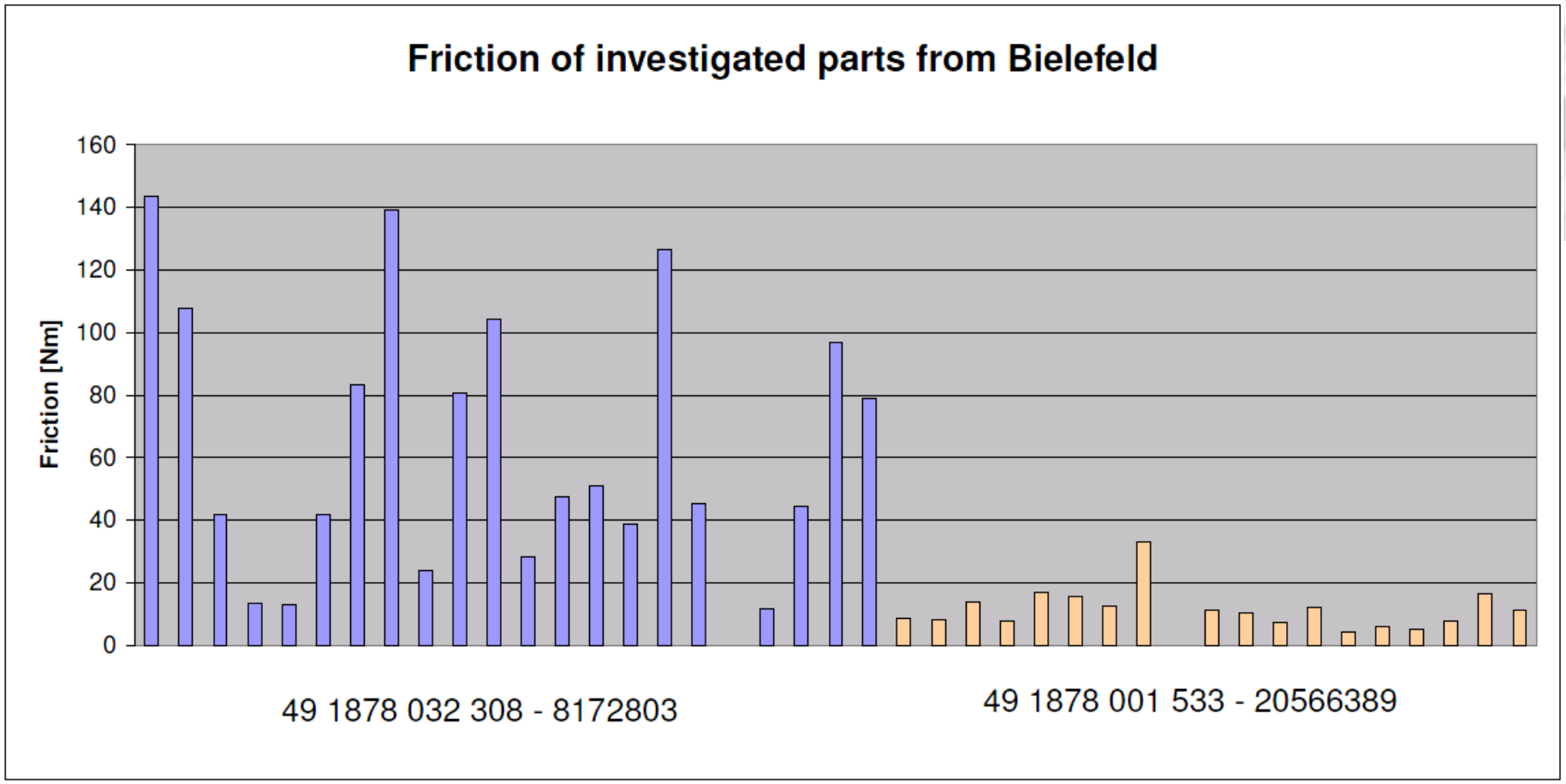


QJ 1-1359387371 Worn clutch disc damper springs

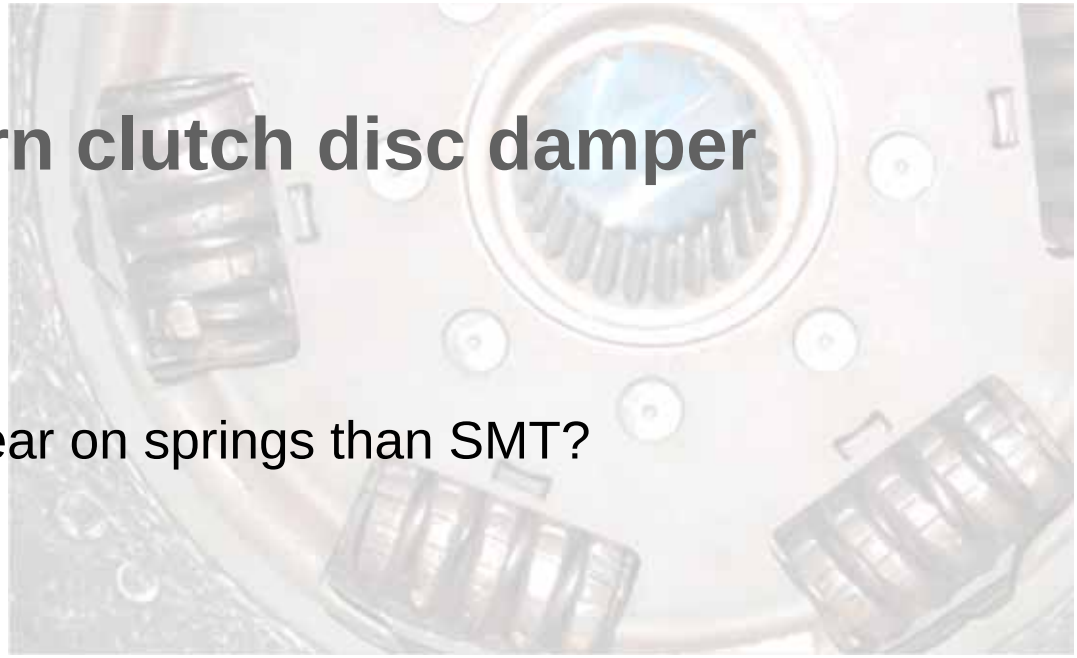
B4 – Investigation of 50 clutch discs from Bielefeld



QJ 1-1359387371 Worn clutch disc damper springs



QJ 1-1359387371 Worn clutch disc damper springs



- Why is AMT-C giving more wear on springs than SMT?

  - …….

- Why more damper wear on AMT-C vs SMT

#	Statement	Confirming?	Against?	Actions!
1	Increased engine excitation responsible	Just claimed cases with FH13	SMT (FH13) nearly not affected	
2	AMT C is responsible	Nearly just AMT C cases claimed	---	- Compare LVDs between SMT and AMT trucks (FH13) - Compare friction into transm. AMT C and SMT (usage of disc w/o. friction device)
3	Principle design of torsional damper	---	Same torsional damper for FH12 / FH13 and AMT / SMT	
4	Safety factor of the torsional damper responsible			- safety facors for all appl. needs to be checked
5	Safety factor of the pressure plate responsible			- safety facors for all appl. needs to be checked
6	PTO is responsible	More cases with PTO	With AMT B (PTO) no cases and SMT not affected	
7	Pressure plate is responsible	Just cases with push-type	---	- Influence of pull- and push-type on damper load (test bench)
8	ConAct is responsible	Just cases with ConAct	---	- Influence of the missing joint on the torsional damper load - No tumbling degree of freedom
9	Resonance speed is responsible	Difference between AMT-B/SMT and AMT-C unknown		- Measurement of torsional vibration at AMT, SMT truck (FH13) and AMT (FH12) => relative angle and acceleration
#	Low torsional damper friction is responsible	All claimed parts have low friction	SMT parts also have low friction, but not affected	
11	Tumbling excitation is responsible	50% increase at FH13	SMT is not affected with the same engine	
#	Facing material is responsible	Just cases with S620C affected	---	
#	Number of load cycles is responsible	difference between AMT-B and AMT-C unknown		
#	Cushion springs	Standard for FH12 and FH13 SMT Soft cushion springs for FH13 AMT-C	---	
#	Gear shifting time is responsible	difference between AMT C and AMT B		- Comparisson of shifting strategy (software)
#	Imbalance of the disc assembly		SMT is not affected with the same balance specification	- Check the time of introduction

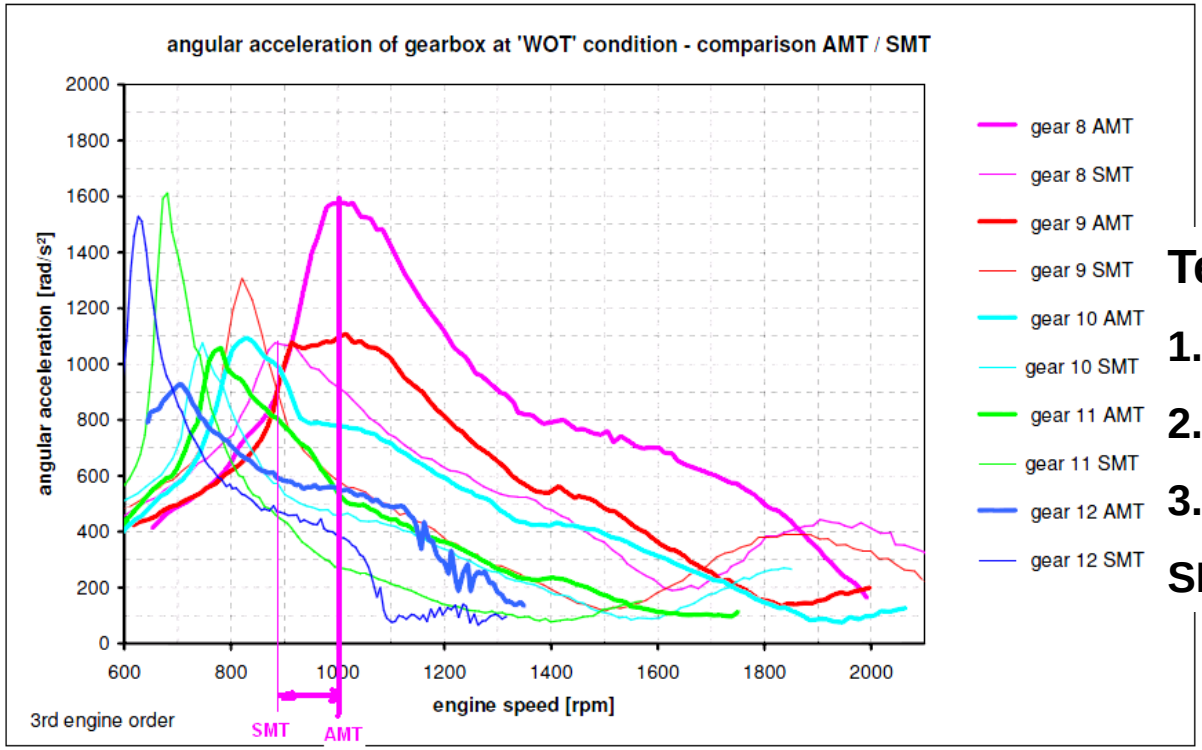
QJ 1-1359387371 Worn clutch disc damper springs Brainstorming excersice

Se bifogat attachment

Brainstorming excersice

QJ 1-1359387371 Worn clutch disc damper springs
Resonance peak analys between AMT-C and SMT

position of resonance peak – comparison AMT / SMT



Test ongoing to confirm

1.Disc with friction device

2. Disc without friction device

3. Drive cycle NÖTC to compaire SMT and AMT usage

QJ 1-1359387371 Worn clutch disc damper springs Resonance peak analys between AMT-C and SMT Measured in vehicle VPT

Max torsional angle rpm		
Without friction damper in clutch		
Gear	SMT	AMT
1		
2		
3		
4		
5	930	
6	780	
7	855	1060
8	740	870
9	710	880
10	640	745
11	600	710
12	585	

Measurments confirming that SMT have a lower resonance vs AMT-C

Comparision made in the same driving cycle confirms that the resonance is noticed more frequent in an AMT-C than in an SMT.

Clutch disc damper friction device

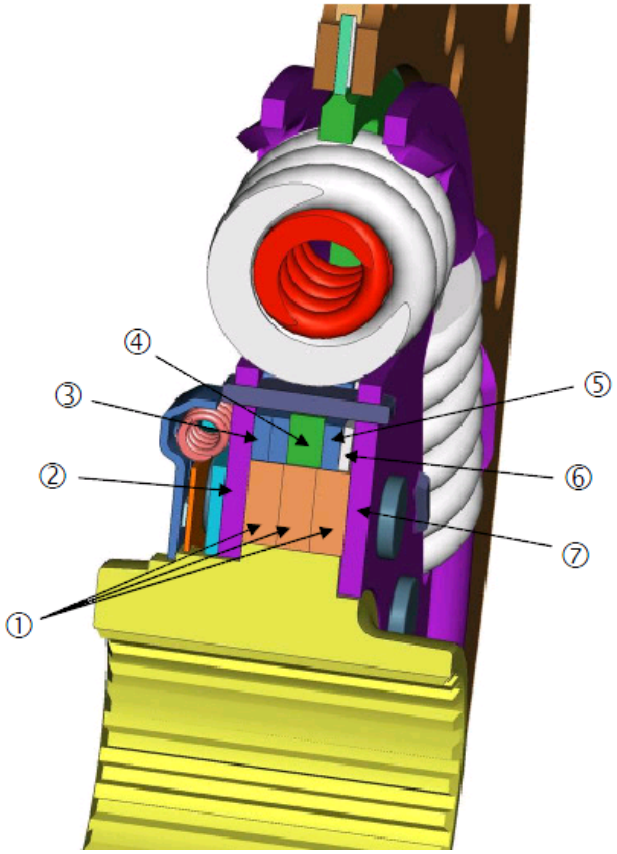
Current design

Multiple hub ring

- 3x Hub ring ①

Friction device

- Retainer plate ②
- 2x Engine sided friction ring ③
- Driven disc ④
- Gearbox sided friction ring ⑤
- Belleville spring ⑥
- Retainer plate ⑦



Clutch disc damper friction device

Cost and lead time.

- **Piece cost:** +1.35€
- **Tooling VPT share:**

  59 K€

(total tool cost 197K€)

Lead time:

9 months after confirmation

Verification:

- Field tests in UK, Finland and Sweden. W22->
- Accelerated test for wear on friction device, TBD

ZF SACHS

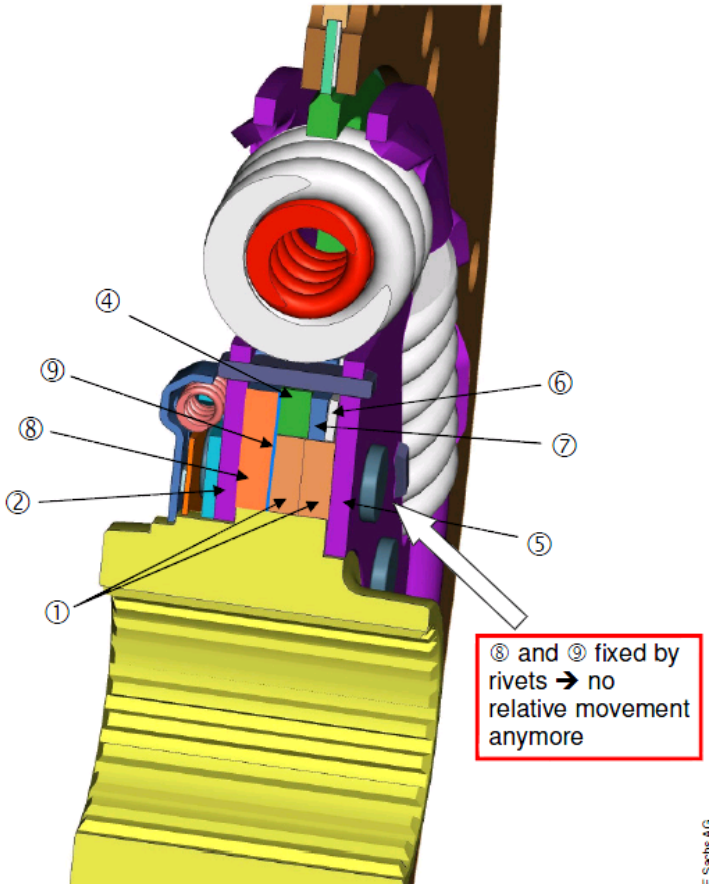
Advanced friction device

Multiple hub ring

- **1x Hub-friction ring** ⑧
- 2x Hub ring ①

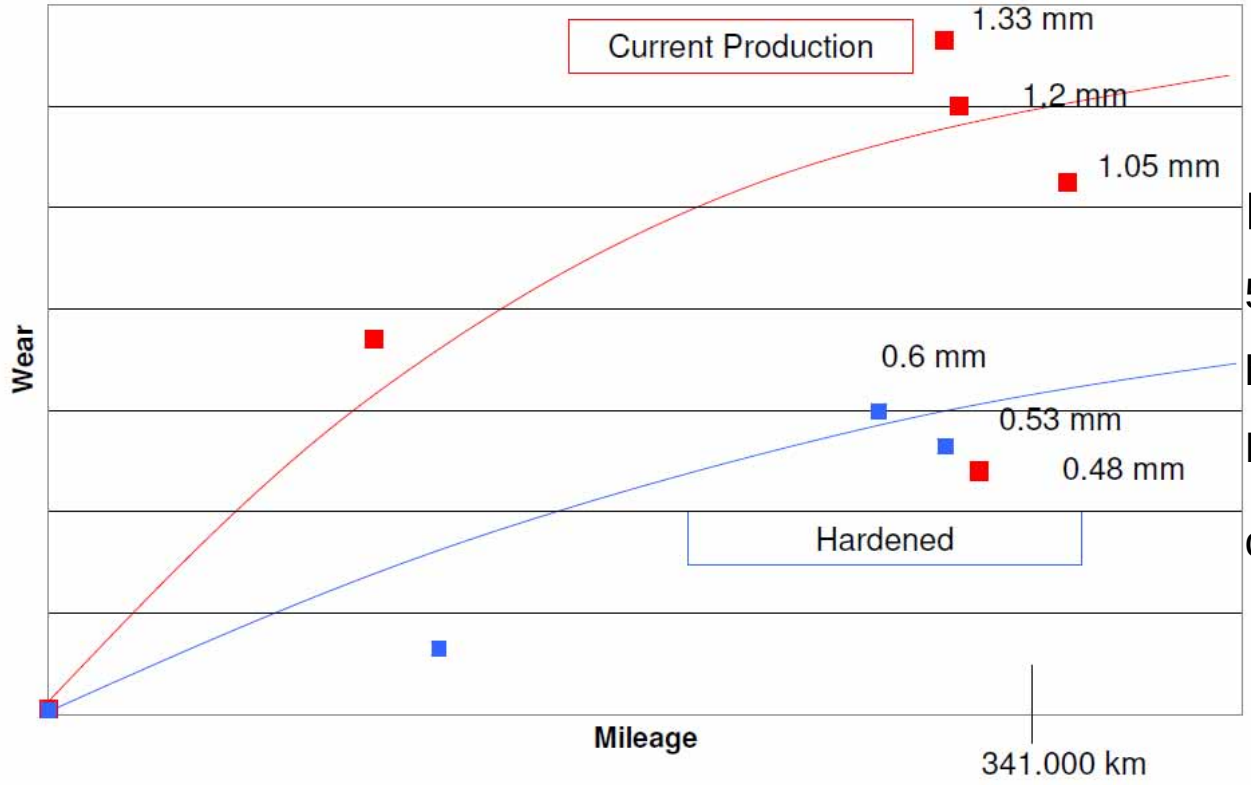
Friction device

- Retainer plate ②
- **1x Hub friction ring** ⑧
- **1x Hub friction ring** (friction layer) ⑨ hardened ➔ lower wear
- Driven disc ④
- Gearbox sided friction ring ⑤
- Belleville spring ⑥
- Retainer plate ⑦



Clutch disc damper friction device

Results of Prototype Testing



For field testing with VPT

50 000 km gives a good hint of wear.

