Andhra Pradesh State Road Transport Corporation

Office of the Managing Director, Bus Bhavan, Hyderabad – 500 624.

No: OP2/462(4)/2011-MED

# CIRCULAR NO: 14/2011-MED, Dt.03.05.2011

Sub: **PERFORMANCE** - Comprehensive guidelines on improvement of key Mechanical parameters at Depots – Reg.

A well maintained healthy Bus is the prerequisite for efficient operation of Services and to attract the customers in the present competitive environment. There is no need to reiterate that the profitability of our organization depends upon the Occupancy Ratio that we achieve by offering the best services to the passengers. Improving OR alone would not suffice to survive financially if the expenditure is not contained to the optimum level. Unless efforts are made to operate our services with the minimum possible expenditure, it is difficult to realize good profits. Therefore it is highly essential to improve the key MED parameters like HSD KMPL, Lub KMPL, Spring consumption, Breakdown rate, Cancellation of Kms due to Mechanical reasons and Tyre performance etc. With a view to guide the Depot Managers and Maintenance incharges on improvement of the above parameters, the following comprehensive guidelines are issued.

1.00 **HSD KMPL**: Corporation spends about Rs.1845 crores per annum on HSD oil. The expenditure on fuel has become a major concern in view of high volatility in oil prices. This is one of the most upsetting factors in profitability of the corporation. There is no other means but to improve the fuel efficiency to compensate the price hike. More focus is needed on improving HSD kmpl parameter because an improvement of 0.01 kmpl saves about Rs.3.00 crores to the Corporation per annum. Exercising proper Technical, Operational & Managerial controls with true spirit will give the best results in this area.

1.01 **TECHNICAL CONTROLS**:

a) Monthly Low KMPL vehicles: Identification of monthly 10% of low KMPL vehicles (or minimum of 10 vehicles) based on route-wise kmpl targets by 1st of every month. (The list is generated by VEMAS)

KMPL Mechanic has to inspect the vehicles thoroughly as per the checklist and rectify the defects. Attention of identified vehicles shall be completed by 10th of the month and record the observations and work done in the Register (as per Annexure-A of Cir-19/07-MED). The performance of the vehicles after attention shall be monitored duly posting the data in the register (as per Annexure-B of Cir-19/07-MED).

b) Monthly Negative Trend Vehicles: Take the list of 10% or minimum of 10 negative trend vehicles on the 1st day of the month (report is generated by VEMAS). Check the vehicles thoroughly and identify the reasons for drop in kmpl compared to previous month. Take timely corrective action to prevent fall in kmpl. This work shall be completed by the 1st week of the month by KMPL Mechanic. The identification and attention particulars of negative trend vehicles shall be recorded in a separate register as per the format shown at annexure 'D' of Cir No.19/07-MED

c) Daily Low KMPL vehicles: Identify a minimum of 5 Low KMPL vehicles everyday and take up for attention during Sch-I/II maintenance

**1.02 MANAGERIAL CONTROLS:**

a) KMPL Pocket Books: Provide KMPL Pocket books to all Drivers and insist for regular posting of books

b) Monthly Low KMPL/ Negative trend Drivers: Identify at least 20 absolute Low performance Drivers based on Route-wise/ type-wise targets and 20 negative trend drivers (compared to previous month) by 1st of Every month (Based on the report generated by VEMAS).

c) Counseling: DM shall counsel all the identified drivers by 10th of the Month. The counseling particulars shall be recorded in the register as per the proforma shown at Annexure-E (Low KMPL) & Annexure-H (Negative trend) of Cir 19/07-MED. At the end of the month, the progress made by the Drivers after counseling has to be reviewed.

d) Daily Low KMPL Drivers: Daily low KMPL Drivers shall be identified through the report generated along with challan every day. The Maintenance In-charge has to counsel these drivers on daily basis. The proforma to be used for recording the counseling particulars of daily low KMPL Drivers is prescribed at Annexure- 'G' of Cir 19/07-MED.

e) Training by SDI: The Drivers not showing improvement after counseling by DM in the previous month shall be taken up for training by SDI. The SDI shall also take up other low kmpl drivers as identified by DM. In all, SDI shall train at least 20 drivers in every month.

The details of training imparted by the SDI along with the KMPL of tranined drivers at the end of the month shall be recorded in a register as per the format given at Annexure-'F' of Cir 19/07-MED. Depot Manager and Maintenance In-charge shall closely monitor and review the work carried out by SDI.

f) Training by PJDI: The Dy CME of the Region shall organize the training to Drivers by PJDI based on the annual fuel performance of Drivers of the Depot. The Drivers figuring with low KMPL for the entire year shall be selected for training. The PJDI shall also focus on training of Drivers operating long distance/TIMS/ interstate services, which will have impact on the KMPL of the Depot.

g) TRAINING AT ZSTC - The drivers who continue to perform low in KMPL even after training by SDI and PJDI have to be deputed to ZSTC for training. Low KMPL drivers should be sent to ZSTCs for training for " 2nd and 3rd " time without paying wages for the period of training if they fail to improve after attending 1st training.

h) Master Register – The master register which contains details of KMPL, Accidents, Damages (Body, Springs, Tyres etc.) of each Driver shall be maintained with regular postings. This register can be used for recording the dates of counseling by DM, training by SDI/PJDI/ZSTC etc which can be treated as basis for initiating disciplinary action against the Drivers who fails to improve their performance even after repeated counseling and training.

i) FIXING OF BENCH MARK KMPL FOR ROUTES - Every year during January (preferably during oil conservation fortnight), the route wise benchmark HSD KMPL may be arrived using good KMPL drivers and displayed at the dispensing pump as envisaged in the Circular no.23/MED.DT.24.08.2001.