But to get an idee of the wear curve longer test are needed

VPT field test Qj 1-1359387371 worn disc damper spring

- Vehicles for test of new disc design
  - 20 pcs (D1)disc with new material, 10 pcs (D2)new friction device and new material.
    - UK
    - Batch 1
      - 3 pcs of design D1, chassis to be nominated (4 rigid) Approx. w20 (disc no. 8,11,16)
      - 3 pcs of design D2, chassis to be nominated (3 rigid) Approx. w22 (disc no.
    - Batch 2
      - B481808 1pcs D2 (reference testing mtrl tested in GOT D1/D2). Approx. w34
      - 1 pcs of design D1, chassis to be nominated (4 rigid) Approx. w34
    - Finland
      - 3 pcs D2 , A677716, A664751, A635789 ,xxxx Confirmation needed
      - 3pcs D1 Confirmation needed
    - Field test Sweden
      - Timber applications 4 pcs (2pcs D2 and 2 pcs D1) start ~10w26

LVD data

- 54 vehicles with LVD data

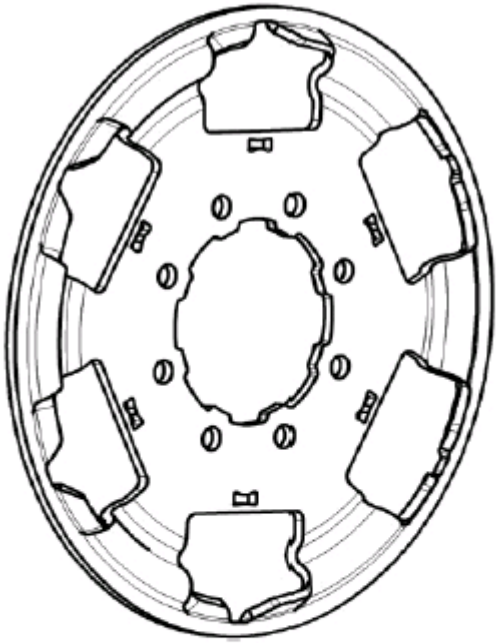
Transport Cycle	excessive wear	Axle Arrangement	PTO gearbox	PTO engine	Retarder	Last known mileage	Chassis Id	(%) RPMlevel 0-750	(%) RPMlevel 750-950	(%) RPMlevel 950-1150	(%) RPMlevel 1150-	(%) Drive mode Idle	(%) Drive mode PTO	(%) Drive mode Drive
TC-DISTR	y	6*4	PTOTRA	UPTER	URETARD	181280	B 532069	41,0%	3,4%	13,9%	22,6%	14,3%	21,4%	64,2%
	?	6*4	PTOTRA	UPTER	URETARD	280037 (5	A 635789	20,6%	16,7%	14,3%	30,8%	10,0%	21,9%	67,3%
	n	6*2	PTOTRA	UPTER		282450	A 646190	39,5%	8,5%	18,8%	26,0%	13,4%	20,1%	66,6%
	n	6*2	PTOTRA	UPTER			A 619475	20,2%	10,5%	12,4%	42,1%	10,9%	10,6%	78,5%
	n	6*2	PTOTRA-S			269906	A 650978	36,4%	8,4%	18,7%	25,4%	11,6%	19,4%	69,0%
	y	6*2	PTOTRA	UPTER	URETARD	419344	A 664751	37,9%	9,8%	18,7%	25,1%	5,0%	26,9%	68,1%
	y	6*2	PTOTRA-S				B 471433	21,3%	46,0%	13,9%	11,2%	7,6%	49,1%	43,4%
	y	6*2	PTOTRA-S			149078	B 479853	14,5%	50,8%	15,7%	12,0%	5,0%	48,6%	46,4%
	?	6*2	PTOTRA-S				B 479874	19,7%	46,5%	14,5%	12,0%	6,7%	48,1%	45,2%
	?	6*2	PTOTRA	UPTER	URETARD	259478	B 480928	22,3%	42,3%	15,2%	11,9%	5,5%	48,4%	46,1%
	y	6*2	PTOTRA-S				B 481808	14,4%	52,0%	13,9%	11,6%	4,5%	50,4%	45,1%
	?	6*2	PTOTRA	UPTER	URETARD	226806	B 482695	18,2%	49,0%	14,3%	108,0%	6,0%	50,4%	43,7%
	y	4*2		UPTER	RET-TH		B 442405	47,8%	10,0%	14,6%	21,1%	8,4%	29,4%	62,2%
	y	4*2		UPTER	RET-TH		B 487077	49,8%	12,3%	15,9%	18,0%	6,0%	32,0%	62,0%
								28,8%	**26,2%**	**15,3%**	**27,0%**	**8,2%**	**34,1%**	**57,7%**
TC-LONGD	?	6*4	PTOTRA-S				A 623892	29,9%	2,1%	11,5%	34,0%	15,2%	11,1%	73,7%
	y	6*2	UPTOTR	UPTER	URETARD	485804	A 629770	18,5%	2,8%	11,3%	24,6%	14,5%	0,0%	85,5%
	y	6*4	UPTOTR	UPTER	URETARD	285551	D 128158	24,1%	3,5%	7,8%	11,1%	15,6%	0,0%	84,5%
	y	6*2	UPTOTR	UPTER		130195	B 538375	19,2%	1,9%	10,9%	48,9%	13,4%	0,0%	86,6%
	y	4*2	UPTOTR	UPTER	URETARD	251884	A 677092	12,4%	2,9%	11,4%	66,3%	8,5%	0,0%	91,5%
	y	4*2	UPTOTR	UPTER	URETARD	222961	A 671592	22,8%	2,7%	9,8%	56,0%	18,5%	0,0%	81,5%
	y	6*2	UPTOTR	UPTER	URETARD	235880	A 665463	36,1%	4,0%	11,4%	44,9%	27,2%	0,0%	72,8%
	y	6*4	PTOTRA	UPTER	URETARD	498001	A 637161	29,5%	6,9%	11,4%	42,9%	11,1%	17,1%	71,9%
	n	6*2	PTR-FH				A 630255	33,0%	3,8%	13,7%	28,5%	23,0%	7,6%	69,5%
	?	6*2	?	UPTER			A 637848	33,8%	2,9%	12,6%	28,1%	25,8%	0,0%	74,2%
	y	6*4	PTOTRA	REPTO		439957	A 617687	19,6%	25,0%	7,6%	28,9%	13,5%	23,4%	63,1%
	n	6*2	PTOTRA	UPTER		534000	A 634994	25,7%	6,0%	12,7%	37,4%	14,8%	8,3%	77,1%
	y	6*2	PTOTRA-S				A 631178	24,6%	3,1%	11,9%	42,6%	14,2%	2,8%	83,0%
	?	6*2	UPTOTR			249500	A 651152	28,9%	3,0%	7,6%	34,0%	21,9%	0,0%	78,1%
	y	6*2	PTOTRA-S			483700	A 624524	41,9%	4,2%	10,4%	34,3%	16,0%	19,5%	64,5%
	?	4*2	PTOTRA-S				B 423849	32,9%	16,5%	7,3%	12,9%	25,4%	13,6%	61,0%
	?	4*2	UPTOTR	UPTER	URETARD	319000	B 476886	15,3%	3,1%	7,9%	34,4%	10,5%	0,0%	89,6%
	n	6*2	UPTOTR				B 496801	16,7%	4,0%	15,0%	59,4%	7,6%	0,0%	92,4%
	y	6*2	PTOTRA-S				A 650248	40,6%	6,4%	12,9%	30,9%	14,8%	17,8%	67,4%
	?	6*4	PTOTRA	UPTER	URETARD	179730	A 663399	48,4%	4,7%	13,0%	19,3%	25,4%	21,2%	53,4%
	n	4*2	UPTOTR				B 447421	19,8%	3,7%	13,2%	35,1%	12,2%	0,0%	87,9%
	y	4*2	UPTOTR			303276	B 446259	25,9%	6,1%	22,9%	34,3%	14,7%	0,0%	85,3%
	?		UPTOTR				S 871374	25,0%	60,7%	14,2%	0,1%	10,3%	0,0%	89,8%
	?		UPTOTR				S 873604	21,0%	25,7%	32,6%	19,7%	10,3%	0,0%	89,7%
	?		UPTOTR				S 873612	26,3%	21,1%	41,8%	10,4%	14,9%	0,0%	85,2%
	?	4*2	UPTOTR				A 630192	15,0%	4,2%	19,6%	59,4%	9,6%	0,0%	90,4%
	?	6*4	PTOTRA	PTER-DI	URETARD	199000	A 677716	24,5%	7,9%	15,5%	28,2%	14,2%	16,1%	69,7%
	n	6*4	PTOTRA-S				A 656907	31,6%	13,4%	12,5%	19,9%	16,6%	19,9%	63,6%
	y	6*2					B 477734	18,0%	5,8%	16,3%	43,9%	10,3%	0,0%	89,8%
	y	4*2					B 488878	38,4%	13,6%	11,9%	14,2%	29,5%	13,8%	56,7%
	y	6*2	APF-ENH	UPTER	URETARD		A 676785	14,6%	5,6%	38,1%	33,8%	7,8%	24,6%	67,6%
	?	6*4	PTOTRA-S				N 267911	57,1%	4,5%	7,6%	21,9%	12,1%	37,7%	50,2%
	?	6*4	PTOTRA-S				N 267910	46,7%	3,4%	8,0%	23,1%	5,4%	36,3%	58,3%
	y	6*4		UPTER	URETARD		A 648783	20,3%	16,5%	15,8%	30,4%	6,5%	20,8%	72,7%
	y	4*2		UPTER	URETARD		B 427339	15,1%	4,2%	17,8%	56,7%	7,5%	0,0%	92,6%
	y	4*2		UPTER	URETARD		B 457995	20,6%	10,7%	32,8%	27,6%	8,7%	5,6%	85,7%
	y	4*2		UPTER	URETARD		B 484896	23,7%	4,6%	16,4%	48,7%	12,7%	0,0%	87,4%
	n		UPTOTR	UPTER			B 498807	22,5%	5,3%	11,3%	36,4%	11,8%	0,0%	88,3%
	n						B 479523	14,1%	2,5%	4,9%	28,2%	8,9%	0,0%	91,1%
	y	4*2	APF-BAS	UPTER	RET-TH		B 489861	27,1%	10,1%	15,1%	43,6%	19,8%	7,3%	73,0%
								26,5%	**8,5%**	**14,7%**	**33,4%**	**14,5%**	**8,1%**	**77,4%**

Improved retainer plates made out of 16MnCr5

- Verification test ongoing at ZfSachs
- Field test vehicles ongoing in UK and Sweden.

Cost and leadtime

- Piece cost: 2.16€
- No tooling cost
- Lead time: 6 months



PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

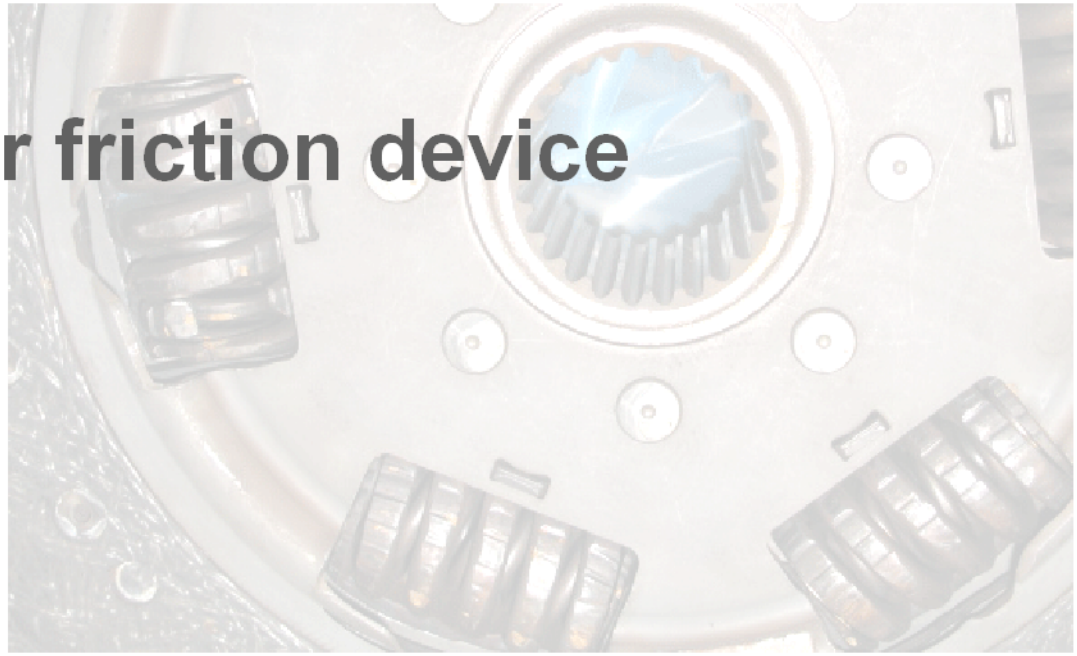
QJ 1-1359387371

1359387371 Worn damper spring w1151

QJ 1-1359387371 Clutch disc spring worn or broken

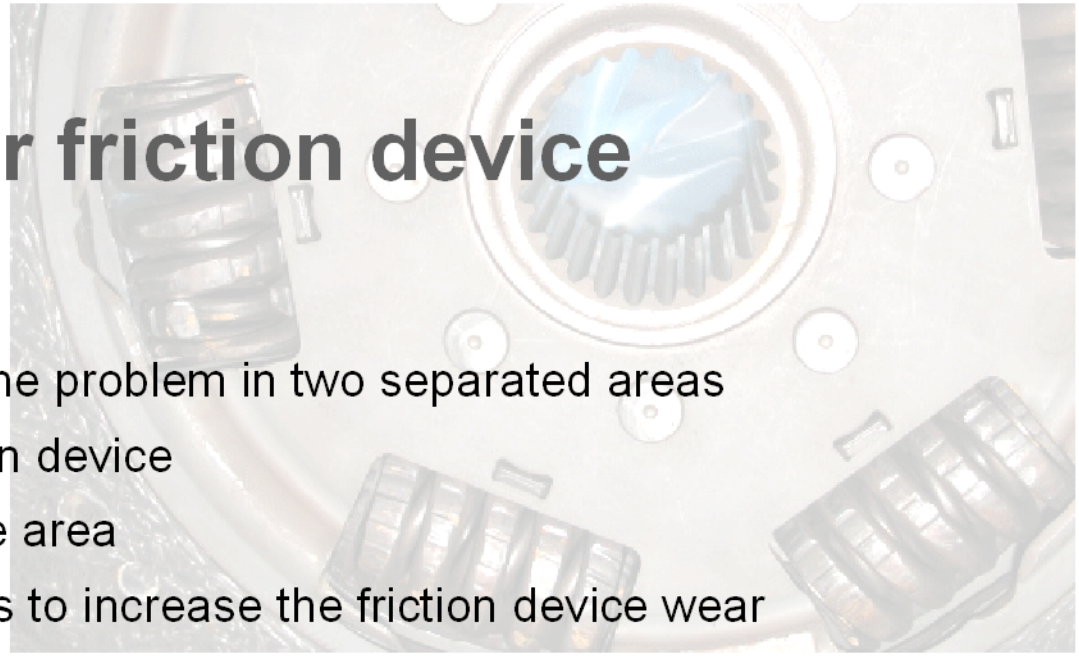
- Introduction date: 2011w05
  - –Friction device change
  - –Retainer plate material change

Clutch disc damper friction device



- Summary
- Specify the problem
  - Wear of friction device
- Estimated life improvement
  - Wear of retainer plate
- Flaking of material spring end side retainer plate
- Plan of improvement
- Driving in resonance

Clutch disc damper friction device



- Summary
  - As we see it we can divide the problem in two separated areas
    1. Wear resistance of friction device
    2. Driving time in resonance area

  What we have done in this QJ is to increase the friction device wear resistance.

Futher possibilities:

To understand possibilities to reduce time in resonance by software control in the i-shift, needs a lot more understanding of negative impacts as for comfort and fuel consumptions etc.

We have some possibilities to reduce the driving time in resonance with the Clutch disc. A time plan will show how these improvements will look like and when they are possible to introduce.

The flaking of the material is not connected to this problem. A plan will be presented from ZFSachs how they will improve this.

VPT field test Qj 1-1359387371 worn disc damper spring

- **Problem description in theory:**
- 1. Vehicle drives often in driveline resonance.
- 2. Friction unite wear down and will give low or none damping.
- 3. Due to no or low damping (friction device) the main damper will make large angular movements. Especially during or close to resonace. These movements will wear down the retainer plate and the spring will come in contact with the disc intermediate plate .
- 4. The disc intermediate plate will wear down the spring.

Spring wear is a consequential damage of the other failures.

Clutch disc damper friction device
Wear of friction device

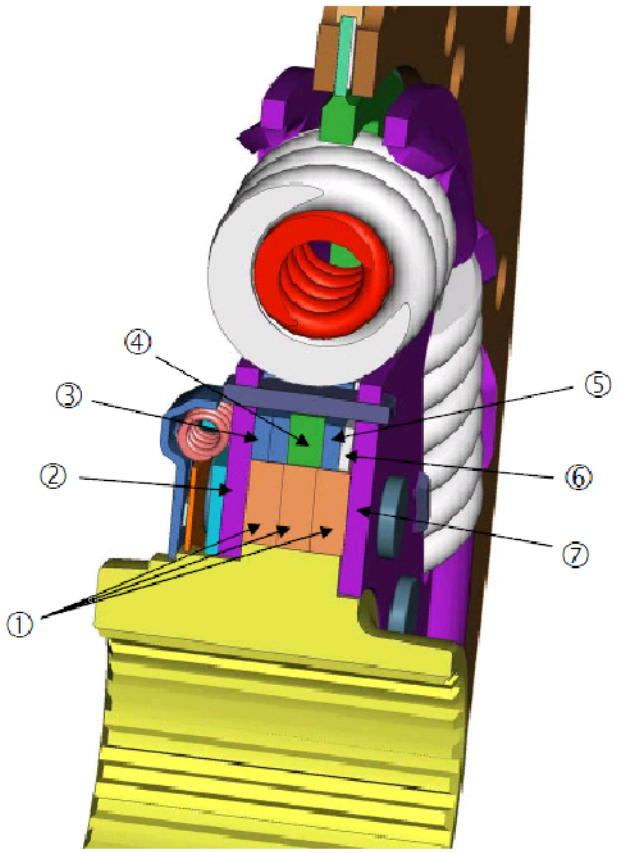
Current design

Multiple hub ring

- 3x Hub ring ①

Friction device

- Retainer plate ②
- 2x Engine sided friction ring ③
- Driven disc ④
- Gearbox sided friction ring ⑤
- Belleville spring ⑥
- Retainer plate ⑦



Clutch disc damper friction device
Wear of friction device

Cost and lead time.

- **Piece cost:** +1.35€
- **Tooling VPT share:**

  59 K€

(total tool cost 197K€)

Lead time:

9 months after confirmation

Verification:

- Field tests in UK, Finland and Sweden. W22->
- Accelerated test for wear on friction device, TBD

ZF SACHS

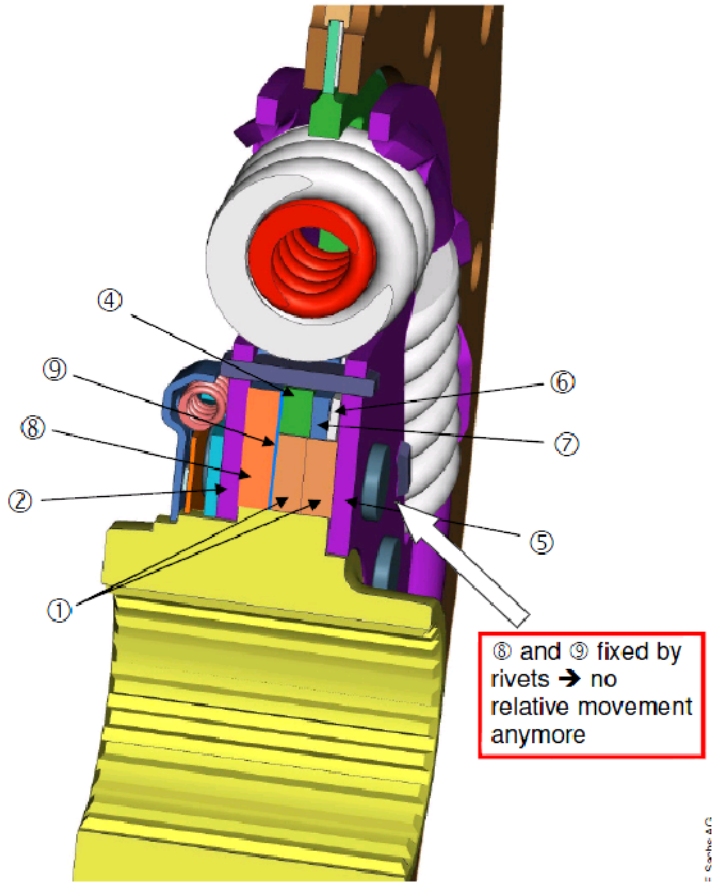
Advanced friction device

Multiple hub ring

- **1x Hub-friction ring** ⑧
- 2x Hub ring ①

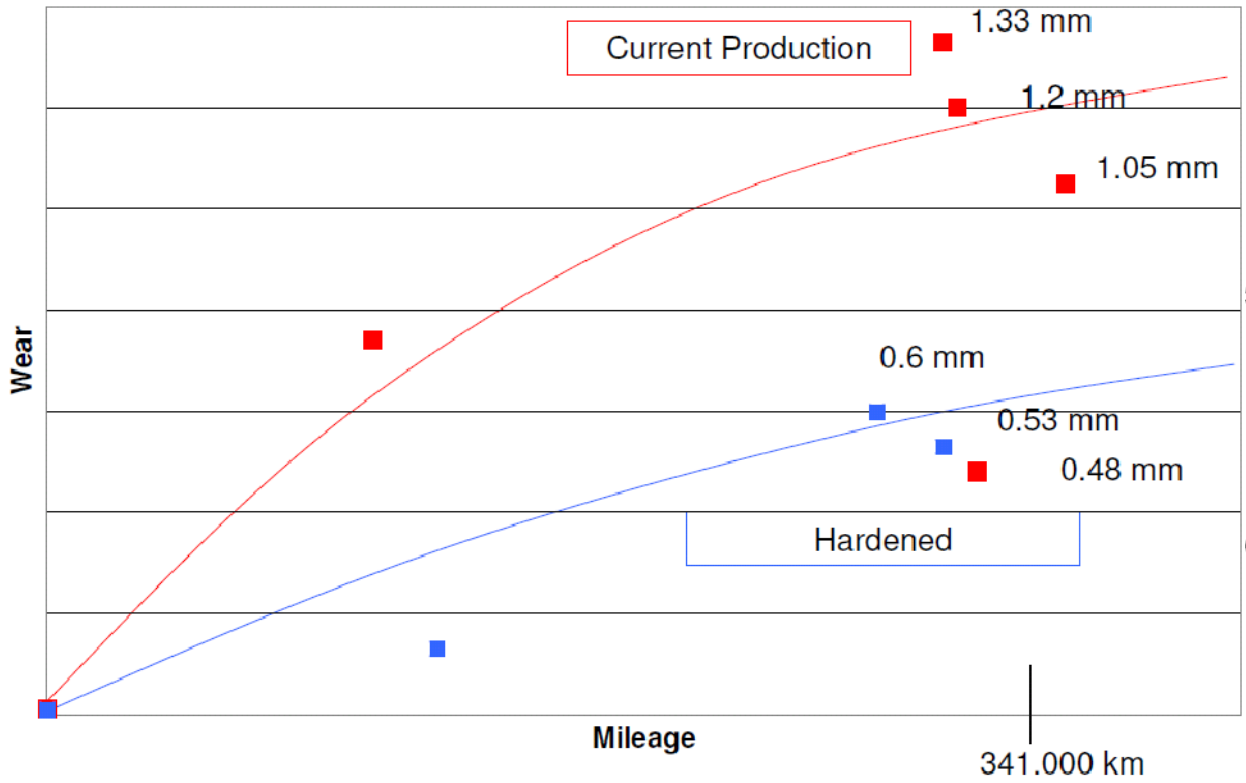
Friction device

- Retainer plate ②
- **1x Hub friction ring** ⑧
- **1x Hub friction ring** (friction layer) ⑨ hardened ➔ lower wear
- Driven disc ④
- Gearbox sided friction ring ⑤
- Belleville spring ⑥
- Retainer plate ⑦



Clutch disc damper friction device
Wear of friction device

Results of Prototype Testing

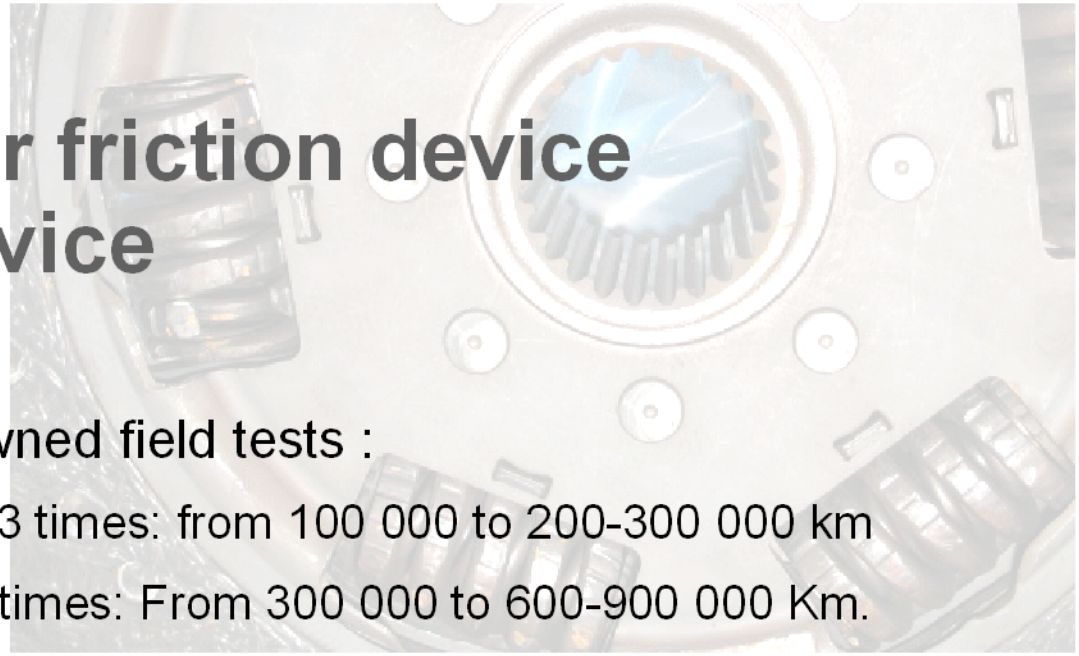


For field testing with VPT

50 000 km gives a good hint of wear.

But to get an idee of the wear curve longer test are needed

Clutch disc damper friction device
Wear of friction device



- Conclusions from ZFSachs owned field tests :
  - Life expectancy distribution 2-3 times: from 100 000 to 200-300 000 km
  - Life expectancy long haul 2-3 times: From 300 000 to 600-900 000 Km.
- Conclusion from field test vehicle (distr.) UK:
  - Same isolation as new after 40 000 Km (need 80 000 km for reliable conclusion). Next test estimated to end Mars beginning of April 2011.

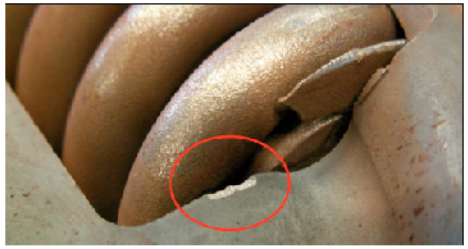
Clutch disc damper friction device
Wear of retainer plate

- Conclusion from material analysis:
  - Harder material should be more wear resistante (Mn16Cr5vs C10). According ZFSachs and VOLVO TU
  - New Mn16Cr5 more process stable material
- Conclusion from testing
  - Flaking found on test vehicle (tested at ZFSachs).
  - Field tests havn't enough milage yet to have any conclusion ready. Needs approx. 100 000 Km for this.

Clutch disc damper friction device
Flaking of material spring end of retainer plate

- Flaking is not a new phenomena, it was found on both materials(new and old).
- It is not a VOLVO specific problems acc. To ZFSachs
- ZF Sachs was not aware of this until VOLVO found it.
- ZFSachs are analyzing this and will present a plan of improvements for VOLVO.

flakings of the Volvo field test clutch



test results

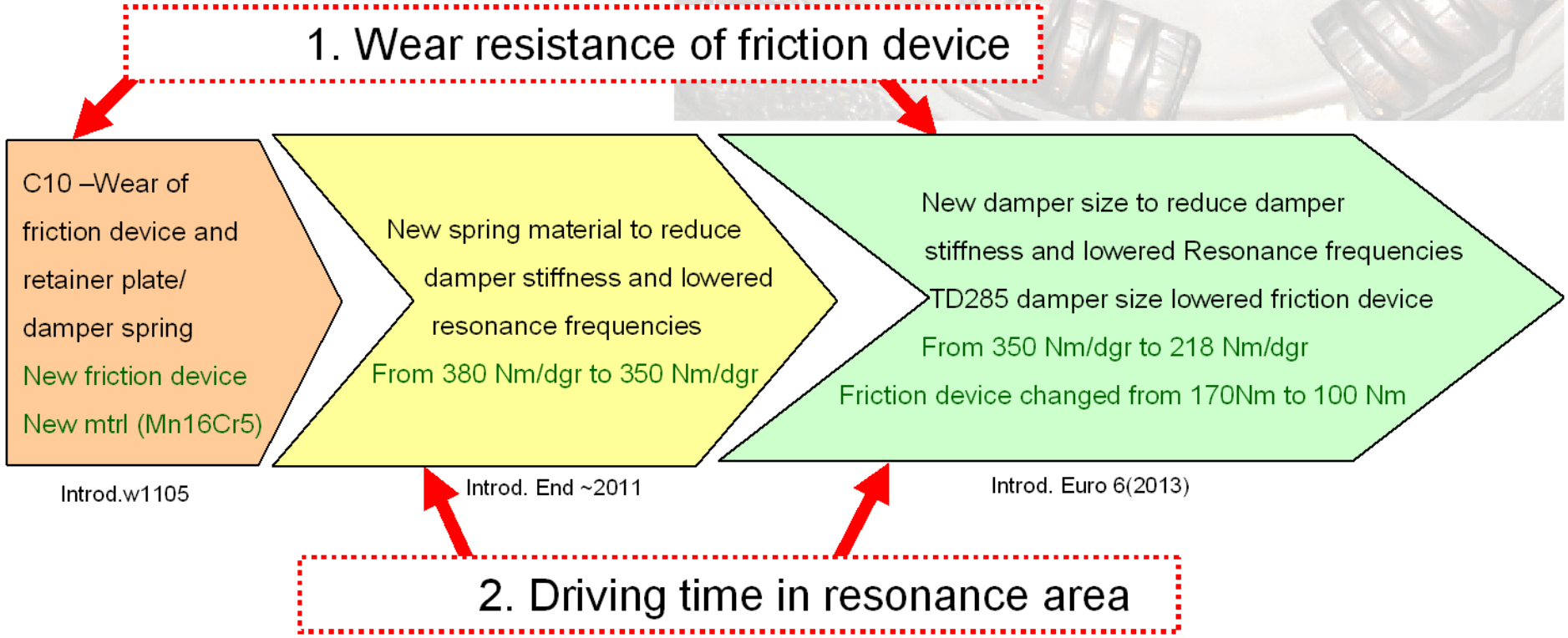
serial retainer plates - C10

- 2 major flakings on plate 1843000025 (flywheel-side)

- 1 major flaking on plate 1843000028 (gearbox-side)

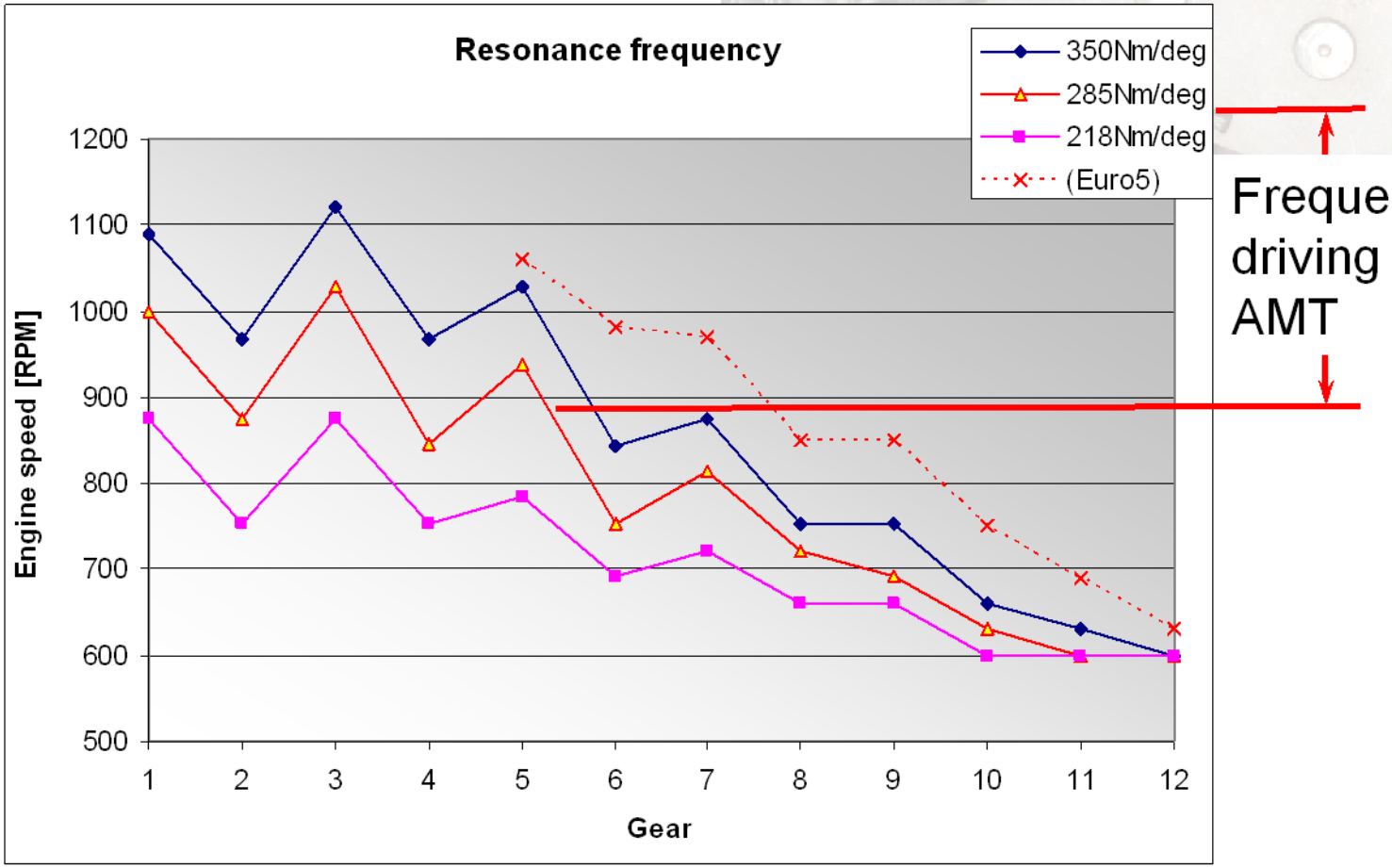
Clutch disc damper friction device

- Which problem do we attack, when and how
  1. Wear resistance of friction device
  2. Driving time in resonance area

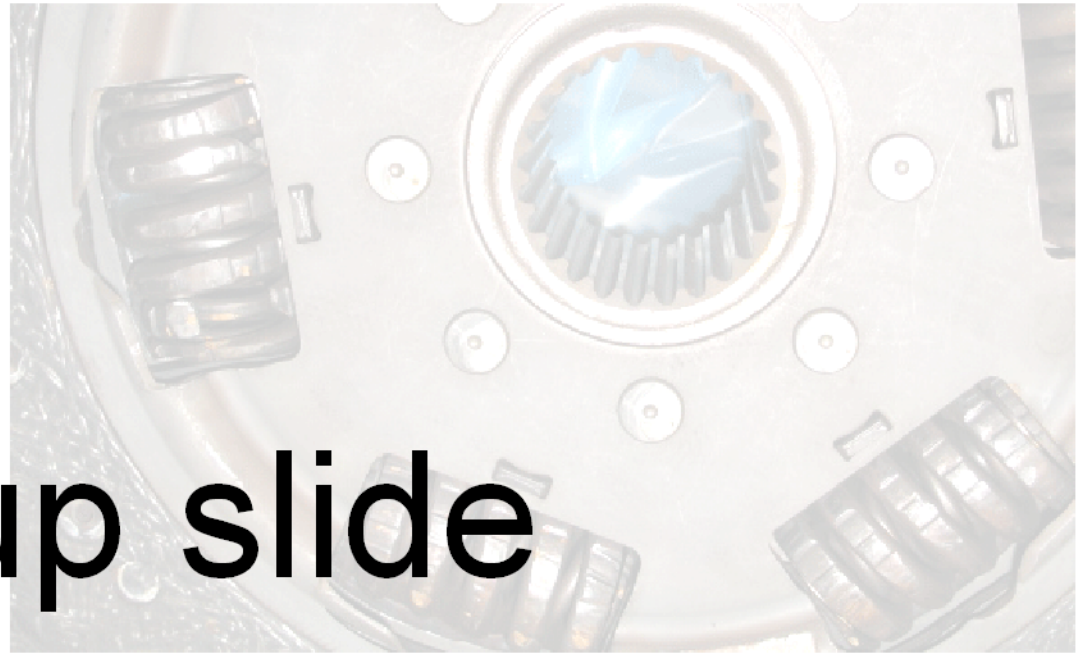


Clutch disc damper stiffness

- Why are we influencing drive time in resonance with damper stiffness??



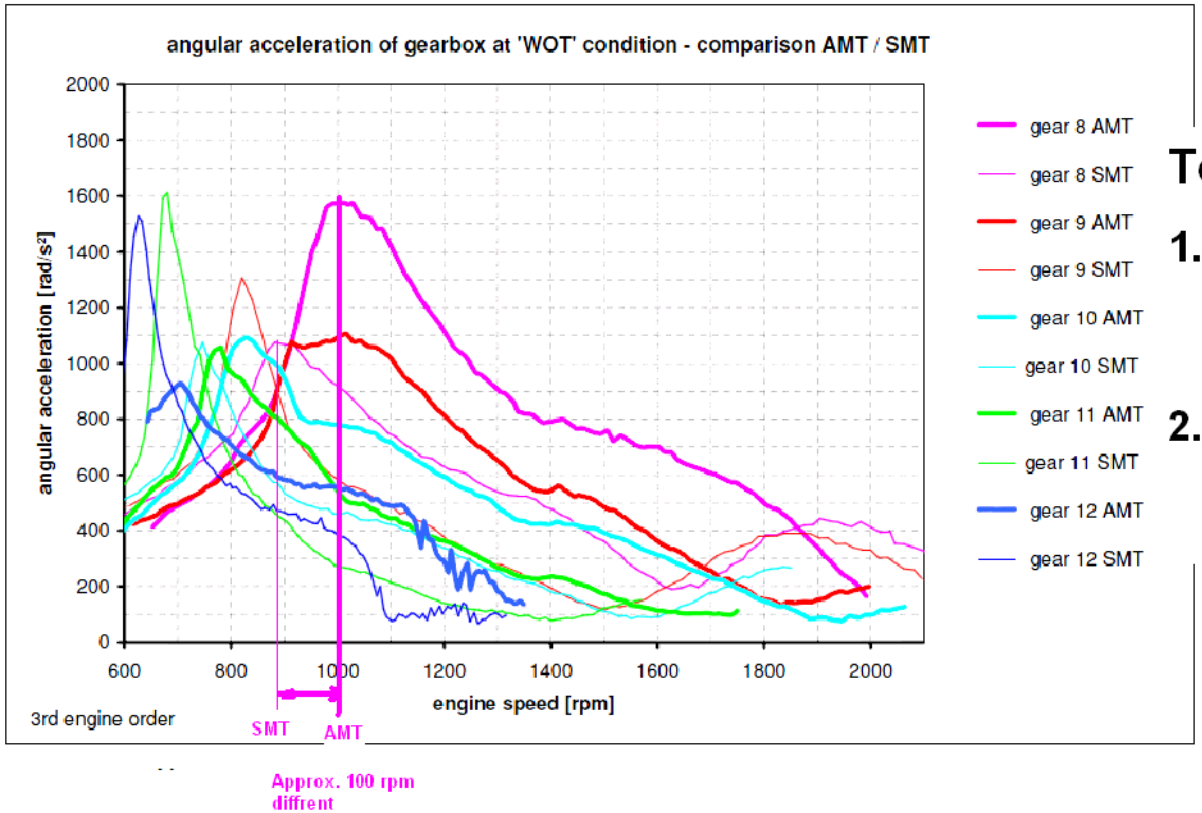
Frequently used driving area with AMT



Backup slide

QJ 1-1359387371 Worn clutch disc damper springs
Resonance peak analys between AMT-C and SMT

position of resonance peak – comparison AMT / SMT



Test has confirmed results

1. **AMT has a higher resonance rpm compared to SMT (+100rpm)**
2. **AMT drives more frequent in lower rpm (resonance rpm's) compared to a SMT.**

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1359387371

AMT C clutch damper

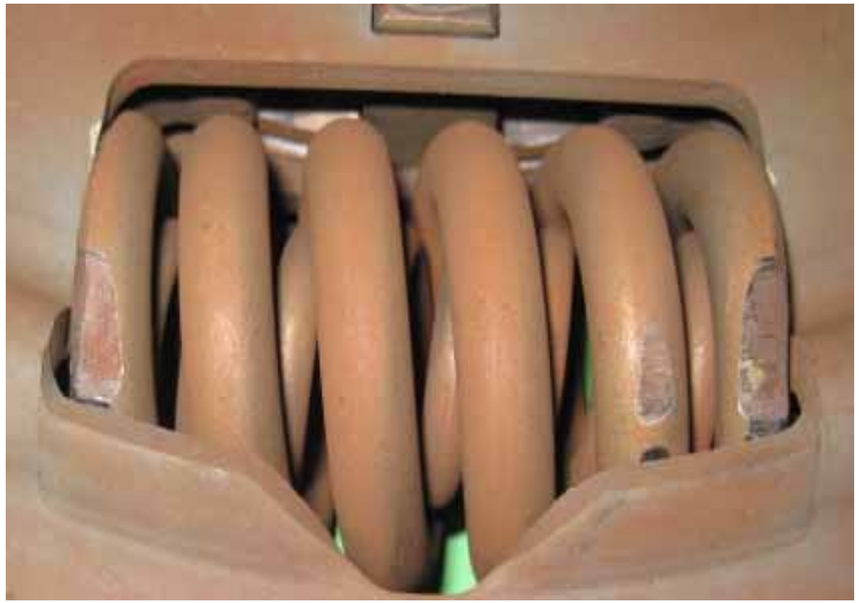
Variant C Gear Jump Out

30th March 2010

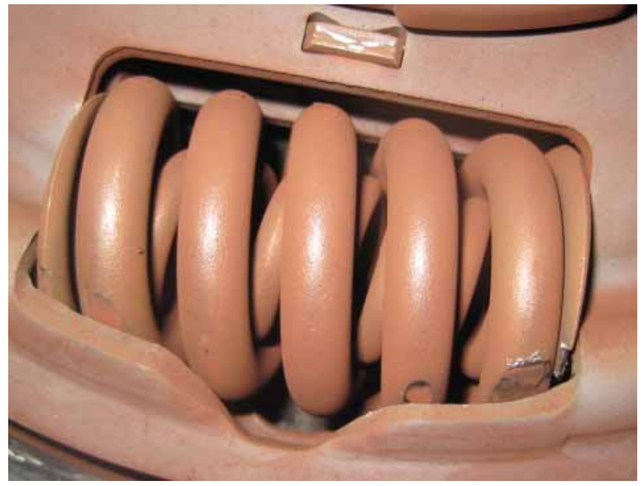
A-656043 - 311970kms
1068 Carlisle Jump Out 2/3/4/5/7/9
Damper, sleeve & gear all damaged

A-659144 - 283154klms

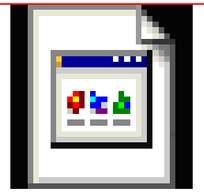
B493510 - 293778kms



B530191 126629klms 30/03/2010 – Includes Vcadspro Job cards



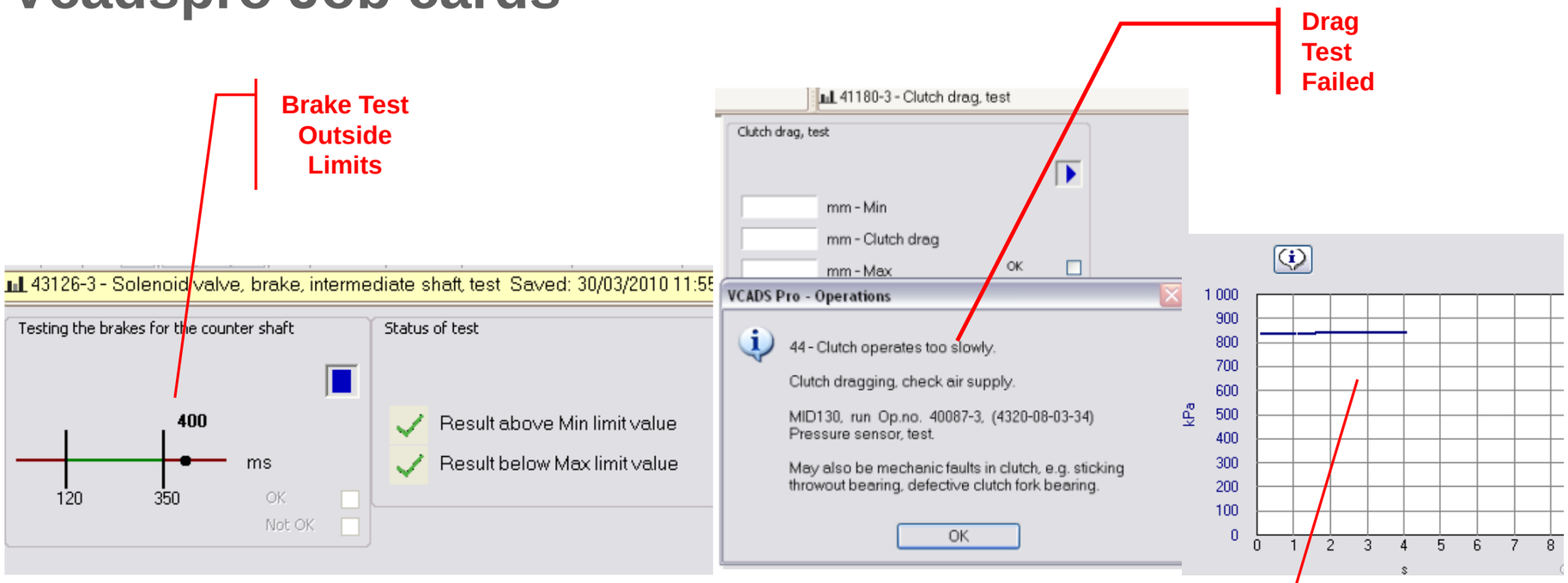
B530191 126629klms 30/03/2010 – Includes Vcadspro Job cards



Mvc-023v.mpg

Mvc-024v.mpg

B530191 126629klms 30/03/2010 – Includes Vcadspro Job cards



PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1359387371

ER-618062

Volvo Truck Corporation

Engineering Report

ER-618062

Date: 2010-03-31

Report Type: ☑ Test ☐ Calc. ☐ Design ☐ AE ☐ Misc.