1.03 **OPERATIONAL CONTROLS**:

a) Advocate the drivers to practice Momentum mode driving by using Prototype simulator. Use "Indhanam" CD to educate the drivers on PJ Driving.

b) Provide accelerator pedals in correct position (at 45°), proper foot rests and ensure proper working condition of RPM meters.

1.04 **MOTIVATIONAL MEASURES**:

a) Present the cash awards every month (Rs 500/- and Rs300/-) to the highest oil saved drivers, display the names of monthly and daily high and low KMPL Drivers at oil bunk, display the names of best KMPL Drivers of the previous year at prominent place.
b) Encourage staff on achieving annual Cash incentives (ranging from Rs.50,000/- to Rs.1,50,000/- based on fleet strength) by achieving the Revenue HSD KMPL target.
c) Display the magnified photographs of Depot Drivers receiving awards from VIPs at Awards presentation ceremony organized by Corporate Office during oil conservation fortnight.

2.00 **LUB KMPL**: Corporation spends about Rs.38.00 Crores per annum on Lubricants. Conservation of all types of Lubricating oils including Gear oil, ATF oil is highly essential to reduce expenditure. Leakage of oil is one of the common causes for high consumption of Lubricating oils.

a) Proper care shall be taken to ensure correct length of engine oil dip sticks and see that oil level is always maintained in between maximum & minimum mark.
b) Engine should never be allowed to operate with oil level below the minimum mark
c) Engine oil level should be checked only after giving sufficient time for settling i.e, after completion of vehicle maintenance.
d) Always use filling cans of 1/4th & ½ Ltr capacity only for topping of engine oil.
e) Proper care shall be taken to avoid contamination of different grades of oil while filling.

f) Cleanliness of containers used for filling oil is of utmost importance.
g) Vehicles consuming more engine oil shall be identified based on the top-up kmpl generated by VEMAS reports
h) The identified vehicles shall be checked thoroughly and taken up for necessary action like Top Overhaul, Engine Change etc.
i) Negative trend vehicles shall also be taken for attention even if their top-up kmpl is higher than low lub kmpl vehicles.
j) Engine shall be thoroughly washed/cleaned and kept under idling for some time to identify the leakages
k) Engines shall never be allowed to run with starvation of Engine oil or delayed engine oil changes for the sake of Lub kmpl.
l) Never entertain wrong practices to boost up the Lub kmpl
m) Always use Base oil for Air Cleaners and Monograde RC oil for top-up wherever applicable.
n) Refer the following Circulars on Lub KMPL improvement:
   - Circular No : 40/92-MED, Dt.04-08-1992
   - Circular No : 02/94-MED, Dt.12-01-1994
   - Circular No : 10/96-MED, Dt.09-05-1996
   - Circular No : 07/99-MED, Dt.06-04-1999
   - Circular No : 16/99-MED, Dt.06-05-1999

2.01 ENGINE OIL LEAKAGES: Excess consumption of Lub oil towards top-up is mainly on account of leakages **both internal & external.** The following steps shall be taken to avoid engine oil leakages

a) EXTERNAL LEAKAGES: The root cause for external leakage of engine oil is **choked breathers**. The leakage of engine oil if not prevented in time affects the Engine life & performance drastically.

   – Ensure tightness of all fasteners like Sump bolts, timing case cover bolts, FIP mounting bolts, Valve cover bolts, Cooler mounting bolts, Filter mounting bolts etc.
   – Replace the worn out & perished oil seals/ gaskets during preventive maintenance schedules

b) INTERNAL LEAKAGES: The engine oil leakage also takes place internally through **engine blow-by** and seepage through **worn out valve guides** and **guide seals**. **In Tata 697** engines, there is chance for engine oil to seep into the air intake through the **valve cover gasket** which separates the air intake and rocker chamber. The following steps shall be taken to arrest internal leakages.

   – Replace the **worn out Air Compressor piston rings** in right time
   – Check the Internal leakage through the worn out **shaft seals in Turbocharger. (Chocked Air filters also lead to seepage of Engine oil from shaft seals)**
   – Do not allow the engine to run in blow-by condition due to worn out piston rings & cylinder liners.

- Avoid entry of unfiltered air into the Engine through the defective Air filters/ Air intake system which is the main cause for premature blow-by. Ensure working condition of Red band Indicator wherever provided.
- Maintain proper cooling system to avoid overheating of engine which otherwise may contribute to faster wear of piston rings & liners.
- Carry out Compression test to know the engine blow-by
- Carry out Engine Top-overhaul at appropriate time (New engine at 3.00 to 3.5 lakh kms and C.O. engine at 1.00 to 1.50 lakh kms) to avoid excess engine oil consumption and extensive damage to engine components
- Replace the sump gaskets, Cylinder Head Gaskets, Valve Cover gaskets etc along with piston rings during T.O.

c) CRANK CASE DILUTION: Never allow the engines to operate with "Crank Case Dilution", which not only necessitates replacement of entire engine oil but also causes severe damage to the engine.
- Take timely action on defects like Injector Dribbling, Barrel leak in FIP, Feed pump shaft seal leak (integral lubricated) and Injector pipe/ leak-off pipe leakage in 697 model engines to avoid CCD.

3.00 **CONTROL OF BREAKDOWNS**: Prevention of Breakdowns is one area which if neglected, not only results in pecuniary loss to the Corporation but also leads to loosing patronage of the commuters. Therefore, the stoppage of vehicle on road due to mechanical failures rendering the vehicle immobile or discontinuation of further journey is a most undesirable phenomenon

3.01 Analysis & Review : ***Proper analysis/review*** plays major role in taking corrective action for prevention of breakdowns. Each breakdown ***shall be analyzed in a diagnostic manner*** to identify the root cause for failure. The causes for breakdowns can be classified into three categories viz., ***Human negligence***, ***material fault***, ***process/system deficiencies***.

Quality of Sch-III/IV maintenance and ensuing no backlog, use of Vehicle Back History Register will help to reduce Breakdowns and micro analysis of Breakdowns

A careful analysis is therefore required to identify the actual cause of failure to take corrective action. The measures to be taken for prevention of breakdowns which occur more frequently are furnished below.

3.02 Steps to avoid Air lock failures

i. ***Proper Clamping of fuel hoses*** to ***avoid rubbing*** with other chassis parts.
ii. ***Cleaning of HSD oil tank*** & ***strainer*** during Sch.IV maintenance
iii. Replacement of ***fuel filters at stipulated interval***
iv. ***Cleaning of Fuel Strainer*** (baby filter) at prescribed mileage
v. ***Draining of water*** from Fuel-Water Separator
vi. ***Replacing Feed pump valves/ overflow valves*** as per Cir No ***15/2005-MED***

vii. ***Implement the instructions issued through the following Circulars on Fuel system maintenance***

- **11/2009**-MED, Date: 26-06-2009,
- **16/2007**-MED, Dt 23-07-2007,
- **Lr.No.OP3/463(7)/06**-MED, 26.02.2007,
- **15/2006**-MED, Dt.24-11-2006,
- **19/92**-MED., Dt. 08-05-1992,
- **18/92**-MED., Dt. 8-05-1992,
- **54/1992** MED., Dt. 05-11-1992

3.03 Steps to avoid Engine breakdowns

a) ***Ensure timely replacement of Engines based on the condition/ performance***.
b) ***Carry out top-overhauls*** as per the Circulars ***54/91-MED & 40/92-MED***
c) Do not ***allow the vehicles to run in overheating*** condition.
d) Always maintain correct engine oil level. Never run the engine with CCD
e) Ensure ***cylinder head nuts tightening during Sch.III/IV***.
f) ***Take timely action on arresting engine oil leakages*** and ensure ***proper maintenance of Air intake system***
g) ***Refer the instructions issued through the following circulars***.

- **13/2009**-MED dt.27.06.2009
- **23/2008**-MED, Dt. 29.09.2008
- **18/2007**-MED, Dt.06/09/2007
- **3/2000**-MED, Dated 29.2.2000
- **64/1992** MED., Dt. 22 12 1992
- **40/92**-MED., Dt. 04 08 1992
- **54/1992** MED., Dt. 05-11-1992
- **35/91**-MED., Dt. 28 9 1991
- **54/91**-MED., Dt. 9-12-1991

3.04 Steps to avoid Cooling system failures

a) Check for the following defects on vehicles and rectify them promptly to avoid Water boiling failures
   - ***Loss of Coolant due to leakage in the system***
   - ***Incorrect mixing of coolant additive***
   - ***Choked Radiator tubes, fins and engine water jackets due to neglected flushing, dust accumulation between Radiator and Intercooler, malfunctioning of Viscous fan***
   - ***Missing/ non-fitment of Fan shroud***
   - ***Malfunctioning of thermostat***
   - ***Faulty fuel injection system & timing***
   - ***Defective water pump***
b) Ensure proper Lubrication of Water pump bearings (wherever applicable) to avoid water pump failures.
c) ***Replace the defective Water pump*** assembly immediately on noticing the defect.

d) ***Thoroughly inspect the fan belts*** condition. ***Do not Overtighten fan belts*** . Never allow ***Mixing of old & new fan belts*** in the ***Tata*** twin belt system.
e) Replace the ***damaged and uneven water pump pulleys***.
f) ***Check for Defective Alternator bearings*** and ***Belt tensioners***
g) ***Inspect the condition of all rubber hoses*** & ***hose clamps*** during the preventive maintenance schedules and replace if necessary
h) Always ensure fitment of ***correct size hoses*** and avoid ***fouling of hoses with other parts***.
i) Implement the ***guidelines*** issued on proper maintenance of cooling system vide ***Cir No. 18/2007-MED***

3.05 Steps to avoid clutch failures

a) ***Ensure Correct setting of clutch free play*** (using ***Z' gauge*** in Leyland) at the time of replacing clutch disk/ pressure plate
b) ***Check and replace worn out release bearing sleeves, Muff liner, Withdrawal plate, operating lever*** etc during sch.IV
c) ***Ensure provision of lubricating pipes*** and ***regular greasing to release bearings & Clutch operating lever (wherever applicable)***
d) ***Check and replace*** worn out ***flywheel face plate/ flywheel assy, pressure plate assy and clutch disc*** during sch.IV
e) ***Lubricate the linkages*** during every sch.II
f) ***Replace Clutch Mater Cylinder/ Slave cylinder*** kits at every 75,000 kms
g) ***Check and replenish Clutch fluid*** everyday
h) ***Counsel the Drivers on clutch riding***.
i) ***Ensure implementation of the following circular instructions***
   - **15/2002**-MED, DT. 18-10-2002,
   - **02/2000**-MED, Dated 24.01.2000,
   - **27/99**-MED, DT. 06.09.1999.,
   - **19/2009**-MED, Dated: 20-08-2009,
   - **19/2002**-MED, DT. 17-12-2002,
   - **54/1992** MED., Dt. 05-11-1992