Receiver (department, name, location)		Requisition/order no.	Project no.	Secrecy level
91552 Albert Pettersson	O3		QJ 1-1359387371	2-Confidential
24140 Anna Cikorska	PLB2	Function group no.		Analysis no.
91430 Gunilla Eldeblad	O3			
91552 Sami Aho	O3	Ordered by (department., name, location)		
		91552 Fredrik Sjöqvist	O3	
		Issued by (department, name, location)		
		91435 Klas Arvidsson	O3	
		Approved by (department, name, location)		
		91435 Lars Jacobsson	O3	

Approval date	Date carried out	No of Pages	No of Appendices
	10W11	14	

Advanced Engineering Area	Key Technology Area	Property Area
Transmission	2.3 Transmission	LP

QJ 1-1359387371 AMT Clutch Damper Springs. Result from on-site measurements in distribution application in the UK.

Summary

This report is a summary of the measurement campaign done in Plymouth 10W11 where the operator has had frequent clutch problems on their fleet.

The measurements showed that at low engine speeds the clutch system acts as an amplifier, for the third order torsional vibrations. This can be seen in all the measurement with worn clutches. On PTO load the amplitude of the torsional vibration differed with engine load.

My strongest recommendation is to look further into this to be able to design a more robust clutch spring/damper system.

Content

1 Introduction

1.1 Background

Worn clutches on certain applications spriged the QJ 1-1359387371. This report is a summary of the measurement campaign done in Plymouth 10W11 where the operator has had frequent clutch problems on their fleet.

2 Objectives

2.1 Purpose

The purpose of this test is to investigate why the clutch damper springs get worn.

2.2 Test truck

Chassis ID: B 481808

Model: FM13 6x2R, AT2512C

Mileage: 274 233 Km

Customer: Dairy Crest

REPORTED PROBLEMS AND ACTIONS UNTIL NOW:

The vehicle was delivered in the end of 2007, all problem listed below is only transmission related.

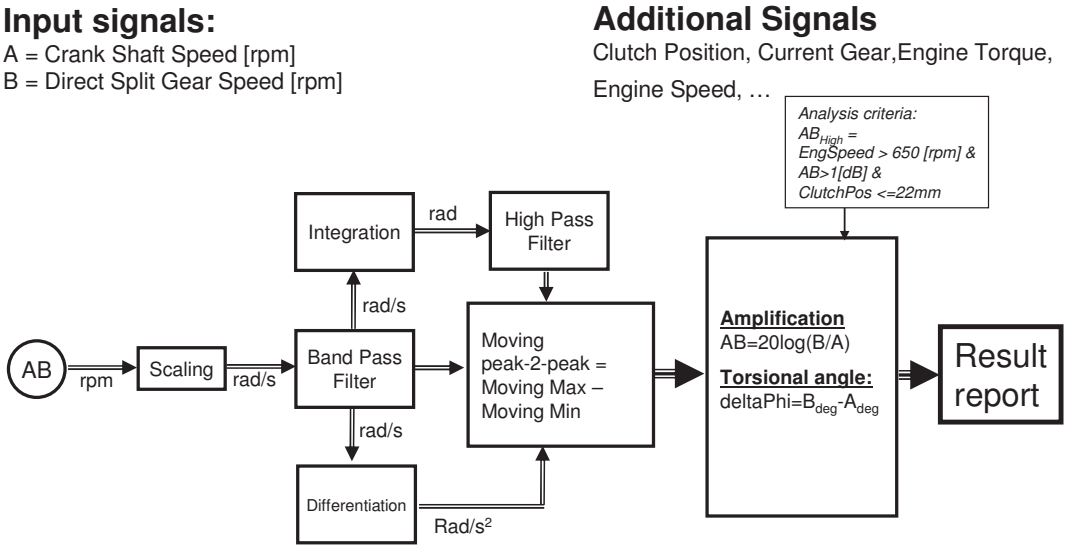
- 2008-12-04, mileage 125 484Km: Change clutch disc and pressure plate because of damaged damper springs. Kit no. 85000907.
- 2009-05-21 mileage 183 000Km: Gear jumping out. Changed gear, engaging sleeve etc. As a pre-caution they changed the clutch disc also. Part no. 85000625.
- 2010-02-11 mileage 263 145Km: One piston rod in the GCU broken, change of the complete GCU. Part no. 21314138
- Also see Argus QJ 1-1359387371 & MQR 1320-2522.

Figure 1 Milk truck from Dairy Crest.

3 Analysis and result

3.1 Method

Rotational speed of the flywheel and input shaft of the gearbox were measured. This gives us information how the clutch damper is working. Different driving modes were tested. The raw data was processed in the following manner:



3.2 Performed test

3.2.1 Day 1 Original clutch

D101-D105:	Driving with trailer 1 from Dairy Crest to park trailer 1, total weight empty: 16610 kg, without trailer 11t.	
D106:	Driving to farm 1	Total weight: 11t only truck (empty)
D107:	Loading 14460 litres of milk (40 min),	PTO-drive
D108:	Driving to trailer 2	Total weight: 11t + 14,46t = 25,46t
D109:	Unloading 11500 litres of milk to trailer 2,	PTO-drive
D110:	Driving to farm 2	Total weight: 13,96t
D111:	Loading 10500 litres (20 min), total 13500 litres,	PTO-drive
D112:	Driving to farm 3	Total weight: 24,46t
D113:	Loading 500 litres (5 min), total 14000 litres,	PTO-drive
D114:	Driving to trailer 1	Total weight: 24,96t
D115:	Unloading 12100 litres, total 2000 litres,	PTO-drive
D116:	Driving to farm 4	Total weight: 12,86t
D117:	Loading 11800 litres, total 13800 litres	PTO-drive
D118:	Driving to trailer 1	Total weight: 24,66t
D119:	Driving back to Diary Crest, total weight: 24,66t + (16, 61-11, 00) + 12, 1 = 42.42t	
D120:	Unloading at Dairy Crest	PTO-drive

3.2.2 Day 2 Bad clutch

Partially filled with water, total weight: 19600 kg (11t empty). Vehicle was fitted with a an old clutch from a long haul application

D203:	Driving between roundabouts near the workshop
D205:	Driving from workshop to city of Plymouth
D206:	Driving from city of Plymouth to motorway
D207:	Driving from motorway back to workshop
D208:	Uphill driving at workshop
D209:	Full load sweeps

3.2.3 Day 3 New reman clutch

Partially filled with water, total weight: 19600 kg (11t empty).Vehicle was fitted with a new reman clutch.

D301: Full load sweeps

D302: City driving 1

D303: City driving 2

3.3 Test equipment

The vehicle was equipped with rotational sensors on the starter gear teeth and the high split gear wheel. All J1939-1 parameters were measured.

A pressure transducer was mounted on the high pressure side of the PTO pump ~1m from outlet.

Canalyzer and an IMC Chronos PL8 DLG212 were used to collect the data.

Figure 2 Roots compressor, driven from a gearbox PTO.

3.4 Result of performed tests

3.4.1 Engaged PTO

Engine load on engaged PTO was very low (~2kW @ 760 rpm).

PTO runtime is ~40-50% of total engine hours, the milk compressor in on 48% of the PTO run time.

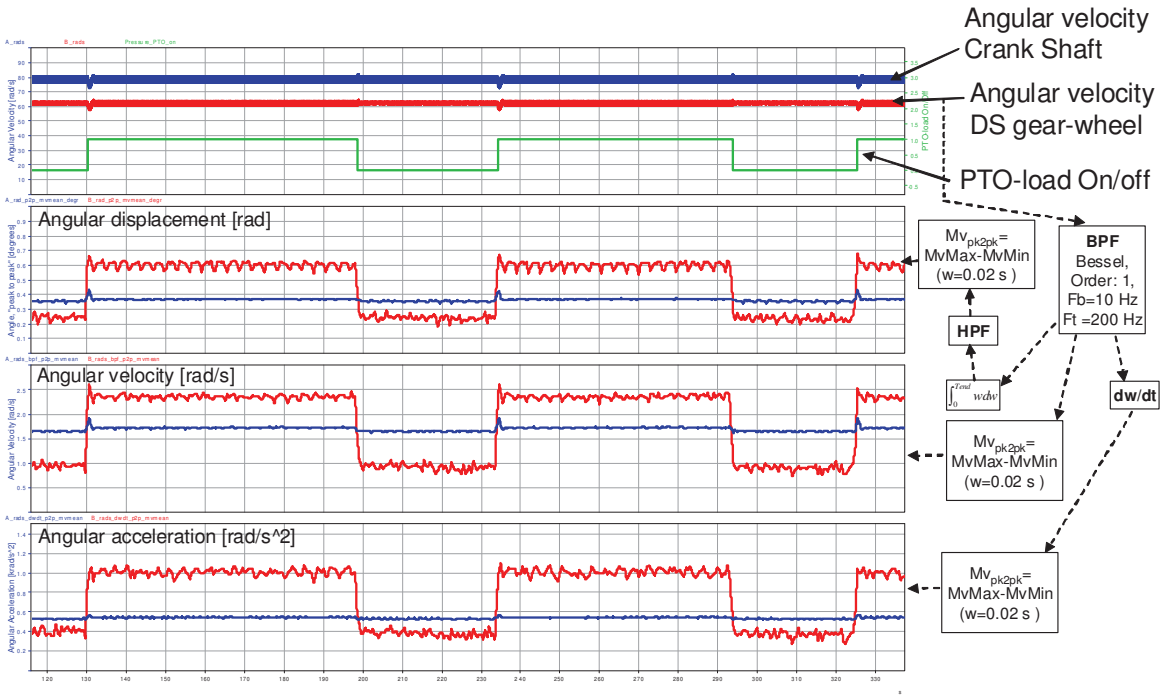


Figure 3 PTO-load on/off (typical for loading milk, dataset d107)

3.4.2 Regular driving

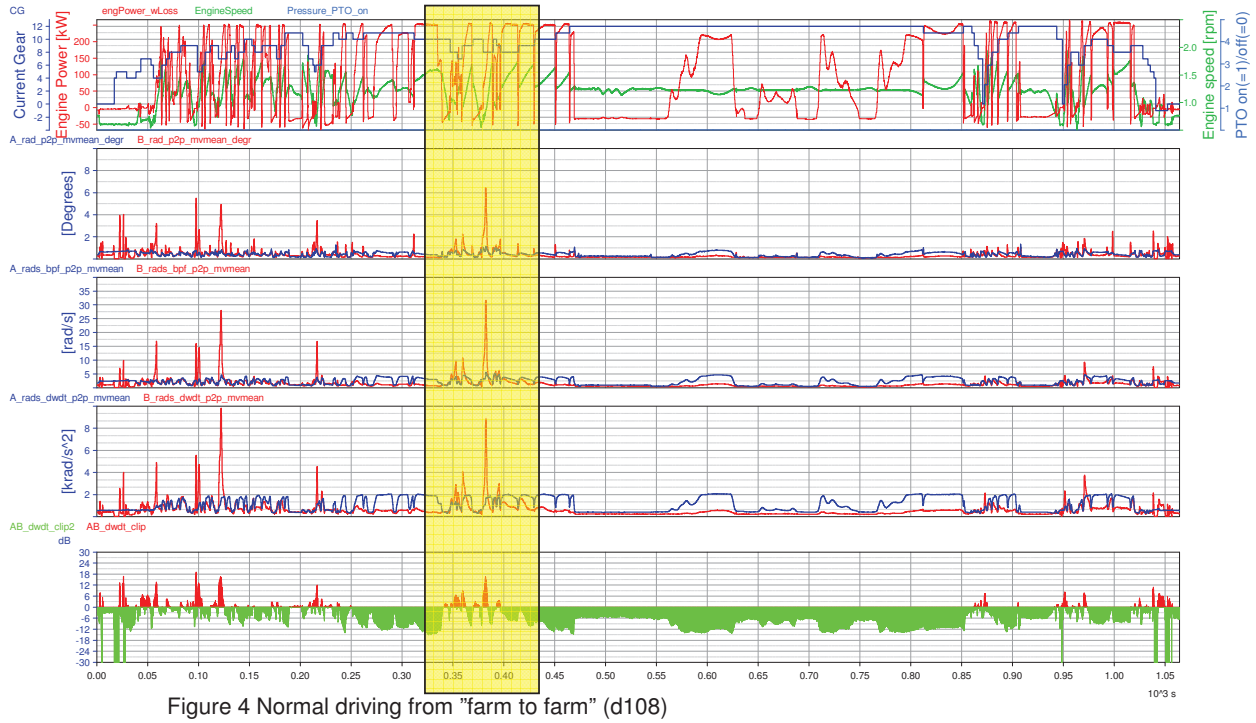


Figure 4 Normal driving from ”farm to farm” (d108)

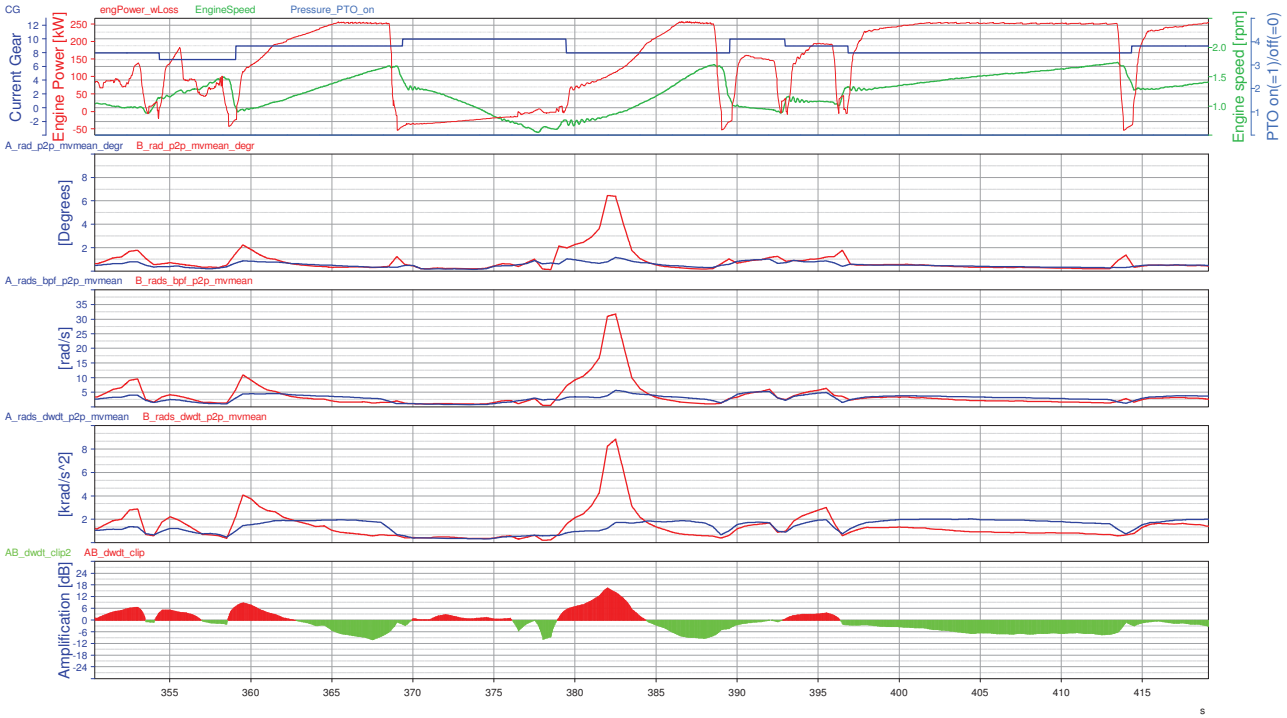


Figure 5 Zoom in from yellow band in figure 4.

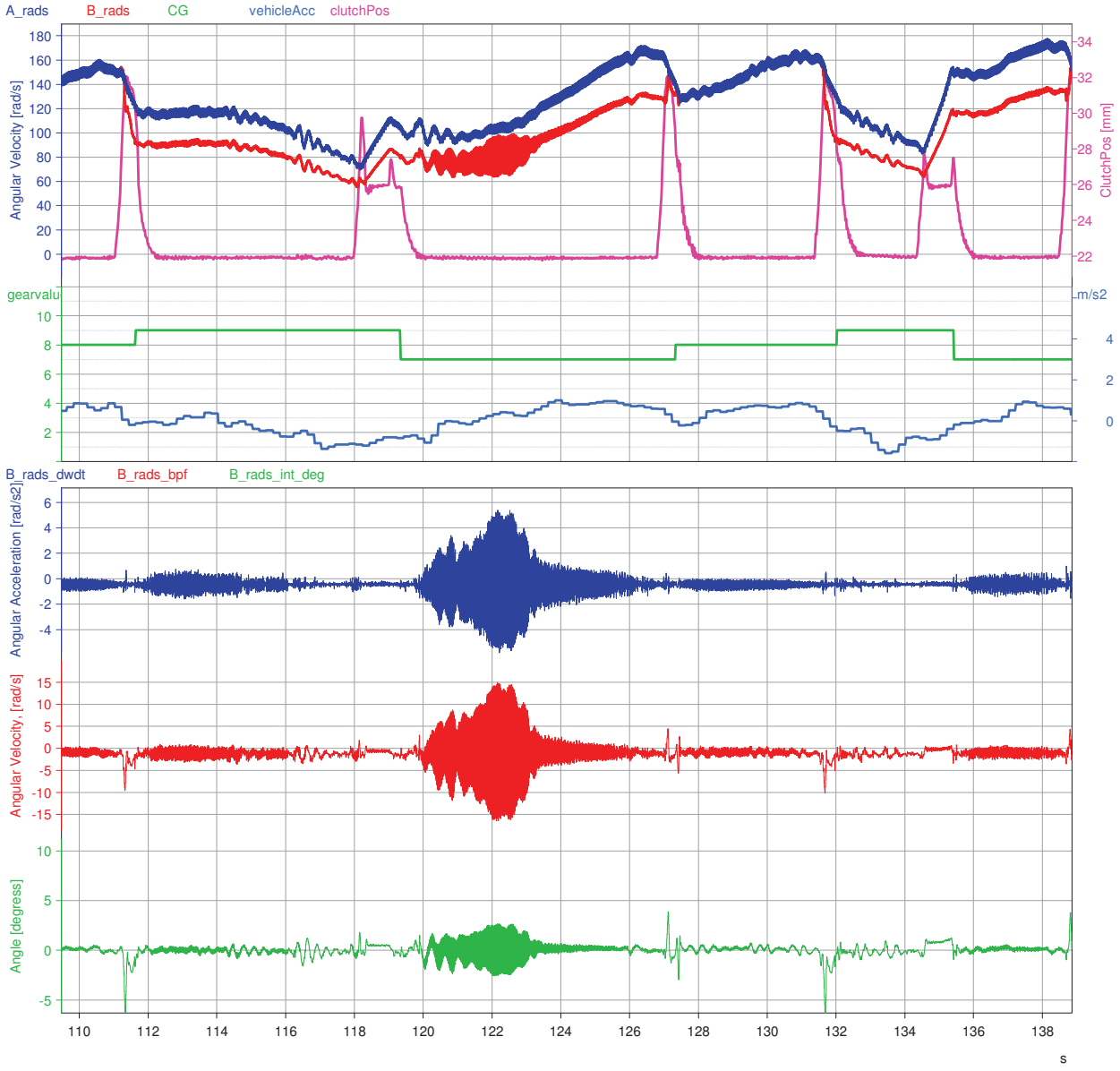
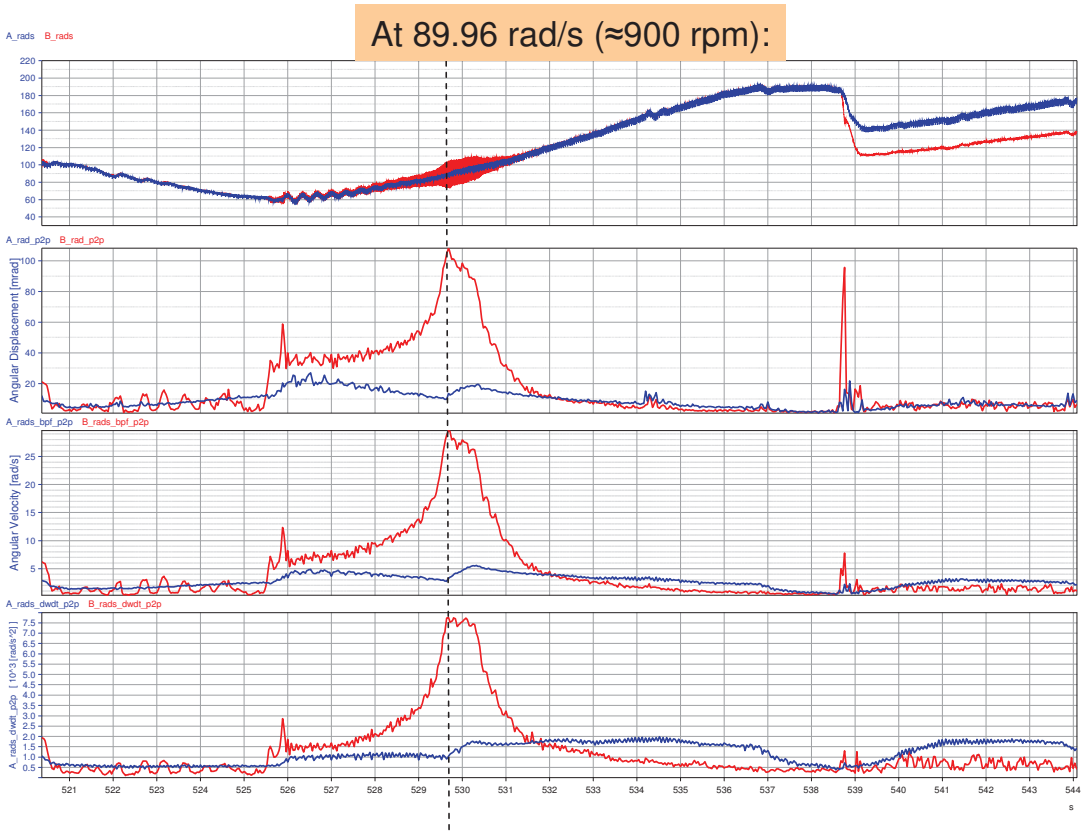