3.06 Steps to avoid Gear system failures

a) ***Common failures in Gear boxes*** are ***Gear Struck ups***. Negligence in ***inspecting the top-cover assy*** during every Sch.IV maintenance for ***worn out shifting forks, shifter rods, selector dogs*** etc results in gear struck up.
b) In Tata, check for ***Mini-top shifting finger*** condition and replace if necessary during sch.IV.
c) In Leyland, ***tighten the half lever assy*** mounting bolts during every sch-I
d) ***Arrest the play in remote gear shifting linkages*** and ensure proper ***tightening of gear lever bed bolts*** in Tata.
e) ***Educate the Drivers on proper gear engagement*** particularly in ***Leyland area***

3.07 Steps to avoid Propeller Shaft failures

a) ***Ensure proper lubrication and fitment of dust seals*** to avoid excess play in splines, UJ Crosses and center joint bearings. Provide Grease nipples to all points.
b) ***Never allow mis-alignment of PP shafts***. ***Mis alignment of PP shafts***, ***heavily worn out UJ crosses*** & ***CJ Bearings*** and ***loose foundation bolts*** lead to ***breakage of CJ Iron brackets*** and ***Rubber bed*** failures.
c) ***Check and replace*** the ***worn out rubber beds*** & ***UJ Crosses in time***
d) Do not ***use non-recommended and uneven size bolts/nuts*** for Coupling flanges. Ensure proper tightening during sch-I Maintenance
e) ***Check and tighten CJ check nuts regularly***.
f) ***Refer the following circulars on PP shaft maintenance***
   - **15/2006**-MED, Dt.24-11-2006 &**17/2000**-MED, Dated 24.05.2000
   - **02/2004** - MED DT.08.01.04
   - **54/1992** MED., Dt. 05-11-1992
   - **52/91**-MED., Dt. 9 12 1991
   - **6/99**-MED, DT. 19.02.99
   - **28/91**-MED., Dt. 14 8 1991

3.08 Steps to avoid Rear Axle failures

a) ***Inspect the condition of Crown-pinion*** assembly and ***adjust backlash/ thrust pads*** during sch.IV maintenance
b) ***Avoid gear oil leakages***, ensure proper ***cleaning of breather and tightness of Pinion flange check nut*** during scheduled maintenance
c) ***Check & replace the worn out axle shafts***.
d) ***Tighten the Axle studs and nuts of Leyland vehicles during Sch-I***

3.09 Steps to avoid Brake system failures

***a)*** The failures on account of Air leakages

- ***Change the FC kits religiously*** as per the cir.No ***29/2003-MED*** to avoid leakage from broken rubber hoses & other rubber items
- Ensure ***proper clamping to the Air pipe lines*** to avoid fouling with other chassis parts and consequential failure of metal pipes/ Polyamide pipes.
- Take proper ***care to avoid damage to the polyamide pipes*** by the ***weld spatter*** at the time of welding
- Refer ***Circular No. 16/2005-MED to identify and arrest Air leakages***.

b) AC Head Failures

- ***Carbon deposits*** on the AC head valves due to ***oil throw from the worn out AC piston rings*** is the main reason for AC Head failure.
- Check the condition of reed valves ***during FC*** and Decarbonize the AC Head
- ***Replace Air Compressor Assy once in 2 years***.
- ***Always ensure fitment of AC Suction hose*** to avoid entry of dirt/ foreign particles into the Valves.

c) Foundation Brake Failures:

- The common failure in foundation brake systems is Brake jam which occurs mainly due to ***incorrect setting of drum-liner clearance***, ***Mis-matching of Drum & liner***, ***defective slack adjusters/ S'cam shafts***, ***rollers/pins*** and ***shoe return springs***.
- ***Replace defective/ sagged shoe return springs***. (Replace at the time of liner change)
- ***Always match the rivets with liner hole contour*** (countersunk & Plain head rivets) at the time of fixing the liner to the brake shoes
- ***Follow correct riveting procedure*** (riveting sequence) & avoid ***excess hammering*** of rivets which otherwise may lead to the failure of brake liner rivets.
- ***Check for unevenness of shoe surface***, clean the ***dirt/dust in between the shoe and liner***.