Figure 6 Normal driving from ”farm to farm” (d108)

Figure 7 Normal driving from ”farm to farm” (d108)

3.4.3 Full load sweeps

Bad clutch



Engine Speed
At 89.96 rad/s:

Gear: 8

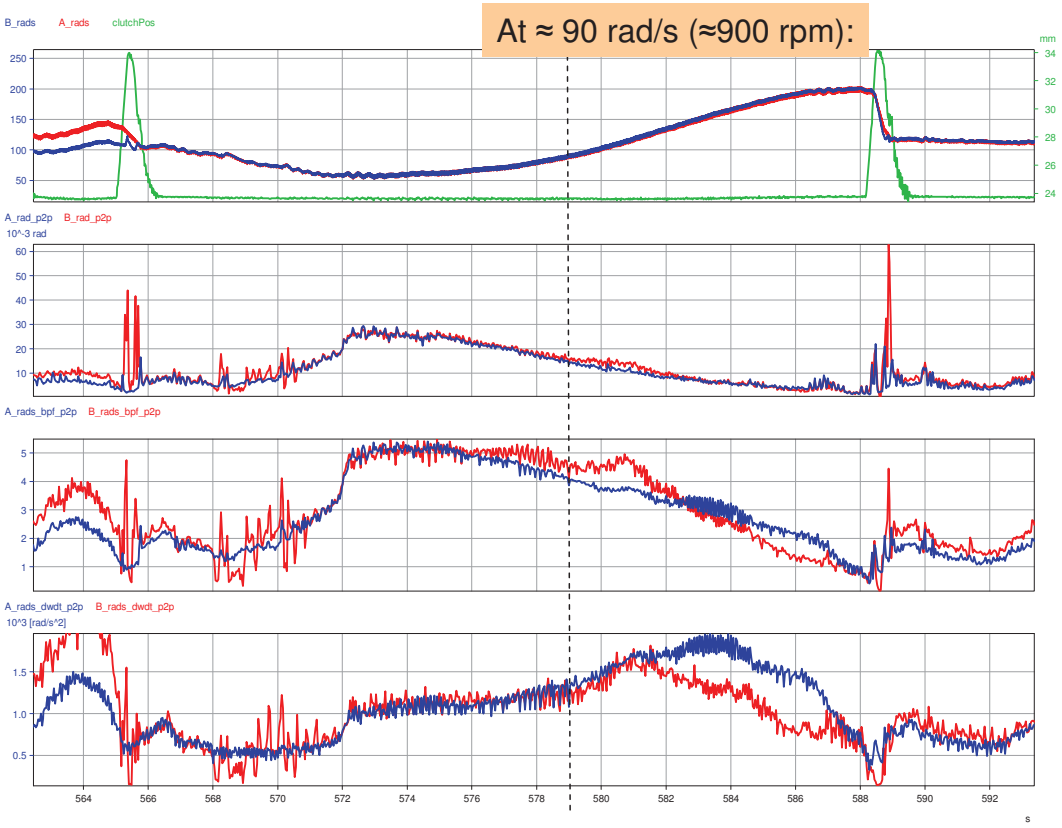
$\Delta\varphi = 0.107 \quad [rad]$

$\Delta\dot{\varphi} = 29.6 \quad [rad/s]$

$\Delta\ddot{\varphi} = 7700 \quad [rad/s^2]$

Figure 8 Typical acceleration with Bad Clutch, dataset = d209.

New reman clutch



EngineSpeed
At 90 rad/s:

Gear: 8

$\Delta\varphi = 0.015 \quad [rad]$
$\Delta\dot{\varphi} = 4.25 \quad [rad/s]$
$\Delta\ddot{\varphi} = 1160 \quad [rad/s^2]$

Figure 9 Typical acceleration with new reman clutch. No resonances are present.

4 Recommendation

Improve the clutch and measure what gets worn, when and why.

5 Conclusion

At low engine speeds the clutch system acts as an amplifier for the third order torsional vibrations. This can be seen in all the measurement with worn clutches. On PTO load the amplitude of the torsional vibration differs with engine load.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1413013293

QJ 1-1413013293

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1 -1413013293 AMT Clutch valve unit cables squeezed causing problems All Documents

[redacted]

Owner : [redacted]


I Like It


Tags & Notes

Type	Name	Modified	Modified By
	300253143	4/10/2013 10:27 AM	Säfblad Katarina
	5Why 300253143	4/10/2013 10:27 AM	Säfblad Katarina
	Clutch valve unit	4/10/2013 10:27 AM	Säfblad Katarina
	Verifiering D6	4/10/2013 10:27 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1413013293

300253143

8D report

Reference no.:	10917,10964 and 11065-1165-R	Intermediate report:	
Concession no.:		Final report:	2010-02-11

Header data

Complaint date:		Product:	Volvo CVU 24V
8D title:	300253143	Rexroth material no.:	R404058419
Warranty decision:	Godkänd	Manufacturing plant:	Vagnhärad
Customer:	Volvo Powertrain Köping	Customer material no.:	21206430
Complaint type/mode:	Tekniskt	Serial no.:	24196 och 24231
Supplier no.:			
Supplier name:		Issuer:	Stefan Gustavsson

Contact person at customer:	Anders sjöman	Telephone:	+46 (0) 221 457 718
Business adress:	Dept.761103,T1 73180 Köping	Telefax:	+46 (0) 221 221 73
Email:	anderssjoman@volvo.com		
Contact person Bosch Rexroth:	Stefan Gustavsson	Telephone:	+46 (0) 156 35 20 93
Business adress:	Kalkbruksvägen 2, 61071 Vagnhärad	Telefax:	+46 (0) 156 35 20 91
Email:	Stefan.gustavsson@boschrexroth.se		
Contact person at supplier:		Telephone:	
Business adress:		Telefax:	
Email:			

D1 Problem solving team

Sponsor: Ulf Peterson

	First name	Last name	Team leader	Email
Team:	Thomas	Carlsson (TC)	X	thomas.carlsson@boschrexroth.se
	Stefan	Gustavsson (SG)		stefan.gustavsson@boschrexroth.se
	Daniel	Frisk (DF)		daniel.frisk@boschrexroth.se
	Johan	Björkman (JB)		johan.bjoerkman@boschrexroth.se
	Lars-olof	Karlsson (LOK)		lars.olof.karlsson@boschrexroth.se
	Stefan	Värehag (SV)		Stefan.vaerehag@boschrexroth.se

D2 Problem description

Customer complaint:	Abnormal low electric current or interruption				
Manufacturer description:	Kablaget till 4pins kontakten har blivit klämd melan lock och ventilhus.				
Defect type:	Elektriskt				
Defect location:	Assemblyline				
Manufacturing date:	2009-08-17	No. of complaint parts:	5	End of D2:	2009-10-01

D3 Containment actions(s)

- Inga detaljer i lager hos oss finns att kontrollera då leveranserna går direkt iväg till Volvo.

- Inga ventiler är på väg till Volvo i detta nu.

-Volvo gör en kontroll/provning av deras lager (110st) i deras produktion enligt mejl från Lennart Borgenvik. (se bifogat mejl)

- Vi sätter 3st stripes nu from serienummer 36050 istället för 2st som vi hade tidigare för att hålla ihop kablarna för det visar sig att det fortfarande kunde uppstå klämda kablar även men 2st stripes. Detta förhindrar kablarna att dela sig och kan hamna i kläm mellan lock och ventilhus.(se bifogad bild)

Responsible: TC,SG | Intruduced on: 2009-10-01 | Effective from: 2009-10-01

Agreement of customer with process and product changing containment measures at: Info gick till Volvo 2009-12-18. Uteblivet svar tom 2010-02-04 tolkas som tyst medgivande. | Responsible: A. Sjöman

D4 Root cause analysis

Defect cause / Causing process:

Defekten uppstår vid lockmontage.

Root cause(s) (RC) and verification of effectiveness: why could the defect occur?

Otillräcklig buntning av kablage vid lockmontage. Se bifogad 5 Why analys.

Responsible: Team | Completed on: 2009-10-14

Root cause(s) (RC) and verification of effectiveness: why has the defect not been detected?

Kontroll av 4 polig kontakt skar hos leverantör. Ingen ytterligare kontroll hos BR då vi inte orsakar yttre påverkan på kontakten. Se bifogad 5 WHY analys.

Responsible: Team | Completed on: 2009-10-14

Expected risks / Risk assessment (Probability)

Risken för klämda kablage sträcker sig ända tillbaka till introduktionen av nya CVU linan.

Production period affected from: 2009-02-01 to: 2009-10-01 | Responsible: TC | Completed on: 2009-10-14

Expected number of further non-conformities: ????? | Pot. failure qty.: internal: 0 | 0-km: 0 | Field: ?????

D5 Corrective actions and proof of effectiveness

1. Fortsätta med trippel stripe.
2. Tejpa kablage för att skapa en stabil härva som inte kan klämmas imellan lock hus.

Responsible: Team | Completed on: 2009-12-16

D6 Introduction of corrective actions and tracking of effectiveness

Introduced corrective action(s)

1. Trippla stripes införs som åtrgärd tills vidare med hänvisning till Intern project V-132 där vi arbetar med att ta hem pigtail montaget och därmed inför tejpning om det skulle visa sig vara den bästa lösningen.

Responsible: SG, TC, MA | Planned introduction on:

Introduced on: S/N 36050 | Effective from: S/N 36050

Customer agreement on: Info gick till Volvo 2009-12-18. Uteblivet svar tom 2010-02-04 tolkas som tyst medgivande. | By: A.Sjöman

Tracking of effectiveness of the introduced corrective action(s)

20st ventiler öppnades vör verifiering. Se bilaga “Verifiering D6” för ytterligare information

Responsible: **TC, SV,** | Completed on: 2010-02-10

Removal of containment action(s)

D3 ligger kvar som långsiktig lösning tills project V-132 är genomfört.

Responsible: **TC, P/QMM** | Completed on: 2010-02-04

D7 Prevention of recurrence of the defect

Update of QM system (FMEA, procedures, instructions, PQP, …)

Uppdatera P-FMEA_640070943

Responsible: JB, TC

Due date: 2010-02-11 | Completed on: 2010-02-11

Adoption of possible corrective action(s) for other proecces, products, locations:

Could the defect concern other processes, products or plants?

If yes: Which department do you inform (e.g.: lessons learned coordinators)?

If no: Why don’t you expect other processed, products or plants to be concerned?

Denna form av kabel dragning är unik för CVU enheten och kan inte överföras på andra produkter.

Responsible: TC

Due date: 2010-02-04 | Completed on: 2010-02-04

D8 Final meeting

	First name	Last name	Email
Participants:	Medverkande på FTM		

Accomplished at:

Results:

Signatures:

Team leader:	Name:	Thomas Carlsson	Date:		Signature:
P/QMM:	Name:	Markus Anglered	Date:		Signature:
Sponsor:	Name:	Ulf Peterson	Date:		Signature:

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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1413013293

5Why%20300253143

8D: 300253143

5 Why Analysis

Rexroth
Bosch Group

Occurence

1. W — Funktionsfel

2.W — Kortsluten 4-pins kontakt

3.W — Kablar klämda mellan hus och lock.

4.W — Kablar hamnar lätt fel vid montering av locket. Strävar åt olika håll.

5.W — Det finns ingen styrsel i Kablaget. (Buntning)

Problem Description:

Kablaget till 4-pins kontakten har blivit Klämd mellan lock och ventilhus.

Detection

1.W — Funktionsfel

2.W — Kortsluten 4-pins kontakt

3.W — 4-pins kontakten provas ej i EOL

4.W — Provas hos lev. BR påverkar inte kontakten i sin montering

5.W

PE13-002

VOLVO TRUCK

5/1/2013

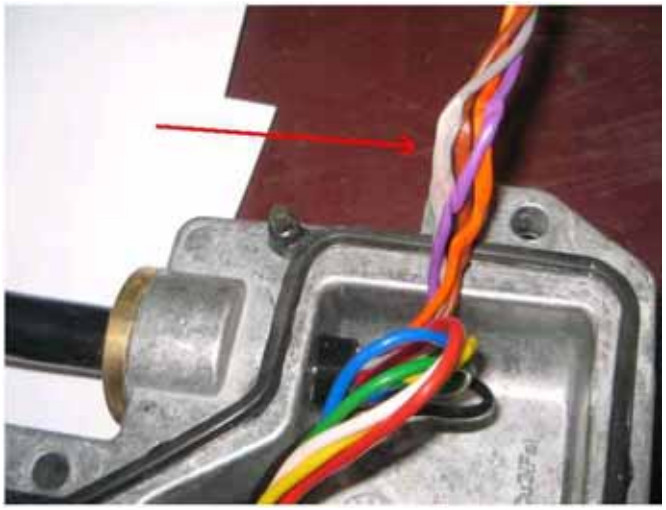
QUESTION 9

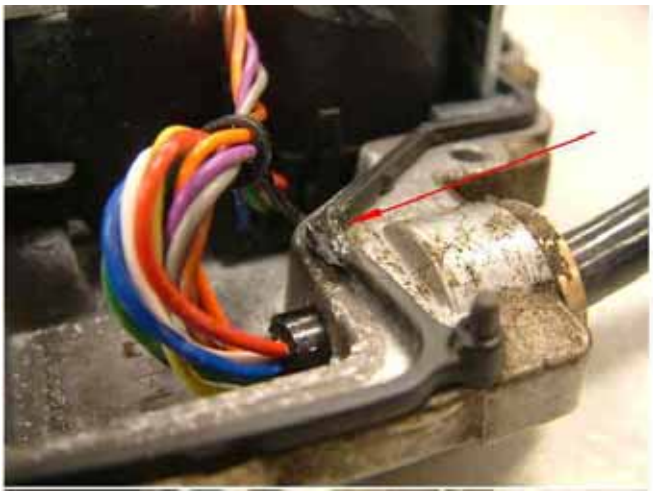
QJ 1-1413013293

Clutch valve unit

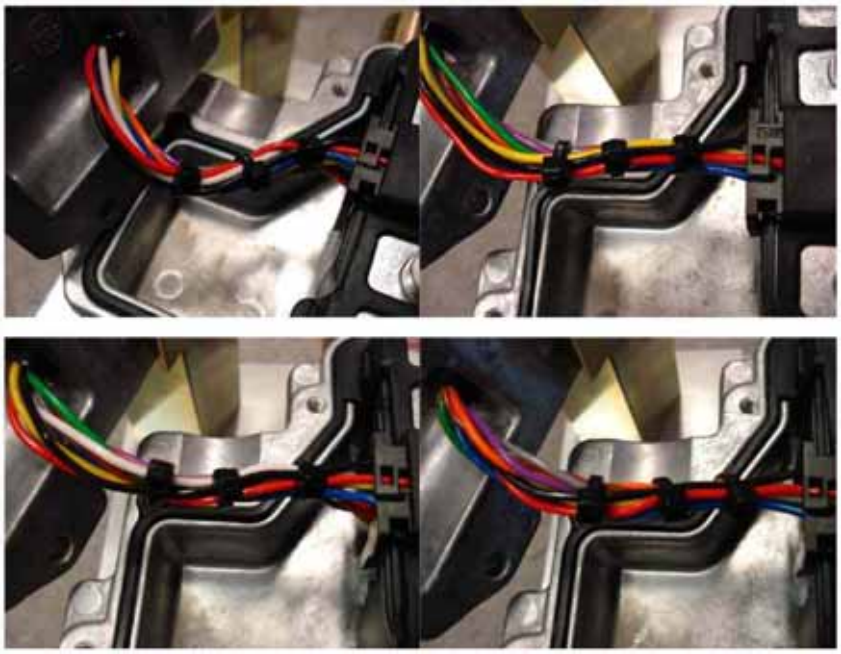
Clutch valve unit P/N 21206430

Due to not sufficient clamping of CVU internal cables, there have been claims of electrical connection broken and of water intrusion. Some cables have been squeezed between cover and housing during assembly at supplier.
Before S/N 36050:





S/N 36050 was produced 2009-12-04 09:00:32.
After S/N 36050 the assembly process has been changed. 3 cable ties are mounted:



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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1413013293

Verifiering%20D6

Bosch Rexroth Teknik AB
2010-02-11
THOMCARL

Verifikation av långsiktig lösning

8D nr: 300253143
Utförd av: Thomas Carlsson, Stefan Värehag
Utförd: 2010-02-10

Status för verifiering: Godkänd

Långsiktig lösning:
Kablar i ventil buntas ihop med tre stripes för att förhindra klämning mellan lock och hus.

Verifiering:
20 godkända ventiler öppnades för att okulärt besiktiga kablaget med fokus på striparnas position och eventuella klämda kablar.
Ventilerna som öppnades hade serienummer 42017-42036
Nedan följer bilder från verifieringen i den följd som ventilerna plockades för verifiering.

42029

42028

42027

42032

42031

42030

42033

42034

42036

42035

42021

42026

42025

42024

42023

42020

42022

42019

42018

42017

Sammanfattning:

Samtliga ventiler hade tre stripes och dessa satt enligt gällande förfarande.
Inga klämda kablar och klämrisken anses minimal.

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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1480701871

LVD%20Claims%20-QJ 1-1480701871

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1 -1480701871 Jerking when starting All Documents

Owner : [redacted]

I Like It Tags & Notes

Type	Name	Modified	Modified By
	DEC QJ	4/10/2013 10:30 AM	Säfblad Katarina
	LVD Claims - PID33 FMI2	4/10/2013 10:29 AM	Säfblad Katarina
	Notification Letter CVU	4/10/2013 10:29 AM	Säfblad Katarina
	PID 33-2	4/10/2013 10:29 AM	Säfblad Katarina

Add document

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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1480701871

DEC QJ

QJ 1-1491230955 MID130 PSID27 FMI8 air leakage- frequent occurrence in UD and VTNA trucks

Problem description:

- Air leakage in the clutch system triggers PSID27 FMI 8 fault code

- When the gearlever is moved to neutral the TECU checks if the fault code can be reset.

- When the fault code is active the TECU take actions that could explain many complaints.

Product /customer: All vehicles with AMT-C/D gearbox UD, Renault, VTNA, VTC, VBC

Root cause: Airleakage due to CVU quality issues, GD needs to be updated

Recommendations/Solutions:

-Notification letter

-Update GD in order not to change components that are ok

-QJ CVU improvement

Containment action: none

Updated 2011-06-13

Current Activity and Status:

1. Notification letter in order to have claims when no fault: The system checks that the clutch disengagement valves not need to be used more than normal to hold the clutch in a disengaged position
2. Requirement specification for new air leakage test-rig, ready, w1124
3. GD updates will be ok w1124
4. W1124 decision if further activities for CVU and CCA in this QJ is needed.
5. QJ 1-1491230931 AMT-D, CVU MR w1125

	NEW	KOFF (INV)	DEC (DES)	REL (DCN)	SUP (PPAP)	SPS (OK)	MP (MR)
Locked plan (DEC)		W1050	w1113				w1124
55Current actualized plan	W1050	W1050	w1124				w1125

Customer effect	Customer came work to shop due to warning lamp turned on during a run.
QJ trigger	- UD: 9 reported cases ~ 1% - VTNA under investigation - VTC under investigation
Containment action	TBD
Recommended AM Strategy	TBD

1-1480701871 Jerking when starting or during gear shifting; vehicle don't engage any gear - MID130 PID33 FMI2

Problem description: Jerking when starting or during gear shifting; vehicle don't engage any gear

Product /customer: 20710519 among others, VTC

Root cause: TBD

Recommendations/Solutions: Update GD

Containment action: Old part nr for CVU, start with changing CVU

Updated 2011-06-14

Current Activity and Status:

1. Root-cause analysis ongoing
2. Testing of claimed sensors ongoing
3. Updates in GD, check all connectors for corrosion, tighter tolerances (4,5 – 5,5 V)
4. CCA sensor ASIC will be updated (SOP w1140)

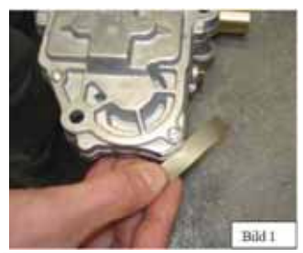
	NEW	KOFF (INV)	DEC (DES)	REL (DCN)	SUP (PPAP)	SPS (OK)	MP (MR)
Locked plan (DEC)		W1108	W1123	W1123	W1140	W1140	W1140
Current actualized plan	W	W1108	W1124	W1124	W	W	W1140

Customer effect	Jerking
QJ trigger	Image
Containment action	None
Recommended AM Strategy	Update GD

Design decision:

QJ-number: QJ 1-1491230955 MID130 PSID27 FMI8 air leakage- frequent occurrence in UD and VTNA trucks

Date: 2011-03-15



Description of solution:

-Notification letter in order to have claims when no fault: The system checks that the clutch disengagement valves not need to be used more than normal to hold the clutch in a disengaged position

-Update GD in order not to change components that are ok

-CVU improvements in QJ 1-1491230931 AMT-D, CVU MR w1125, see the pictures

Aftermarket solution:

Updated GD

New p/n on CVU on AM in QJ 1-1491230931 AMT-D, CVU

New part numbers	Deleted part numbers

Design decision:

QJ-number: **1-1480701871 Jerking when starting or during gear shifting; vehicle don't engage any gear - MID130 PID33 FMI2**

Date: 2011-06-14

Description of solution:

-Notification letter sent out to change the old version of the CVU

-Update GD in order to check for corrosion in contacts for CVU, CCA and GCU

-Update GD, tighter tolerances (4.75V-5.25V)

-CVU improvements in QJ 1-1491230931 AMT-D, CVU MR w1125, see the pictures

Aftermarket solution:

Updated GD

Notification letter 2011-4000-05 sent out

New part numbers	Deleted part numbers

Business case

- Link to xl-sheet --
- Business case summary: No investment or increased product cost.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1480701871

LVD%20Claims%20-%20PID33%20FMI2(1)

Application	Labor Code	Causal Part	PID 33	FMI 2	Chassis Se	Chassis Nu	repeted repair	Claim Mont	Country of	Debit Code	Engine Assembly Date	Engine Coc	Engine Mo	Function G	Function G	Mileage (kn	Months in S	Operation C
HIGHWAY	43100-0-0(	21462376	x	x	N	262082		27	CAN	29	6/25/2008	D13	D13	4	4312	407259	31	10
HIGHWAY	41350-0-01	20710519	x	x	N	262699		33	USA	18	11/17/2007	D13	D13	4	4312	557160	39	10
HIGHWAY	28401-0-02	21465235	x	x	N	266740	x	22	USA	18	6/27/2008	D13	D13	4	4312	480825	29	10
HIGHWAY	43236-0-04	21274018	x	x	N	266740	x	22	USA	18	6/27/2008	D13	D13	4	4326	485787	29	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	272225	x	10	CAN	10	6/26/2008	D13	D13	4	4310	138222	30	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	272225	x	14	CAN	18	6/26/2008	D13	D13	4	4310	201205	30	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	272225	x	15	CAN	18	6/26/2008	D13	D13	4	4310	227064	30	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	272225	x	16	CAN	18	6/26/2008	D13	D13	4	4310	242615	30	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	272225	x	17	CAN	18	6/26/2008	D13	D13	4	4310	253446	30	10
HIGHWAY	43236-0-08	20710519	x	x	N	272354		12	USA	10	6/30/2008	D13	D13	4	4312	114727	32	10
HIGHWAY	43182-2-0(	21008347	x	x	N	277033	x	4	CAN	10	6/12/2008	D13	D13	4	4312	158184	30	10
HIGHWAY	43100-0-0(	21462376	x	x	N	277033	x	25	CAN	18	6/12/2008	D13	D13	4	4312	565781	30	10
HIGHWAY	43200-0-0(	3092515	x	x	N	277397		6	CAN	10	2/19/2009	D13	D13	4	4326	77960	12	10
HIGHWAY	43182-2-0(	21462376	x	x	N	277399		8	CAN	10	2/23/2009	D13	D13	4	4312	121119	14	10
HIGHWAY	43236-0-04	20829006	x	x	N	281289		7	USA	10	10/30/2008	D13	D13	4	4326	26030	28	10
HIGHWAY	43100-0-0(	NO PROBLE	x	x	N	286370		14	CAN	18	3/13/2009	D13	D13	4	4310	255654	18	10
HIGHWAY	43207-2-0(	8079639	x	x	N	287056		22	USA	29	3/11/2009	D13	D13	4	4320	413909	23	10
HIGHWAY	43162-2-0(	21462376	x	x	N	290199		9	USA	10	9/9/2009	D13	D13	4	4312	152617	14	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	290927	x	4	CAN	10	10/6/2009	D13	D13	4	4310	114172	12	10
HIGHWAY	43100-0-0(	LABOR	x	x	N	290927	x	8	CAN	10	10/6/2009	D13	D13	4	4310	243363	12	10
HIGHWAY	43112-0-03	NO PROBLE	x	x	N	291705	x	11	USA	10	9/24/2009	D13	D13	4	4310	141043	17	10
HIGHWAY	36411-2-0(	3092515	x	x	N	291705	x	12	USA	10	9/24/2009	D13	D13	4	4326	180092	17	10
HIGHWAY	43200-0-0(	NO PROBLE	x	x	N	291732	x	8	USA	10	10/14/2009	D13	D13	4	4320	96844	15	10
HIGHWAY	43200-0-0(	21244587	x	x	N	291732	x	8	USA	11	10/14/2009	D13	D13	4	4326	96844	15	10
HIGHWAY	43100-0-0(	3190598	x	x	N	291915		6	USA	10	11/5/2009	D13	D13	4	4311	77364	14	10
HIGHWAY	41350-0-01	20710519	x	x	N	291934		6	USA	10	11/24/2009	D13	D13	4	4312	75555	13	10
HIGHWAY	43236-0-04	LABOR	x	x	N	292526		9	USA	?	12/8/2009	D13	D13	4	4320	214944	11	10
HIGHWAY	41301-0-02	20829012	x	x	N	292751		10	USA	10	11/12/2009	D13	D13	4	4130	157239	15	10
HIGHWAY	43161-2-0(	21462376	x	x	N	497491		38	USA	18	8/29/2007	D13	D13	4	4312	565136	42	10

Product Cla	SWA Claim	SWA Produ	Unadjusted	Unadjusted	Unadjusted	Unadjusted	Unadjusted	Unadjusted	Unadjusted	Unadjusted	Unplanned	VIN	Vehicle Assem	Vehicle Ass	Vehicle Ma	Vehicle Ma	Vehicle Mo	Vehicle Typ	Business U	Cab Type
4	C1_116107	4V4NC9EG	404.82	3800.02	190.15	1784.91	214.67	2015.11	0	0	?	4V4NC9EG	7/7/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105942	4V4MC9EH	669.12	6304.7	474.64	4472.25	193.2	1820.45	1.27	12	NO	4V4MC9EH	11/27/2007	N	VOLVO	VNM64T	VMT060	VNM	VPT	DAY
4	C1_105899	4V4NC9EJ	166.84	1578.18	166.84	1578.18	0	0	0	0	?	4V4NC9EJ	7/11/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105977	4V4NC9EJ	3268.61	30917.6	1461.82	13827.24	1806.79	17090.36	0	0	?	4V4NC9EJ	7/11/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_095080	4V4MC9EJ	77.59	856.29	77.59	856.29	0	0	0	0	NO	4V4MC9EJ	7/10/2008	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_095366	4V4MC9EJ	75.99	782.61	75.99	782.61	0	0	0	0	NO	4V4MC9EJ	7/10/2008	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_105451	4V4MC9EJ	52.46	547.98	52.46	547.98	0	0	0	0	NO	4V4MC9EJ	7/10/2008	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_105515	4V4MC9EJ	80.4	816.62	80.4	816.62	0	0	0	0	NO	4V4MC9EJ	7/10/2008	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_105550	4V4MC9EJ	83.51	821.15	83.51	821.15	0	0	0	0	NO	4V4MC9EJ	7/10/2008	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_095234	4V4NC9EH	738.84	8154.12	578.17	6380.91	160.67	1773.21	0	0	?	4V4NC9EH	7/14/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	630
4	C1_094727	4V4NC9EH	437.31	4861.73	219.44	2439.59	217.87	2422.14	0	0	YES	4V4NC9EH	6/24/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105973	4V4NC9EH	379.17	3461.78	275.38	2514.17	103.79	947.6	0	0	NO	4V4NC9EH	6/24/2008	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105986	4V4NC9EJ	314.07	2867.44	207.04	1890.27	107.03	977.17	0	0	NO	4V4NC9EJ	3/3/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	630
4	C1_106000	4V4NC9EJ	414.51	3784.43	184.31	1682.77	230.2	2101.66	0	0	NO	4V4NC9EJ	3/3/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	630
4	C1_095015	4V4N19EF	220.12	2304.91	220.12	2304.91	0	0	0	0	YES	4V4N19EF	11/7/2008	N	VOLVO	VNL42T	VMT060	VNL	VPT	DAY
4	C1_106052	4V4MC9EJ	214.16	2010.33	214.16	2010.33	0	0	0	0	NO	4V4MC9EJ	4/2/2009	N	VOLVO	VNM64T	VMT060	VNM	VPT	430
4	C1_116251	4V4NC9EH	0	0	0	0	0	0	0	0	YES	4V4NC9EH	3/31/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_106003	4V4NC9EH	398.35	3636.9	172.51	1575.02	173.88	1587.52	51.96	474.37	YES	4V4NC9EH	9/18/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105839	4V4NC9EJ	91.02	865.93	91.02	865.93	0	0	0	0	NO	4V4NC9EJ	10/21/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	780
4	C1_106036	4V4NC9EJ	119.35	1108.56	117.25	1089.08	2.1	19.49	0	0	NO	4V4NC9EJ	10/21/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	780
4	C1_105964	4V4NC9EH	398.32	3753.11	398.32	3753.11	0	0	0	0	NO	4V4NC9EH	10/8/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_106038	4V4NC9EH	482.35	4480.28	391.84	3639.56	87.2	809.92	3.32	30.8	NO	4V4NC9EH	10/8/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105888	4V4NC9EJ	154.67	1462.97	154.67	1462.97	0	0	0	0	NO	4V4NC9EJ	10/23/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105888	4V4NC9EJ	388.1	3671.04	388.1	3671.04	0	0	0	0	NO	4V4NC9EJ	10/23/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	670
4	C1_105826	4V4NC9EJ	123.02	1170.38	123.02	1170.38	0	0	0	0	NO	4V4NC9EJ	11/23/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	780
4	C1_105924	4V4MC9EC	191.59	1805.22	191.59	1805.22	0	0	0	0	NO	4V4MC9EC	12/16/2009	N	VOLVO	VNM64T	VMT060	VNM	VPT	DAY
4	C1_116180	4V4NC9EJ	0	0	0	0	0	0	0	0	?	4V4NC9EJ	1/15/2010	N	VOLVO	VNL64T	VMT060	VNL	VPT	630
4	C1_105997	4V4NC9EJ	304.01	2775.57	304.01	2775.57	0	0	0	0	?	4V4NC9EJ	12/3/2009	N	VOLVO	VNL64T	VMT060	VNL	VPT	630
4	C1_106047	4V4NC9EJ	393.7	3656.89	209.45	1945.48	184.25	1711.41	0	0	NO	4V4NC9EJ	9/6/2007	N	VOLVO	VNL64T	VMT060	VNL	VPT	780

Campaign I	Campaign ˙	Claim Registra	Claim Statu	Claim Subn	Comments	Company	Customer N	Delivered S	Delivery Cc	Delivery De	Delivery Di	Delivery Re	Delivery St	Design Are	Engine Ass	Engine Ass	Engine Fan	Engine Ge	Engine Hor	Engine Mal
PURC-021	PURCHAS	1/6/2011	ADJUSTEI	22	N	?	LOCATION	Y	CAN	2806K	NAD	CANADA	QUEBEC	TRANSM	Jun-08	2008	D13	EM-USA07	375	VOLVO
STD-00573	STANDARI	9/28/2010	APPROVEI	14	N	?	FL TRANSI	Y	USA	5402D	NAD	FLEET	TEXAS	TRANSM	Nov-07	2007	D13	EM-USA07	425	VOLVO
STD-00573	STANDARI	9/1/2010	APPROVEI	15	N	?	BOWLING	Y	USA	5339D	NAD	SOUTHEA	TENNESSI	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	10/15/2010	APPROVEI	15	N	?	BOWLING	Y	USA	5339D	NAD	SOUTHEA	TENNESSI	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	7/27/2009	APPROVEI	13	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	12/11/2009	APPROVEI	13	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	1/21/2010	APPROVEI	13	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	2/18/2010	APPROVEI	13	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	3/4/2010	APPROVEI	13	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Jun-08	2008	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	10/9/2009	ADJUSTEI	54	N	?	TRULER C	Y	USA	5523D	NAD	CENTRAL	INDIANA	TRANSM	Jun-08	2008	D13	EM-USA07	425	VOLVO
STD-00578	STANDARI	2/4/2009	APPROVEI	20	N	?	CHALLENC	Y	CAN	2779K	NAD	CANADA	ONTARIO	TRANSM	Jun-08	2008	D13	EM-USA07	425	VOLVO
STD-00676	STANDARI	10/20/2010	ADJUSTEI	20	N	?	CHALLENC	Y	CAN	2779K	NAD	CANADA	ONTARIO	TRANSM	Jun-08	2008	D13	EM-USA07	425	VOLVO
STD-00573	STANDARI	10/21/2010	APPROVEI	14	N	?	D & W FOF	Y	CAN	2788K	NAD	CANADA	ONTARIO	TRANSM	Feb-09	2009	D13	EM-USA07	475	VOLVO
STD-00578	STANDARI	10/28/2010	APPROVEI	44	N	?	BYTOWN E	Y	CAN	2790K	NAD	CANADA	ONTARIO	TRANSM	Feb-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	6/25/2009	APPROVEI	21	N	?	AIROLDI B	Y	USA	5255D	NAD	CENTRAL	WISCONSI	TRANSM	Oct-08	2008	D13	EM-USA07	325	VOLVO
STD-00573	STANDARI	12/1/2010	APPROVEI	18	N	?	SOKIL EXF	Y	CAN	2720K	NAD	CANADA	ALBERTA	TRANSM	Mar-09	2009	D13	EM-USA07	475	VOLVO
PURC-021	PURCHAS	3/25/2011	APPROVEI	25	N	?	KILLPACK	Y	USA	5720D	NAD	WESTERN	UTAH	TRANSM	Mar-09	2009	D13	EM-USA07	425	VOLVO
STD-00578	STANDARI	10/29/2010	APPROVEI	13	N	?	KILLPACK	Y	USA	5720D	NAD	WESTERN	UTAH	TRANSM	Sep-09	2009	D13	EM-USA07	425	VOLVO
STD-00573	STANDARI	7/29/2010	APPROVEI	9	N	?	V & T COA	Y	CAN	2747K	NAD	CANADA	SASKATCH	TRANSM	Oct-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	11/20/2010	APPROVEI	9	N	?	V & T COA	Y	CAN	2747K	NAD	CANADA	SASKATCH	TRANSM	Oct-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	10/7/2010	APPROVEI	17	N	?	FL TRANSI	Y	USA	5402D	NAD	FLEET	TEXAS	TRANSM	Sep-09	2009	D13	EM-USA07	425	VOLVO
STD-00573	STANDARI	11/21/2010	APPROVEI	17	N	?	FL TRANSI	Y	USA	5402D	NAD	FLEET	TEXAS	TRANSM	Sep-09	2009	D13	EM-USA07	425	VOLVO
STD-00573	STANDARI	8/26/2010	APPROVEI	13	N	?	PV TRANS	Y	USA	5160D	NAD	NORTHEA	PENNSYL\	TRANSM	Oct-09	2009	D13	EM-USA07	475	VOLVO
GW-00952	GOODWILI	8/26/2010	APPROVEI	13	N	?	PV TRANS	Y	USA	5160D	NAD	NORTHEA	PENNSYL\	TRANSM	Oct-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	7/22/2010	APPROVEI	10	N	?	ASHLEY D	Y	USA	5545D	NAD	CENTRAL	MINNESO	TRANSM	Nov-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	9/17/2010	APPROVEI	26	N	?	GIANT EA(	Y	USA	5285D	NAD	NORTHEA	PENNSYL\	TRANSM	Nov-09	2009	D13	EM-USA10	375	VOLVO
?	?	2/16/2011	PENDING	16	N	?	KARL KAN	Y	USA	5559D	NAD	CENTRAL	OHIO	TRANSM	Dec-09	2009	D13	EM-USA07	475	VOLVO
STD-00573	STANDARI	10/27/2010	APPROVEI	13	N	?	STIDHAM I	Y	USA	5254D	NAD	WESTERN	OREGON	TRANSM	Nov-09	2009	D13	EM-USA07	475	VOLVO
STD-00676	STANDARI	11/29/2010	APPROVEI	28	N	?	TRANS AD	Y	USA	5514D	NAD	CENTRAL	ILLINOIS	TRANSM	Aug-07	2007	D13	EM-USA07	475	VOLVO

Engine Pla	Engine Pla	Engine Size	Fgrp 1 Digi	Fgrp 2 Digi	Fgrp 3 Digi	Fgrp 4 Digi	Front Axle	Front Axle	Function G	Function G	Gear Box	Gear Box N	In Service Dat	In Service M	In Service Y	Last Known	Last Known R	Model Year	Rear Axle M
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	9/16/2008	Sep-08	2008	277154	8/28/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	1/11/2008	Jan-08	2008	346203	1/8/2008	2008	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	10/30/2008	Oct-08	2008	311403	7/18/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	4326-GEAF	?	?	43	432	?	?	10/30/2008	Oct-08	2008	311403	7/18/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/17/2008	Oct-08	2008	159459	8/14/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/17/2008	Oct-08	2008	159459	8/14/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/17/2008	Oct-08	2008	159459	8/14/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/17/2008	Oct-08	2008	159459	8/14/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/17/2008	Oct-08	2008	159459	8/14/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	8/6/2008	Aug-08	2008	130349	7/29/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	10/4/2008	Oct-08	2008	351560	8/13/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	10/4/2008	Oct-08	2008	351560	8/13/2008	2009	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	4326-GEAF	?	?	43	432	?	?	4/15/2010	Apr-10	2010	72457	2/26/2010	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	2/22/2010	Feb-10	2010	94442	2/17/2010	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	4326-GEAF	?	?	43	432	?	?	12/5/2008	Dec-08	2008	87430	3/23/2009	2009	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	10/9/2009	Oct-09	2009	142425	5/4/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	432-GEAR	?	?	43	432	?	?	5/21/2009	May-09	2009	244203	4/20/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	2/25/2010	Feb-10	2010	94832	10/7/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	4/12/2010	Apr-10	2010	179016	10/31/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	4/12/2010	Apr-10	2010	179016	10/31/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	431-GEAR	?	?	43	431	?	?	11/6/2009	Nov-09	2009	112922	11/30/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	4326-GEAF	?	?	43	432	?	?	11/6/2009	Nov-09	2009	112922	11/30/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	432-GEAR	?	?	43	432	?	?	12/31/2009	Dec-09	2009	89709	12/3/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	4326-GEAF	?	?	43	432	?	?	12/31/2009	Dec-09	2009	89709	12/3/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4311-MAN	?	?	43	431	?	?	2/4/2010	Feb-10	2010	114706	12/23/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	3/16/2010	Mar-10	2010	91069	1/27/2010	2010	?
H	HAGERST	13	4-POWER	43-GEARB	432-GEAR	432-GEAR	?	?	43	432	?	?	5/10/2010	May-10	2010	144056	1/25/2010	2011	?
H	HAGERST	13	4-POWER	41-CLUTCI	413-CLUTC	413-CLUTC	?	?	41	413	?	?	1/6/2010	Jan-10	2010	112557	12/24/2009	2010	?
H	HAGERST	13	4-POWER	43-GEARB	431-GEAR	4312-HOU	?	?	43	431	?	?	10/11/2007	Oct-07	2007	362982	10/11/2007	2008	?