d) Refer the following circulars on Brake System maintenance

- **21/2009**-MED, Dt 11.09.2009 on ensuring proper connections between DB Valve & Relay valve
- **10/2009**-MED, Date: 11.06.2009 on latest model Ashok Leyland Brake linings
- **29/2009-MED**, Dt 24.12.2009 on features & maintenance of brake system in Tata SLF vehicles
- **27/2009-MED**, Dt 17.11.2009 on features & maintenance of brake system in Ashok Leyland SLF vehicles
- **17 / 2008** – MED Dt.16.07.2008 on features and maintenance of Automatic slack adjuster
- **20/ 2007**-MED, Dt.11-10-2007 on features & maintenance of DDU, Relay valve, Polyamide pipes.
- **29/2003-MED**, Dt.11.08.2003, Cir No.**20/97**-MED.Dt.20.09.97 & Cir No.**14/96**-MED. Dt:7.6.96 on Brake maintenance during FC attention
- **23/2003**-MED, Dt.07.07.2003 on maintenance of Hand brake system
- **17 / 2003** - MED, Dated 5.06.2003 on method of tapping of air for horn, wiper
- **14/2000**-MED, Dated 3.5.2000 on features of modified brake drums Ashok Leyland
- **16/97**-MED. Dt.03.07.97 on the features of Automotive Axles in Ashok Leyland
- **15/96**-MED Dt:7.6.96 guidelines on Brake Drum-Liner matching
- **8/96**-MED, Dt.22.3.96 on maintenance of Tata Foundation brake system
- **9/96**-MED. Dt.22.3.96. on maintenance of Leyland foundation brake
- **5/95**-MED., Dt 15.3.95 on usage of proper brake lining rivets
- **59/91**-MED., Dt.28-12-1991. 42/1993 MED., Dt. 12 10 1993. on Tata full air brake maintenance
- **7/1993** MED., Dt. 20 02 1993. on Leyland brake maintenance

3.10 Steps to avoid Electrical system failures

a) ***Long cranking*** & ***cranking when the gears engaged causes severe damage*** to the Self Starter components and enroute failures
b) ***Non usage of Self starter push buttons*** for cranking causes pinion damages due to ***pinion running with flywheel*** after starting.
c) Strictly avoid ***Hitting of Starter body*** in the Axial starters for cranking
d) Check and replace the ***fly wheel ring gear*** during Sch.IV maintenance to avoid Starter pinion failures
e) ***Carry out Self Starter maintenance during Sch.III***/IV maintenance
f) Ensure ***correct Fan belt tension*** and proper tightness in ***alternator foundation*** during sch-II maintenance to avoid ***alternator bearing failures***.
g) Ensure ***correct polarity during battery replacement***
h) ***Remove battery cables at the time of welding*** to prevent regulator failures
i) ***Avoid loose wiring, exposure of bare joints without insulation and use of fuses other than recommended rating***
j) ***Refer the following circulars on Electrical maintenance***
   - **16/2007**-MED, Dt 23-07-2007 on wiring harness maintenance of Tata BS-II vehicles
   - **14/83**-MED Dated 1-7-1983 on maintenance Electrical systems
   - **26/1993** MED., Dt. 18 06 1993 on preventive maintenance of Tata Electrical system and Cir No.**1/1993** MED., Dt. 29-01-93 on preventive maintenance of Ashok Leyland Electrical system
   - **35/98**-MED,DT. 18.12.98, Cir No.**14/97**-MED. DT.03.06.97, Cir No.**10/86**-MED Dated 15-5-1986 and Cir No.**5/86**-MED, Dt.5.4.1986 on maintenance of Self Starters
   - **7/2005**-MED, DT: 8.7.05 on usage of de-mineralized water for batteries

3.11 Steps to avoid Steering system failures

a) The failures occurring in power steering Gears and Vane pumps are mainly due to oil starvation because of leakages, using wrong grade of oil, delayed filter/ oil changes, entry of air, water/dust into the system.
b) The common deficiency observed in Power Steering vehicles is under-lubrication of kingpins which is leading to severe distortion of bores in I-beams and bore cracks.
c) Ensure proper Lubrication of all ball joints during scheduled maintenance
d) Do not tamper Wheel lock bolts
e) Refer the following circulars on Steering system maintenance
   - Circular No**.11/2006**-MED, dt.11.10.2006 on maintenance & trouble-shooting of Power steering systems of both Tata & Leyland.
   - **15/2006**-MED, Dt.24-11-2006 on features & maintenance of FA 90 Front Axles in Ashok Leyland BS-II vehicles
   - **13/2005**-MED, Dt.07.11.2005 on proper fitment of steering arm bolts
   - **18/99**-MED, DT. 01.05.99, Cir No. **37/90**-MED., Dt. 22-12-1990 & Cir No.**30/91**-MED., Dt. 31-8-1991 on maintenance of Tata steering system maintenance
   - **14/96**-MED. Dt:7.6.96 on replacement of ball joints during FC attention.
   - **15/97**-MED. Dt.03.6.97 on proper procedure for setting wheel alignment
   - **31/91**-MED., Dt. 7.9.1991 on Ashok Leyland steering system maintenance
   - **3/86**, dt.4.06.1986 & Cir No.**21/89**-MED. Dated 8.12.1989 on maintenance of Front Axles
   - **13/88**-MED Dated 30.5.1988 on fitment of wheel lock bolts

3.12 Steps to avoid Suspension system failures

a) Ensure correct practices in preparation of Spring assemblies
b) Tighten spring U'bolts/I'bolts for three consecutive days after replacing the spring assembly
c) Replace worn out spring eye bushes, spring brackets and shackles while changing spring assemblies
d) Do not allow the vehicles to run with broken leaves, loose spring bracket holding bolts and loose cotter bolts
e) Ensure proper lubrication of all greasing points and ensure fitment of grease nipples
f) Ensure replacement of worn out rubber bushes in Air suspension system and replace defective shock absorbers and Air bellows
g) Replace four spring assemblies during every sch-IV
h) Circulars for reference on Maintenance of Suspension system

- The circulars Nos.**17/99**-MED, DT. 06.05.99, **11/94**-MED, Dt. 24.03.1994 & **21/92**-MED. Dt. 16-05-1992 cover all the features of spring maintenance and steps to be taken to avoid spring failures.
- The Circular Nos.**04/2000**-MED Dated 03.03.2000 & **17/97**-MED.DT. 17.7.97 reiterates guidelines on proper fitment of Spring Brackets.
- The salient features of Air suspension system & its maintenance are covered in detail in the circulars No. **02/2007**-MED, Dt.23.01.2007, Cir No.**6/2004**-MED, Dt.08.04.2004 & Cir No.**7/2004**-MED, Dt.08.04.2004.