Rear Axle N	Refno Clair	Repair Date	Repairing C	Repairing D	Repairing D	Repairing P	Repairing S	Supplier Nu	Tread Grou	Used Time	Vehicle Ass	Vehicle Ass	Vehicle Ass	Vehicle Mo	Comment Field
?	1161072	12/6/2010	CAN	3572K	NAD	CANADA	QUEBEC	1387	10 POWER	4	Jul-08	N - NEW R	2008	VN	|TRANY DON T SHIFT PROPERLY AND F/CODE IN THE DISPLAY.
?	1059424	9/14/2010	USA	5788D	NAD	SOUTHEA	NORTH CA	14489	10 POWER	6	Nov-07	N - NEW R	2007	VN	|CUSTOMER STATES TRANSMISSION IS SLIPPING AND TRANS II
?	1058996	8/24/2010	USA	5339D	NAD	SOUTHEA	TENNESSE	14489	10 POWER	2	Jul-08	N - NEW R	2008	VN	|298771 WONT TRANS WONT PULL @ TIMES. CLUTCH CALIBRA
?	1059771	8/27/2010	USA	5339D	NAD	SOUTHEA	TENNESSE	6943	10 POWER	18	Jul-08	N - NEW R	2008	VN	|298771 TRANS CODES E-SERVE 1-1454117251. INSPECT TRUC
?	950805	7/17/2009	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Jul-08	N - NEW R	2008	VN	|REPAIR FOR TRANS. FAULT CODE. TROUBLESHOT REPAIR FO
?	953666	12/8/2009	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Jul-08	N - NEW R	2008	VN	|REPAIR TRANS. FAULT CODE. TROUBLESHOT PRINT FAULT CO
?	1054517	1/13/2010	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Jul-08	N - NEW R	2008	VN	|REPAIR TRANS. FUALT CODES. TROUBLESHOT PRINT FAULT C
?	1055158	2/12/2010	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Jul-08	N - NEW R	2008	VN	|REPAIR FAULT CODE FOR TRANSMISSION. TROUBLESHOT PR
?	1055501	3/1/2010	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Jul-08	N - NEW R	2008	VN	|REPAIR FAULT FOR TRANSMISSION. TROUBLESHOT PRINT FA
?	952347	7/23/2009	USA	5523D	NAD	CENTRAL	INDIANA	14489	10 POWER	14	Jul-08	N - NEW R	2008	VN	|WHY WAS OUR LABOR CUT FOR PULLING THE TRANSMISSION
?	947271	1/28/2009	USA	5737D	NAD	WESTERN	TEXAS	1387	10 POWER	3	Jun-08	N - NEW R	2008	VN	|TRANS CODES AND SHIFTING HARD SOLENOID VALVE INSTAL
?	1059732	10/5/2010	CAN	2813K	NAD	CANADA	QUEBEC	1387	10 POWER	4	Jun-08	N - NEW R	2008	VN	|TRANS TAKES LONG TO ENGAUGE NEED TO GET RPM UP VER
?	1059865	10/14/2010	CAN	2788K	NAD	CANADA	ONTARIO	?	10 POWER	3	Mar-09	N - NEW R	2009	VN	|E-SERVICE CASE #1-1468233001. COMPLAINT THAT CHECK TR
?	1060003	10/6/2010	CAN	2790K	NAD	CANADA	ONTARIO	1387	10 POWER	2	Mar-09	N - NEW R	2009	VN	|***** COMPLAINT: TRANS HARSH TO START OFF MOVING FORE\
?	950158	6/15/2009	USA	5255D	NAD	CENTRAL	WISCONSI	6943	10 POWER	3	Nov-08	N - NEW R	2008	VN	|CHECK TRANSMISSION LIGHT CAME ON AND TRUCK WOULD N
?	1060525	12/1/2010	CAN	2761K	NAD	CANADA	ONTARIO	?	10 POWER	3	Apr-09	N - NEW R	2009	VN	|CHECK UNIT FOR TRANSMISSION FAULTS. HOOK UP TO COMF
?	1162512	3/9/2011	USA	5720D	NAD	WESTERN	UTAH	63277	10 POWER	3	Mar-09	N - NEW R	2009	VN	|1-1535680371 / GDR 7056-684390 CUSTOMER COMPLAINS OF R(
?	1060038	10/25/2010	USA	5720D	NAD	WESTERN	UTAH	1387	10 POWER	3	Sep-09	N - NEW R	2009	VN	|1-1471710863 CHECK FOR TRANSMISSION SERVICE CODES-NO
?	1058393	7/26/2010	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Oct-09	N - NEW R	2009	VN	|REPAIR FOR TRANSMISSION FAULT CODE. TROUBLESHOT PR
?	1060369	11/16/2010	CAN	2720K	NAD	CANADA	ALBERTA	?	10 POWER	1	Oct-09	N - NEW R	2009	VN	|REPAIR TRANS.FAULT CODE TRANS. NOT SHIFTING PROPERL
?	1059641	9/8/2010	USA	5018D	NAD	WESTERN	CALIFORN	?	10 POWER	5	Oct-09	N - NEW R	2009	VN	|CASE 1-1452536271 TRANS WOULD NOT GO INTO GEAR THEN
?	1060380	11/4/2010	USA	5018D	NAD	WESTERN	CALIFORN	?	10 POWER	5	Oct-09	N - NEW R	2009	VN	|CASE 1-1476202241 CHECK TECU COMING ON INTERMITTANTL
?	1058886	8/18/2010	USA	5244D	NAD	CENTRAL	OHIO	?	10 POWER	2	Oct-09	N - NEW R	2009	VN	|CK TRANS SHIFT ISSUE-DIED-WILL NOT GO INTO GEAR. PULL T
?	1058887	8/18/2010	USA	5244D	NAD	CENTRAL	OHIO	6943	10 POWER	5	Oct-09	N - NEW R	2009	VN	|UNIT CAME TO SHOP FOR SHIFTING ISSUE AT TIMES WILL NO
?	1058267	7/19/2010	USA	5249D	NAD	SOUTHEA	MISSISSIP	1165	10 POWER	2	Nov-09	N - NEW R	2009	VN	|CHECK AND REPAIR CUSTOMERS COMPLAINT OF TRANSMISSI(
?	1059242	9/9/2010	USA	5285D	NAD	NORTHEA	PENNSYL\	14489	10 POWER	3	Dec-09	N - NEW R	2009	VN	|E-SERVICE CASE # 1-1453043311NO PART TO RETURN FOR THI:
?	1161800	2/9/2011	USA	5559D	NAD	CENTRAL	OHIO	?	10 POWER	1	Jan-10	N - NEW R	2010	VN	|CHECK TRANS CODES - CHECKED FOR CODES FOUND INACTI
?	1059973	10/18/2010	USA	5880D	NAD	WESTERN	OREGON	?	10 POWER	4	Dec-09	N - NEW R	2009	VN	|C: CUST COMPLAINS OF I SHIFT TRANS FAULTS. DRIVER SAYS
?	1060478	11/20/2010	USA	5514D	NAD	CENTRAL	ILLINOIS	1387	10 POWER	3	Sep-07	N - NEW R	2007	VN	|E-SERVICE #1-1484297416. DRIVER STATES TRANS SEARCHES

CHECK F/CODE MID 130 PID 33 FMI 2 X 47 AND MID 130 PPID 50 FMI 11 X 17 FOR THE CLUTCH CYLINDER POSITION. CHECK CLUTCH FORK CLEARANCE IS AT 1.2 MM AND SHOULD BE AT 1.3 MM DID CLUTCH CALIBRATION
NDICATOR IS ON. CHECK AND FOUND CODE MID 130 PID 33 FMI 2 19X AND PPID 50 FMI 11 1X BOTH INACTIVE. FOLLOW GUIDED DIAGNOSTICS FOR PID 33. CHECK CONNECTION A42 FOR DAMAGE OR CORROSION. CONNEC
TION. INSPT TRUCK FOUND FOUND INACTIVE CODES MID 130 PID 33 FMI 2 63 COUNTS MID 130 PPID50 FMI11 29 COUNTS. CHECKED T/S AND PERFORM CLUTCH CALIBRATION ROAD TEST OK NO COMMENT|? === APPLICABL
K FOUND 4 TRANS CODES MID 130 PID 33 FMI 2 WITH 5 COUNTS MID130 PID158 FMI1 WITH 1 COUNT MID130 PPID50 FMI11 WITH 2 COUNTS MID130 PSID25 FMI11 W/1 COUNT. T/S CODES W/GUIDED DIAGNOSTIC. VTS INSTRUC
R FAULT CODE MID 130 PPID 33 FMI 2. PRINT CODE FROM VCADS FOUND CLUTCH CYLINDER OUT OF POSITION. RECALIBRATE CLUTCH ACTUATER. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573: CLAIM LIMIT
ODE FROM VCADS REPAIR FOR FAULT CODE MID 130PID 33 FMI 2. FOUND CLUTCH OUT OF CALIBRATION. RECALIBRATE CUTCH CLEAR FAULT CODES. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573: CLAIM L
CODE FROM VCADS REPAIR FOR FAULT CODE MID 130 PID 33 FMI 2. FOUND CLUTCH OUT OF CALIBTATION. RECALIBRATE CLUTCH. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573: CLAIM LIMIT IS SATISFIEDAP
INT FAULT CODE FROM VCADS REPAIR FOR FAULT CODE MID 130 PID 33 FMI 2. FOUND CLUTCH OUT OF CALIBRATION. RECALIBRATE CLUTCH. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573: CLAIM LIMIT IS S
ULT CODE FROM VCADS REPAIR FOR FAULT CODE MID130 PID 33 FMI 2. FOUND CLUTCH ACTUATER OUT OF CALIBRATION. RECALIBRATE CLUTCH. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573: CLAIM LIMIT
?? PULLED UP TO STOP AND THEN REVED UP BUT NO GO - RESTARTED AND OK - THEN DID IT AGAIN - PULLED IN SHOP AND PRINTED CODES - HAD 44 COUNTS OF MID130 PID33 FMI2 ALSO MID130 PPID50 FMI11 WITH 5 COU
LLED DRIVELINE W/ NEW STRAP KIT ROAD TESTED UNIT TO VERIFY COMPLAINT TRANS SHIFTED FINE CHECKED AND RECORDED CODES FOUND MID130 PID33 FMI2 INACTIVE. CALLED VOLVO TECH SUPPORT *GIVEN CAS
Y HIGH AND THE TRANS ENGAUGES HARD. T-SHOOT MID 130 PPID 50 FMI 11 MID 130 PPID 33 FMI 25 PERFOMED A RECAL AS PER E-SERVICE 1-1464133111 ROAD TESTED OK NO COMMENT|? === APPLICABLE COVERAGES =
ANSMISSION COMES ON DISPLAY AND THE UNIT SHIFTS ROUGH. ROAD TESTED AND FOUND UNIT SHIFTING OKAY. CONNECTED LAPTOP AND RETRIEVED FAULT CODE MID130 PID33 FMI2 INACTIVE X 47 FOR CLUTCH SYLIN
WARD AND REVERSE CHECK TRANS WARNING COMING ON ***** CAUSE : SCAN FOR CODES =MID130-PID33-FMI2 X 32 TIMES PERFORMED CIRCUIT DIAGNOSTIC TEST PERFORMED FAULT MODE CLUTCH WEAR CHECK RI
OT MOVE. UNIT TOWED TO OUR SHOP. CHECKED CODES - MID 130 PID 33 FMI 2 INACTIVE 10 TIMES (CLUTCH CYLINDER POSITION). CALLED VOLVO TECH SUPPORT AND WAS INSTRUCTED TO USE GUIDED DIAGNOSTICS TO
UTER TO CHECK FAULTS. PRINT OFF FAULTS AND FOLLOW GUIDED DIAGNOSTICS FOR INACTIVE FAULT MID 130 PID 33 FMI 2 AND ALL CHECKED OUT O.K. COULD NOT GET MORE INFORMATION THRU GUIDED DIAGNOSTIC
OUGH TRANSMISSION ENGAGMENT AND EARLY UPSHIFTS. PULL DIAGNOSTIC CODES. FOUND MID 130 CODES PID 33 FMI 2 PPID 50 FMI 0 SPID 270FMI 8 PID 33 FMI 2. FOUND TWO AIR LEAKS TO CLUTCH CONTROL VALVE. F
T SHIFTING CORRECTLY AND NOT ALWAYS GOING INTO REVERSE. PULLED DIAGNOSTIC CODES. RAN UIGDED DIAGNOSTICS ON CODES MID 130 PID 33 FMI 2-33 INACTIVE MID 130 PPID 50 FMI 11-13 INACTIVE. REPLACED CL
INT FAULT CODE FROM VCADS REPAIR FOR FAULT CODE MID 130 PID 33 FMI 2. TROUBLESHOT FOUND CLUTCH OUT OF CALIBRATION. RECALIBRATE CLUTCH. NO COMMENT|? === APPLICABLE COVERAGES ===STD-00573:
Y TROUBLESHOT PRINT FAULT CODE FROM VCADS REPAIR FOR FAULT CODE MID 130 PID 33 FMI 2 FOUND CLUTCH CYLINDER POSITION OUT OF CALIBRATION RECALIBRATE CLUTCH CYLINDER. NO COMMENT|? === APPL
SURGED. NO PROBLEM FOUND. ROAD TEST TO TRY AND DUPLICATE COULD NOT. PULLED CODES INACTIVE MID130 PID33 FMI2 1 TIME MID130 PPID50 FMI11 1 TIME MID130 SID250 FMI9 1 TIME MID206 SID250 FFMI2 1 TIME
Y. MID130 PROGRAMMING. CHECK FOR CODES INACTIVE MID130 PID33 FMI2 16 TIMES MID128 SID230 FMI5 1 TIME MID130 SID250 FMI9 1 TIME. PERFORMED GUIDED DIAGNOSTICS NO TROUBLE FOUND. OPENED E-SERVICE
RK IN SHOP HOOK UP LAPTOP CK CODES FOUND MID 130- PID 33- FMI 2 INACTIVE 10 COUNTS. MID 130- PSID 26- FMI 11 INACTIVE 1 COUNT. FOLLOW TROUBLE SHOOTING STEPS FOR CODE PID 33 FMI 2 IN GUIDED DIAG
T GO INTO GEAR. HOOK UP LAPTOP CK CODES FOUND MID 130- PID 33- FMI 2 INACTIVE 10 COUNTS. MID 130- PSID 26- FMI 11 INACTIVE 1 COUNT. FOLLOW TROUBLE SHOOTING STEPS FOR CODE PID 33 FMI 2 IN GUIDED D
ON FAULT CODES.HOOKED UP AND PRINTED FAULT CODES MID 130 PID 33 FMI 2 MID 130 PPID 50FMI 11 AND MID 130 PSID 25 FMI 9 ALL INACTIVE. PERFORMED DIAGNOSTICS.RECALIBRATED THE TRANSMISSION TO CLUTCH.
S REPAIR.CHECKED CODES FOUND M130 PID33 FMI2 23 TIMES.PERFORMED GUIDED DIAGNOSTICS AND CHECKED ALL HARNESS CONNECTIONS.TEST DROVE TRUCK COULD NOT DUPLICATE COMPLAINT. STARTED E-SERVIC
VE MID130 PID33 FMI2 9X FOR CLUTCH CYLINDER POSITION ERRATIC PERFORMED CYLINDER TEST - PASSED RECALIBRATED CYLINDER CLEARED CODES ROADTESTED RECHECKED NO CODES RETURNED NO COMMEN
CLUTCH WILL NOT DISENGAGE.C: DEFECT IN TRANS CLUTCH PROGRAMING CAUSING FAULTS. ESERVICE 1-1469273551.C: READ FAULTS.THERE ARE 3 INACTIVE TRANNY FAULTS.MID 130 PID 33FMI 2 23 COUNTS. MID 130 PF
FOR GEARS AND AT TIMES IT WILL JUMP / LUNGE FORWARD. CHECKED FOR CODES. FOUND INACTIVE CODES MID130 PID33 FMI2 MID130 PID160 FMI1 MID130 PPID50 FMI11 MID130 PSID27 FMI8 MID130 PSID27 FMI14. CHE

DID GD AND TEST VOLTAGE AT THE SOLENOIDE AS P
:TED BREAKOUT BOX AND CHECK VOLTAGE BETWEEN PINS 11 AND
LE COVERAGES ===STD-00573: DEALER AUTO PAY LIMIT IS
:TED TO REPL TCU. REPL PROGRAMM TEC. ROAD TEST
 IS SATISFIEDAPPROVED TOTAL = 113.355PART AMOUNT
.IMIT IS SATISFIEDAPPROVED TOTAL = 113.355PART AM
PROVED TOTAL = 75.57PART AMOUNT = 0.0LABOR H
ATISFIEDAPPROVED TOTAL = 113.355PART AMOUNT = 0.
 IS SATISFIEDAPPROVED TOTAL = 113.355PART AMOUNT =
UNTS - PERFORMED ALL CLUTCH RELATED TESTS IN PTT - ALL
E#1-1289930913* SPOKE WITH KEN INSTRUCTED TO PERFORM CLUT
:==STD-00676: NULL=== AUTOPROCESS RESULT ===DECIS
IDER POSITION MID130 PPID50 FMI0 INACTIVE X 7 AND
EPORT VOLVO TECH SUPPORT REF CASE # 1-1464909671.****
 TROUBLESHOOT CODE. GO THROUGH STEPS - ALL READINGS GOOD. CA
:S FOR INACTIVE FAULT MID 130 PPID 50 FMI 11. CLEARED FAUL
REPLACE AIR FITTING ON CLUTCH CONTROL VALVE-REPLACE
LUTCH CONTROL VALVE. CLEARED CODES. CLUTCH PROBLEMS RE
 CLAIM LIMIT IS SATISFIEDAPPROVED TOTAL = 113.355PA
.ICABLE COVERAGES ===STD-00573: CLAIM LIMIT IS SATISFIE
E MID206 SID254 FMI4 1 TIME AND MID206 PSID6 FM
E CASE. COULD NOT DUPLICATE PROBLEM. REPROGRAMMED PER
 ALL CKS OK. CALL VOLVO TECH SUPPORT TALKED
DIAG ALL CKS OK. CALL VOLVO TECH SUPPORT T
 CLEARED CODES AND TEST DROVE TRANSMISSION WORK
:ECASE ADVISED TO CHECKED CONNECTION FOR CLUTCH CYL P
NT|NO COMMENT === APPLICABLE COVERAGES ===STD-00573: CLAIM LIM
PID 50 FMI 11 4 COUNTS MID 130 SID 250 FMI 9
ECKED TRUCK HISTORY. CLUTCH ACTUATOR AND CLUTCH

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1480701871

LVD%20Claims%20-Notification Letter CVU

VOLVO

Powertrain

Notification Letter

Date:	**Reg**:	**F-Group:**	**Issued by:**
2011-05-18	2011-4000-05	43	P. Arvidsson 24130

Classification:

	Internal information only
x	Recommended to inform Market Company etc.

Note: If your organisation's products are not concerned, consider this as information only

Replace old version of Clutch Valve Unit when fault code MID130 PID33 FMI2 is shown

Concerns:

For all vehicles with AMT-C and AMT-D

Complaint:

Jerking when starting or during gear shifting (fault code MID130 PID33 FMI2)

Cause:

Intermittent contact failure in the clutch control system

Correction:

In case of occurrence of fault code MID130 PID33 FMI2 together with following p/n: 21162036, 21301883 and 21146800 with break number from s/n 148004 (week 0849), and also p/n 21206430 and 21462376, please replace the CVU to the latest version available as spare part

Concerned Volvo Powertrain part numbers:

Part nr 21162036, 21301883 and 21146800 with break number from S/N **148004** (week 0849) and also 21206430 and 21462376

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1491230931

Design Decision 1-1491230931

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1[redacted]
-1491230931 CVU electric faults All Documents

Owner : [redacted]

I Like It Tags & Notes

Type	Name	Modified	Modified By
	Design Decision 1-1491230931	4/10/2013 10:32 AM	Säfblad Katarina
	RCA action list CVU el faults w1120	4/10/2013 10:32 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1491230931

Design Decision 1-1491230931

Design decision:

QJ-number: 1-1491230931 CVU - electric faults ; short circuit ; PWM valve malfunction
Date: 2011-03-15

Description of solution:

Secured production process for internal tightening of internal cables in CVU housing to avoid squeezed cables.

Secured production process for mounting O-ring gasket between housing and cover.

Moulding of connector to cable hose changed; PA cap removed, and tightness control introduced.

Free cable length between hose and connector adjusted to secure that cables will not reach surface of the moulding.

Aftermarket solution:

New parts replaces old.