3.13 Steps to avoid Tyre punctures:

a) ***Majority of the tyre punctures are avoidable in nature***
b) ***Improper tyre preparation*** is one of the ***main causes for tyre punctures***
c) Folded/ cracked flaps cause injury on the tube surface on the inner periphery of the tube resulting in enroute failures
d) The punctures developed in the tube folds indicate improper positioning of tube inside the tyre and use of elongated tube (not following make-wise selection and not adhering to the system of inflating and deflating the tube at the time of tyre assembly)
e) Punctures owing to hard spots on tube surface indicate the presence of foreign particles, lumps of chalk powder due to negligence in ensuring the cleanliness of tyre inner periphery at the time of assembly.
f) Follow the correct system of applying patches on tubes viz., usage of water tub for puncture identification, proper marking of injury, correct selection of patches, proper cleaning of surface, buffing the punctured area, using the right vulcanizing solution, stitching patch, giving sufficient curing time.
g) Never use old and defective valve pins. Ensure fitment of dust caps
h) Remove trapped stones and pebbles from the tread grooves which otherwise may penetrate deep into the tyre carcass causing punctures.
i) Avoid over inflation which leads to concussions
j) Avoid under inflation which leads to patch failures
k) Circulars for reference:
   - Cir No:11/2005-MED

## 4.00 CANCELLATION OF KMS DUE TO MECHANICAL REASONS

Cancellation of Kms due to mechanical reasons indicates the quality of preventive maintenance and promptness in rectification of vehicle defects at depots. The cancellation of kms not only affect the resource utilization but also results in poor punctuality, loss of revenues, public criticism and dislocation of services. Most of the cancellations of KMs for mechanical reasons are on account of late supply of buses and vehicle breakdowns.

a) Late supply of bus in the early morning is on account of R.Gs brought forward mostly from night shift to day shift and sometimes from day shift to night shift.
b) Provision of adequate manpower and effective supervision is very much essential in night shifts as majority of the vehicles undergo Sch-I&II maintenance during night time.
c) Backlog in attention of vehicle RGs during night shifts on petty reasons shall not be allowed. Ensure provision of essential spares during night shift.
d) Adequate Spring assemblies shall be kept ready in the night shift to avoid Vehicles going off road.
e) Depot Manager and Mechanical incharge of the Depot should inspect the night shift maintenance at least once in a week and check for availability of staff and quality of preventive maintenance being carried.
f) The delays in dispatch of Night-out buses shall be avoided by making changes to the bus links duly providing minimum maintenance time of 2 hrs.
g) Quality in carrying preventive maintenance schedules particularly Schedule-II, III & IV shall be ensured to avoid breakdown
h) Avoid backlog in preventive maintenance schedules viz., Sch-II, Sch-III and Sch-IV
i) The Depot Managers and Maintenance incharges shall check and counter check the Vehicles after completion of Sch-IV, Sch-III and Sch-II maintenance to ensure the quality of preventive maintenance.
j) Adequate stocking of essential spares, float units and oils shall be ensured by advance planning to avoid vehicles going offroad.
k) Proper planning shall be made to avoid cancellation for want of buses whenever the buses are booked for special services.
l) The spare buses as per the prescribed norm shall always be maintained.
m) Meticulous planning shall be made at the time of docking the vehicles for FC attention, Heavy RGs and Body attention, etc., so that the services are not affected for want of buses.
n) All the vehicles shall be provided with spare tyres and tools
o) Top priority shall be given for attending the vehicles failed enroute to avoid cancellation of Kms and inconvenience to the passengers.

Circulars No.41/2000-MED
Cir No. 26/2010-MED
Cir No. 43/1992-MED
Cir No.11/1992-MED

## 5.00 SPRING CONSUMPTION

The Vehicle suspension system is responsible for riding comfort by preventing road shock transmission to body and Steering stability of the vehicle. Improper maintenance of suspension system leads to

- irregular tyre wear,
- chassis cracks formation,
- breakage of body structural members,
- poor riding comfort,
- poor steering stability,
- enroute vehicle breakdowns etc,.

Consumption of springs is reviewed as one of the important cost parameters of Mechanical Engineering department. Corporation spends about Rs.9 Crores per annum on Springs. The following steps need to be taken to reduce spring consumption

a) Check the tightness of U'bolts/I'bolts, Spring bracket mounting bolts and Cotter bolts during Sch-I & Sch-II maintenance.
b) Replace broken blades without delay to prevent consequential breakage of other blades
c) Replace four spring assemblies during every sch-IV without fail
d) Replace worn out shackle pins &bushes without delay. Delay may lead to breakage of blades
e) Ensure fitment of spring buffers, replace them immediately if broken
f) Tighten "U" clamps & "I" bolts consecutively for three days after changing spring assembly
g) Use 'U' clamps and 'I' bolts of correct length
h) Do not add loose washers and nuts to cover the extra length
i) In case of TATA, use double nuts as specified.
j) Lubricate all Grease points for shackle pins during every Sch-II & III maintenance.
k) Provide caster plate (1 each) in proper position below the front springs of TATA vehicles
l) Do not increase the thickness of caster plates
m) Ensure to keep thicker side of caster plate towards front of the vehicles
n) Follow the correct Spring Assembly Practices…

- Clean the rust formed on spring blade with wire brush or Portable buffing machine
- Soak the blades in kerosene for at least 12 Hours
- Clean the blades with cotton waste
- Cut the blades to required size with gas cutter if needed
- Do not place the blade in inverted position while cutting
- Smoothen the sharp edges after cutting
- Drill holes on leaves for center bolt and clamp riveting. Do not make holes by Arc-welding
- Rivet the support clamps, do not weld them.
- Do not touch the blades with electrode to check the continuity of welding current

- Camber the blades by cold hammering
- Apply graphite grease on blades evenly
- Provide extra 3rd blade in the assembly for vehicles operated on bad roads
- Ensure to provide 3 mm gap between the 1st blade & Ferrule and 2 to 3 mm gap between side clamp and blades

i. Important Circulars for reference on spring maintenance

- **17/99**-MED, DT. 06.05.99,
- **11/94**-MED, Dt. 24.03.1994
- **21/92**-MED. Dt. 16-05-1992
- **04/2000**-MED Dated 03.03.2000
- **I7/97**-MED.DT. 17.7.97

**6.00 TYRE PERFORMANCE:**

Corporation spends about Rs.140 crores per annum on Tyres alone which is the highest expenditure next to the Power (HSD oil) cost. Implementing the following measures would help to improve tyre performance.

6.01 SELECTION OF TYRES:

a) Always follow FIFO (First In First Out) principle in picking up tyres from the stock
b) Fit Tyres with full tread depth (either new or RC Tyres as per guidelines) to the Vehicles operating on bad road condition and rotate them to other Vehicles operating on good roads after covering a maximum of 50% of its life.
c) Never use other than "F" mark Tyres & NEW Tyres in the front position
d) The Tyres with heavy repairs i.e., with BP7 or BP8 patches shall be used on off-side rear position of the Vehicle so that it will not be subjected for impact while maneuvering the road margins.

6.02 ASSEMBLING PRACTICES:

Always keep sufficient stock of Tyres prepared in advance for use in the shifts. Ensure sufficient stock of Nylon & Radial Tyres (New & RC) prepared ready for use to avoid intermixing of different types on vehicles.

Follow the guidelines of circular No. 38/91-MED for correct assembling Practices of Tyres. Some of the important aspects to be implemented during assembling of Tyres…

a) Follow the system of make-wise fitment of tubes
b) Follow the system of using Radial tubes only in Radial tyres so as to withstand the flexing characteristics of Radial tyres.
c) Keep the surroundings of tyres assembling area clean to avoid dust entry into the Tyres.
d) Check the Tyre thoroughly inside and outside for any injuries and foreign material before picking it for assembling.

e) ***Only new Tube & Flap shall be used in New Tyre and Fit-for-Front Tyres.***
f) The Tube shall not have excessive folds
g) The Valve stem shall be checked thoroughly for external and internal threads. The effective length of the stem shall be ensured by removing the bends and maintain proper angle to have better reach in any wheel position. ***Use only new valve pins at the time of assembling, as the used pins may be dirty or defective.***
h) Ensure fitment of ***Dust caps***
i) Check the condition of the Flap at the ridges/ ends before use.
j) Ensure that the Wheel Discs are thoroughly cleaned with twisted wire brushes using Ralli Wolf drilling machines before painting with Red oxide.
k) Before placing the correct Tube & Flap inside the Tyre, ensure dusting of chalk powder with the help of a puff made out of perforated cloth to avoid sticking of Flap/Tube with the Tyre. Excessive dusting is not advisable as it may result in stone formation and pinch the Tube.
l) After placing the Tube, Flap & Metallic Washer properly the Tyre shall be mounted on the rim and the flanges, lock rings are correctly seated.
m) The Tyre should be gently inflated to 15 PSI (1 $Kg/cm^2$) initially for correct seating of the lock ring & flanges.
n) ***Double inflation of the Tyres to the operating pressure is a must*** (i.e., inflate to operating pressure, deflate, check seating and then re-inflate). Improper mounting of the Tyre on the Wheel disc causes camber wear on the Tyre. Check for the equidistance of rim edge to the marking on the Tyre to ensure correct positioning.

6.03 <u>INFLATION OF TYRES</u>:

Inflation of Tyres to the recommended pressures plays a vital role in achieving the optimum Tyre life as well as conserving the precious fuel. The inflation pressures are recommended by the Tyre manufacturers basing on the ply rating, Tyre construction (bias & radial), loading pattern etc. The recommended inflation pressures of different types of Vehicles and Tyres are as follows.

| **TYPE** | **CROSS PLY (NYLON)** | | | | **RADIAL** | | | |
|---|---|---|---|---|---|---|---|---|
| | FRONT | | REAR | | FRONT | | REAR | |
| | $Kg/cm^2$ | PSI | $Kg/cm^2$ | PSI | $Kg/cm^2$ | PSI | $Kg/cm^2$ | PSI |
| **Long Wheelbase 9.00 – 20 – 14PR** | **5.95** | **85** | **5.30** | **75** | **8.10** | **115** | **7.00** | **100** |
| **Small Wheelbase 9.00 – 20 – 14PR** | **4.90** | **70** | **4.90** | **70** | **7.40** | **105** | **7.00** | **100** |
| **Meghdoot – N/AC 10.00 R 20 – 16PR** | N/A | N/A | N/A | N/A | **8.45** | **120** | **7.40** | **105** |
| **Meghdoot – AC 10.00 R 20 – 16PR** | N/A | N/A | N/A | N/A | **8.45** | **120** | **7.75** | **110** |
| **Volvo 295/80 R 22.5** | N/A | N/A | N/A | N/A | **8.10** | **115** | **8.45** | **120** |
| **CNG 10.00 R 20 – 16PR** | N/A | N/A | N/A | N/A | **8.10** | **115** | **5.65** | **80** |