New part numbers	Deleted part numbers
21710522	21206430
21712495	21462376
21712497	21146800

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1491230931

RCA%20action%20list%20CVU%20el%20faults%20w1120(1)

ROOT CAUSE ANALYSIS

Main system/component	RCA Team
CVU	J.Gartman, G.Eldeblad, A.Cikorska, F.Sjöqvist, L.Zetterstrand, M.Mäsak, E.Kjörling, T.Ohlsson, M.Wahlqvist

Top event	Issued by	QJ nr
Fault codes related to CVU valve malfunction	M.Wahlqvist	1-1491230931

No	CHAIN OF EVENT				ACTION/STATUS			
	Causes of failure level 1	**Causes of failure level 2**	**Causes of failure level 3**	**Causes of failure level 4**	**Actions and Comments**	**Created**	**Follow up**	**Ended**
1	Short cut/Open circuit				General comment: Secure that earlier assembly issues taken care of when Bosch production moved from Vagnhärad to Hungary (during 2011)	w1102	w1108	w1120
2		Corrosion due to moisture/Water ingress	Wrongly positioned CVU cover gasket	Assembly error	Containment action Bosch: 100% monitoring of gasket position and presence by "bladmått". 1) Follow up field claim situation after "bladmått" intro. 2) Bosch process audit.	w1102	w1104	w1104
3			Missing connector mould	Manuf. Error	Request 8D from Bosch and perform process audit. Filter on Köping and Japan to catch claims.	w1102	w1108	w1111
4			High water content in compressed air in combination with leakage pass valve o-ring	?	1) For vehicles with this symtoms, check if other repairs done which may indicate high water content in compressed air. No more cases at the moment w1107 2) Check possible differencies regarding compressor air cleaning between Japan/France vs markets with no/few claims w 1107: RT is treated separatly, different claims, will be taken out of this QJ	w1102	w1105	w1107
5			CVU washed when disassembled from gear box	?	Released, no warranty if washed when disassembled from gear box	w1104	w1105	
6		Squeezed cable between cable pass through and valve connections	Assembly error		Follow up claim frequency and causes after last CVU action implemented. w1107: Ongoing	w1102	w1108	w1111

VOLVO	ROOT CAUSE ANALYSIS							
Main system/component	RCA Team							
CVU	J.Gartman, G.Eldeblad, A.Cikorska, F.Sjöqvist, L.Zetterstrand, M.Mäsak, E.Kjörling, T.Ohlsson, M.Wahlqvist							
Top event					Issued by	QJ nr		
Fault codes related to CVU valve malfunction					M.Wahlqvist	1-1491230931		
No	CHAIN OF EVENT				ACTION/STATUS			
	Causes of failure level 1	**Causes of failure level 2**	**Causes of failure level 3**	**Causes of failure level 4**	**Actions and Comments**	**Created**	**Follow up**	**Ended**
		Waterintrusion	Waterintrusion through connector/harness	Wrong positioned (too long) harness when moulded.	Bosch changed supplier of harness w1020. Harness is shorter after w1020 and in direction of CVU. Bosch Serial production number 55532. Claims before or after w1020? w1107: 2 were produced after breakpoint w1020 Continue to follow up.	w1105	w1108	w1111
6		Corrosion due to moisture/Water ingress	Logistic and handling process in Japan	If logistic process can cause waterintrusion.	Analyse before and after gearbox is assemblied in Ageo. Climate, handling, logistics etc w1107 Vehicle shower test, Investigation needed if water gets into CVU. Follow up on Volvo-UD meetings on Wednesdays w1111 Vehicle shower test in production plus a more exposed CVU than other brands -> gives larger risk of water intrusion. RT is a bit more covered by chassi and VTC is minor	w1104	w1108	w1111
					Understanding of the UD truck air supply system, air drying insert, specification, functionality etc. needed - please send us info w1107: Info received		w1108	w1107
					Specification of the market specific characteristics: Terrain, climate, ambient temp, customer handling (frequent high pressure wash of the vehicles?) – can we compare the cases and understand circumstances of the water intrusion from outside?? w1107: Info received, more input w1108. w1111: Frequently washing of vehicle in UD gives higher risk of waterintrusion		w1108	w1111
	CVU with PMW valve malfunction				RT reports CVU with PMW valve malfunction. Material technology to analyse white residue in CVU. See link to Analysis of foreign substances in CVU's w1107: Presentation will be sent out. Mainly FeO and Zn.	w1105	w1108	w1108

VOLVO

ROOT CAUSE ANALYSIS

Main system/component	RCA Team
CVU	J.Gartman, G.Eldeblad, A.Cikorska, F.Sjöqvist, L.Zetterstrand, M.Mäsak, E.Kjörling, T.Ohlsson, M.Wahlqvist

Top event	Issued by	QJ nr
Fault codes related to CVU valve malfunction	M.Wahlqvist	1-1491230931

No	CHAIN OF EVENT				ACTION/STATUS			
	Causes of failure level 1	**Causes of failure level 2**	**Causes of failure level 3**	**Causes of failure level 4**	**Actions and Comments**	**Created**	**Follow up**	**Ended**

Participants	**w1102**	**w1104**	**w1105 (Containment action meeting)**	**w1107**	**w1109**	**w1111 DEC**	**w1113**	**w1117**
Jessica Gartman	x	x	x	x		separate notes	x	x
Fredrik Sjöqvist	x	x	x					
Lars Zetterstrand	x	x	x	x	x		x	
Magnus Mäsak	x							
Thomas Ohlsson	x	x					x	
Gunilla Eldeblad	x	x	x	x	x		x	x
Erik Kjörling	x	x	x	x				x
Magnus Wahlqvist	x			x				
Anna Cikorska		x	x	x				x
Wada Suguru			x	x				
Touichi Touya			x					
Kunihiro Kaneko			x					
Anders Sjöman			x	x				x
Lars-Olof Strand (Bosch)			x					
Leif Jansson (Bosch)			x	x				
Anders Dolk (Bosch)			x	x				
Lars-Erik Bergman				x	x		x	x
Kristian Gleisner Nadia Saniks from 4/4				x	x		x	x
Philip Andersson				x				
Daniel Bergstrand (istället för Philip A)								x

VOLVO

ROOT CAUSE ANALYSIS

Main system/component	RCA Team
CVU	J.Gartman, G.Eldeblad, A.Cikorska, F.Sjöqvist, L.Zetterstrand, M.Mäsak, E.Kjörling, T.Ohlsson, M.Wahlqvist

Top event	Issued by	QJ nr
Fault codes related to CVU valve malfunction	M.Wahlqvist	1-1491230931

No	CHAIN OF EVENT				ACTION/STATUS				
	Causes of failure level 1	**Causes of failure level 2**	**Causes of failure level 3**	**Causes of failure level 4**	**Actions and Comments**		**Created**	**Follow up**	**Ended**
	Tommy Lindberg								x
	Liselotte Riutta							x	x
	Bernt Myrberg								

Date	Issue
1/14/2010	1

Resp. Dept/Sign
Erik K
1) Anna C 2) Erik K
Erik K
1) Anna C 2) Lars Z contacts Urban Källdén (GCR (Thierry Saumet)
Jessica G
Anna C

Date	Issue
1/14/2010	1

Resp. Dept/Sign
Anna C
Anna C /Jessica G
Anna C Respons from Ageo
Anna C Respons from Ageo
Lars Z

Date	Issue
1/14/2010	1

Resp. Dept/Sign

w1118	w1119
	x
	x
	x
	x
	x

Date	Issue
1/14/2010	1

Resp. Dept/Sign	
	x

Result	Input info

Result	Input info

Result	Input info

w1120
x
x
x
x

Result	Input info
x	
x	

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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1491230955

QJ 1-1491230955

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 1 -1491230955 AMT MID130 PSID27 FMI8 - frequent occurrence in UD and VTNA trucks All Documents

[redacted] **Owner :** [redacted]

I Like It Tags & Notes

Type	Name	Modified	Modified By
	DEC QJ	4/10/2013 10:33 AM	Säfblad Katarina
	NLAMT-D	4/10/2013 10:33 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 1-1491230955

DEC QJ

QJ 1-1491230955 MID130 PSID27 FMI8 air leakage- frequent occurrence in UD and VTNA trucks

Problem description:

- Air leakage in the clutch system triggers PSID27 FMI 8 fault code

- When the gearlever is moved to neutral the TECU checks if the fault code can be reset.

- When the fault code is active the TECU take actions that could explain many complaints.

Product /customer: All vehicles with AMT-C/D gearbox UD, Renault, VTNA, VTC, VBC

Root cause: Airleakage due to CVU quality issues, GD needs to be updated

Recommendations/Solutions:

-Notification letter

-Update GD in order not to change components that are ok

-QJ CVU improvement

Containment action: none

Updated 2011-06-13

Current Activity and Status:

1. Notification letter in order to have claims when no fault: The system checks that the clutch disengagement valves not need to be used more than normal to hold the clutch in a disengaged position
2. Requirement specification for new air leakage test-rig, ready, w1124
3. GD updates will be ok w1124
4. W1124 decision if further activities for CVU and CCA in this QJ is needed.
5. QJ 1-1491230931 AMT-D, CVU MR w1125

	NEW	KOFF (INV)	DEC (DES)	REL (DCN)	SUP (PPAP)	SPS (OK)	MP (MR)
Locked plan (DEC)		W1050	w1113				w1124
55Current actualized plan	W1050	W1050	w1124				w1125

Customer effect	Customer came work to shop due to warning lamp turned on during a run.
QJ trigger	- UD: 9 reported cases ~ 1% - VTNA under investigation - VTC under investigation
Containment action	TBD
Recommended AM Strategy	TBD

1-1480701871 Jerking when starting or during gear shifting; vehicle don't engage any gear - MID130 PID33 FMI2

Problem description: Jerking when starting or during gear shifting; vehicle don't engage any gear

Product /customer: 20710519 among others, VTC

Root cause: TBD

Recommendations/Solutions: Update GD

Containment action: Old part nr for CVU, start with changing CVU

Updated 2011-06-14

Current Activity and Status:

1. Root-cause analysis ongoing
2. Testing of claimed sensors ongoing
3. Updates in GD, check all connectors for corrosion, tighter tolerances (4,5 – 5,5 V)
4. CCA sensor ASIC will be updated (SOP w1140)

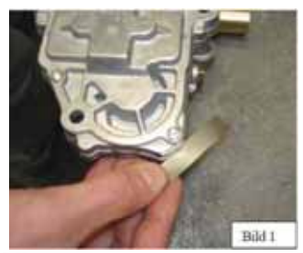
	NEW	KOFF (INV)	DEC (DES)	REL (DCN)	SUP (PPAP)	SPS (OK)	MP (MR)
Locked plan (DEC)		W1108	W1123	W1123	W1140	W1140	W1140
Current actualized plan	W	W1108	W1124	W1124	W	W	W1140

Customer effect	Jerking
QJ trigger	Image
Containment action	None
Recommended AM Strategy	Update GD

Design decision:

QJ-number: QJ 1-1491230955 MID130 PSID27 FMI8 air leakage- frequent occurrence in UD and VTNA trucks

Date: 2011-03-15



Description of solution:

-Notification letter in order to have claims when no fault: The system checks that the clutch disengagement valves not need to be used more than normal to hold the clutch in a disengaged position

-Update GD in order not to change components that are ok

-CVU improvements in QJ 1-1491230931 AMT-D, CVU MR w1125, see the pictures

Aftermarket solution:

Updated GD

New p/n on CVU on AM in QJ 1-1491230931 AMT-D, CVU

New part numbers	Deleted part numbers

Design decision:

QJ-number: **1-1480701871 Jerking when starting or during gear shifting; vehicle don't engage any gear - MID130 PID33 FMI2**

Date: 2011-06-14

Description of solution:

-Notification letter sent out to change the old version of the CVU

-Update GD in order to check for corrosion in contacts for CVU, CCA and GCU

-Update GD, tighter tolerances (4.75V-5.25V)

-CVU improvements in QJ 1-1491230931 AMT-D, CVU MR w1125, see the pictures

Aftermarket solution:

Updated GD

Notification letter 2011-4000-05 sent out

New part numbers	Deleted part numbers

Business case

- Link to xl-sheet --
- Business case summary: No investment or increased product cost.

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VOLVO TRUCK

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QUESTION 9

QJ 1-1491230955

NLAMT-D

VOLVO

Powertrain

Notification Letter

Date:	**Reg**:	**F-Group:**	**Issued by:**
2011-02-28	2011-4000-03	43	P. Arvidsson 24130

Classification:

	Internal information only
x	Recommended to inform Market Company etc.

Note: If your organisation's products are not concerned, consider this as information only

AMT-D air leakage with fault code MID 130 PSID 27 FMI 8

Concerns:

Vehicles trucks with AMT-D transmission, mainly UD and VTNA

Complaint:

Fault code MID 130 PSID 27 FMI 8 displayed.
The system checks that the clutch disengagement valves not need to be used more than normal to hold the clutch in a disengaged position.

Cause:

Probable cause:

- Leakage out from the clutch system (CCA or CVU)
- Problem to activate the disengagement valves

Other factors:

There is a increased risk to set the fault code when:

- The air supply pressure to the transmission is low
- In cold conditions

TECU actions when the fault code is active:

- The gear is put in neutral when the vehicle is stopped
- A forward or reverse gear is then not engaged until the driver applies the accelerator pedal.

Symptoms:

Due to TECU actions when fault active:

- Gear is not engaged until the accelerator pedal is depressed (delayed take-off)
- Gear is put in neutral when the vehicle is stopped

Due to possible leakage:

- Harsh start
- Harsh shifting
- Slow shifting
- Clutch not disengaging when slowing down

Correction:

Deactivate conditions:

- Each time gearlever neutral is entered a sequence is run to check if the system is OK and thus PSID27 FMI 8 can be changed to inactive.

If PSDI27 FMI 8 is active:

- Use the below sequence to initiate a check if the system is ok and to check if the fault code could be changed to inactive status:
- Start the engine and wait to get enough air supply pressure
- Move gearlever to Drive and then back to Neutral
- Wait at least 15 s
- If the check is interrupted or fails the gearlever first have to be moved from Neutral and then back to start the check again

PSID 27 FMI 8 becomes inactive:

- Avoid moving the gearlever from neutral before you are ready to take-off, especially with low air supply pressure or in cold conditions.
- Do not leave the driver seat without both applying the parking brake and moving the gearlever to neutral.

PSID 27 FMI 8 remains active or is set multiple times:

- Bring the truck to workshop for fault tracing or repair.

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 431-698

QJ 431-698

maintenance-site-vpt ▸ Driveline - Active Issues... QJ 431-698 AMT cylinder (clutch) worn guiding strips

All Documents

[redacted] **Owner :** [redacted]

I Like It Tags & Notes

Type	Name	Modified	Modified By
	Design Changes on the CCA	4/10/2013 10:36 AM	Säfblad Katarina
	QJ 431-698	4/10/2013 10:36 AM	Säfblad Katarina

Add document

PE13-002

VOLVO TRUCK

5/1/2013

QUESTION 9

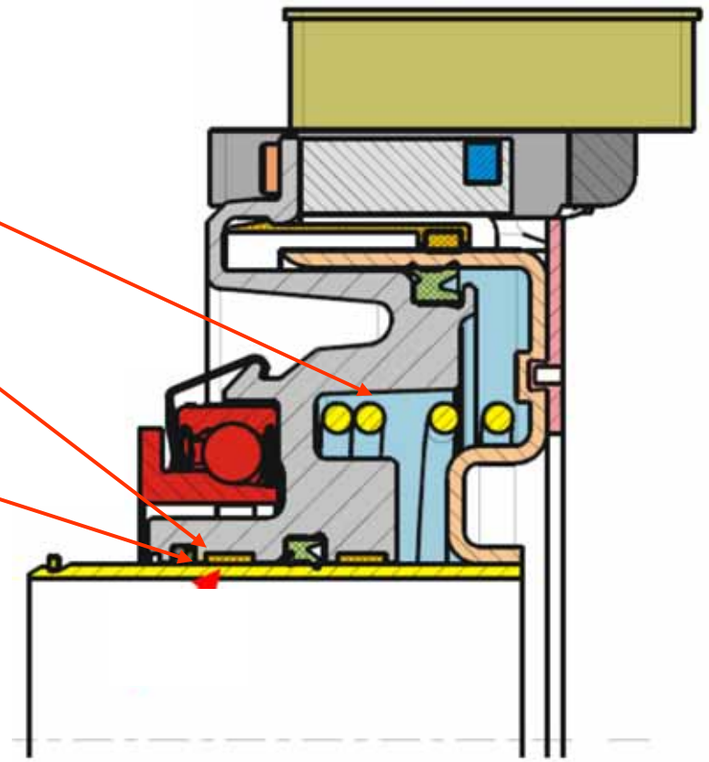
QJ 431-698

Design Changes on the CCA

Design Changes on the CCA, preventive actions after field monitoring

- **Short term design changes (introduced July 2008):**
  - Lower force pre-load spring for the 38mm-CCA
  - Broader Engine side guiding stripe (from 9,5 mm to 13,5 mm)

- **Mid-term design changes (planned for introduction January 2009):**
  - Change of material of the guiding stripes (from PTFE to H1)
  - New pre-load spring for both the 30mm and 38mm stroke CCAs (change of pre-load from 360 N to 150 N).



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VOLVO TRUCK

5/1/2013

QUESTION 9

QJ 431-698

QJ%20431-698

Quality Journal Item

General Information

QJ ID	QJS_TRUCKS_431-698
QJ Description	AMT cylinder (clutch) worn guiding strips
Root Cause Description	Unknown
Root Cause Responsibility	QJS_TRUCKS; Supplier design
Fault Frequency (%)	0

Classification	GOT_TRANSM
Order No	Unknown
Previous QJ Id	QJS_TRUCKS_-

C-Value

N-Value	20
Ntot-Value	1000
F-Value	3
S-Value	4
M-Value	1
C-Value	37.02
Warranty Rep Cost (EUR)	
Unplanned Stop	NO

OCTL N-Value	10
OCTL Ntot-Value	55700
OCTL F-Value	3
OCTL S-Value	2
OCTL M-Value	1
OCTL C-Value	18.50
OCTL Warranty Rep Cost (EUR)	
OCTL Unplanned Stop	NO

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Quality Journal Item

Problem Description and Investigation

QJ Problem Description	Wear on the guiding stripes inside the cylinder
QJ Investigation	Unknown

MQR Importer No	Affected Plant	Chassis Types	Variant	Causing Part No	Related Part No	Protus No
1000-551		FH (13 L)	AT2412C	20806451		
1610-1398		FM (13 L)	AT2512C	20806452		
7830-1343		Magnum	AT2812C	20812087		
1275-1050		Premium	ATO2512C			
			ATO3112C			

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Quality Journal Item

Responsible

Action By	Unknown
Initiated By Name : Dept	Unknown : Unknown
Case Manager/VMT QM	Katarina Säfblad
Item Owner	QJS_TRUCKS; Unknown
Solving Responsible	Gunilla Eldeblad

Vehicle Module Team
VMT060 : Transmission

Action Plan

Actual Status	MR	0912

	NEW	**INV**	**DES**	**DCN**	**OK**	**MR**	**FU**
Planned		0850	0850	0850	0912	0912	
Actual	0849	0850	0850	0850	0912	0912	

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Quality Journal Item

Next Meeting	
Follow Up Issue	Unknown
Action Plan Type	EU

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Quality Journal Item

Documentation of Solution

New Part No	DCN	Plant : Chassis Id/Serial No : Date	Defect Code : Fault Red
21320923	D-13888-20	A GBG : 688682 :	
21320924	K-10991-59	B BELGIUM : 547589 : 0914	
21320929			

QJ Solution

Description : Detailed Information : Verification
Unknown : Design improvements on the clutch cylinder (CCA) are needed in order to decrease/minimize the wear on the guiding stripes inside the CCA. Design changes include change of material for the stripes, and also a pre-load spring with a lower force (this to give lower wear on the stripes). The stripes are also made broader. : Unknown

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Quality Journal Item

QJ Internal

History
Created by: t053866, Katarina Säfblad on 2009-03-20 15:14:33 Last modified by: t053866, Katarina Säfblad on 2009-04-01 10:14:07
J38LF 000078 RT break point
Created by: T0C4806, Gunilla Eldeblad on 2009-03-20 14:03:16 Last modified by: T0C4806, Gunilla Eldeblad on 2009-03-20 14:03:16
Breakpoints PN 21320923 Plant 01 = 688682 Plant 02 = 547589 Plant 22 = 000078 Plant 80 = 134434 Göteborg Export = 887005 PN 21320924 Plant 01 = 688834 21320929 N/A
Created by: T0C4806, Gunilla Eldeblad on 2008-12-11 12:49:49 Last modified by: T0C4806, Gunilla Eldeblad on 2008-12-12 06:35:33

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Quality Journal Item

Kick-off meeting 2008-12-11

Participants:
Gunilla Eldeblad
Sami Aho
Ivana Trogrlic
Katarina Säfblad
Marie-Louise Andersson
Jim Larsson
Anders Sjöman

QJ-Team:
PMQ: Gunilla Eldeblad
Design responsible: Fredrik Sjöqvist
Parts responsible: Ivana Trogrlic
Production responsible: Anders Sjöman
Service responsible VTC: Christer Gustavsson/Björn Jonsson
Service responsible VBC: Mats Gustavsson
Purchasing responsible: Astrid Jonsson
Case manager: Katarina Säfblad

Account number: 4704-0384
Object number: N/A, DCN released with Q3-74569

Notes:
Improvements to decrease the wear on the guiding stripes have
been taken care in factory report F74569.
The stripes will be made broader and in another material.
A pre-load spring with a lower force will be implemented and that
will give us lower wear on the stripes.
No cost impact on part price and no tooling cost.

See uploaded document, please

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Quality Journal Item

□Design changes on the CCA, preventive actions□

Stock at Parts and scrap cost:

PN	Warehouse	Dealer	Scrap cost
20806451	84	123	360.180:-sek
20806452	16	10	54.444:-sek
20812087	28		56.000:-sek

Approx. sales/months: 20806451 ≈ 80 pce, 20806452 ≈ 8 pce

No short term solution is available.

Design Decision:
The design changes that have been done in Protus F74569 are approved in the QJ-team as solution for this QJ-item.

Stock proceeding:
Parts, Supplier, Production = use up

Actions:
- Decide the MR-criteria, 3 different PN with stock proceeding use-up. Resp. Katarina, w.851
- Discuss the lead-time for all part-numbers with supplier. Resp. Astrid, w.851

Created by: t053866, Katarina Säfblad on 2008-12-08 12:25:31
Last modified by: t053866, Katarina Säfblad on 2008-12-08 12:25:31

PRE QJ check list added

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Quality Journal Item

Created by: t053866, Katarina Säfblad on 2008-12-03 09:00:41
Last modified by: t053866, Katarina Säfblad on 2008-12-03 09:00:41

New QJ item opened on improvements that will be introduced on the CCA.
Important is that we clarify what this change will do.
One MQR reported with this problem .

Team
Fredrik S
Purchaser
Ivana
Technical service VTC & VBC
Jim
Lena H

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Quality Journal Item

QJ External

QJ External
New parts introduced in the gerabox plant. Chassis id from week 0913 to 0914, depending on specification. Parts available. Item is market ready

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Quality Journal Item

Attachments

Type	Filename	Size (KB)
ppt	Kick-off meeting agenda 431-698.ppt	26.5
xls	Pre QJ check list QJ 431.698.xls	17.5
ppt	Design Changes on the CCA, preventive actions.ppt	120.5

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