ILL EFFECTS OF UNDER INFLATION & OVER INFLATION

i. Under inflation: Under inflation of the Tyres cause excessive flexing of the casing and builds up heat and weakens casing & plies.
- Under inflation increases rolling resistance thereby more HSD oil is consumed.
- It increases the possibility of ply/tread separations, patch loose due to excessive heat built up.
- Under inflated Tyres are more susceptible to punctures and through-cuts due to weakening of casing.
- Under inflated Tyre wears out on the shoulders only, thereby the life of the Tyre is reduced.

ii. Over inflation: Over inflated Tyre is more prone for concussion bursts. Due to less road contact, the Tyre wears faster in the middle and life gets reduced. Further, the flexing characteristics of the Tyre gets reduced due to over inflation and affects the steering/ riding comfort.

Following measures are essential for maintaining correct inflation pressures.

a) Inflation points @ one for each 20 vehicles shall be provided in the Depot. The inflation points shall be provided at the convenient places, for example, on either side of maintenance pits, Tyre preparation bay etc. Master gauge shall be provided additionally for cross checking of these gauges.

b) Correctness of the gauge is very important for maintaining correct inflation pressures. Wrong gauges will result in either under inflation or over inflation of Tyres. Correctness of the gauges shall be ensured by (a) cross checking with the "Master gauge" once in a week, (b) getting it calibrated at authorised centres ***once in six months***.

c) Provide Automatic Tyre Inflators as per Circular No.06/2010-MED, Dt.29.03.2010

d) Implement instructions on exclusive Inflation Bays issued vide Cir No.04/2010-MED, Dt.18.03.2011

e) All the Supervisors & Tyre Mechanics must be provided with hand pressure gauges with flexible hoses.

f) The adopters of all the inflating points must be in good condition, otherwise it may deflate the Tyres due to leakage.

g) All the Vehicles in a Depot shall be divided into groups so as to check & correct the ***inflation pressures of the Tyres twice in a week by either the Tyre Mechanic or by the Schedule-I Mechanic***. For example, if Tyre Mechanic checks a Vehicle on Friday during normal weekly program then the same Vehicle must be programmed for checking once again on Tuesday by the Sch-I Mechanic. Thus, there shall not be any repetition during this period since every time when the pressure is checked, some amount of air tries to escapes from the Tyres, which results in under inflation.

h) At least ***20% of the Vehicles*** must be cross-checked for correct inflation pressures by the shift supervisor and another ***5% Vehicles must be cross-checked by AE (M)/DM every day***.

Tube Repairing Practices: Proper application of patches on the puncture spot avoids slow leakage of air and prevents Tyre punctures due to patch failure. Following precautions shall be taken while applying the patches.

a) Correct size & type (round or oval) of patch shall be selected basing on the injury on the Tube.

b) The far ends of the injury must be punched with punching tool to avoid extension of injury

c) Preparation of injury spot by buffing & cleaning is important for proper adhesion.

d) Correct centering of the patch on the injury will give strength to the patch. This can be ensured by 'X' marking at the injury using yellow crayon.

e) Since the patches are vulcanized by chemical action, it is essential to use same make patches and CVF as a set. Further, the patches and CVF must be used before the expiry date only. Otherwise, the patches may fail online causing Tyre punctures.

f) The patches so applied must be allowed to cure for at least ***24 hours*** before they are put to use.

g) All the Tubes must be checked in a ***water tub for leakages*** by inflating them with low pressure so that outer circumference of Tube shall not exceed 300 cms. Normally, the Tubes shall be inflated to 1kg/cm2 (15 PSI).

h) Sufficient quantity of repaired tubes of both bias ply and radial shall be kept in advance in the Depot stock for use in the shifts.

6.04 MATCHING OF DUALS:

a) Normally, rear outside Tyre, wears faster than rear inside Tyre. It is suggested to use bigger diameter size Tyre on outside and smaller diameter in inside. Further, the road camber also necessitates using smaller diameter Tyre in inside position. Normally, the inner Tyre shall be ½" (1.3cm) lesser in diameter or 1½" (4 cm) lesser in circumference than the outer Tyre.

   If the Tyres are not matched properly, the entire load of the Vehicle will be carried by single Tyre only and wears out faster and also unevenly. Consequentially the Tyre with more load flexes heavily & builds up heat which affects the plies as well as patches.

b) Tyres shall be checked for "matching" with the help of 'L' Square on fully inflated Tyres. Besides matching for the size, it shall be ensured to avoid using RC & New, Radial & Bias ply, 14PR with 16PR as a set.

c) The matching of Tyres shall be checked by Tyre mechanic every week and if any discrepancies are noticed, it shall be brought to the notice of the shift supervisor duly recording the same in the RG register and arrange for correcting the mismatch.

6.05 AVOIDING MECHANICAL DEFECTS ON VEHICLES:

Properly assembled and matched Tyres can perform better, only when it is not subjected to any mechanical defects on the vehicle. Especially in the front position, the Tyres are subjected to more abuse if the alignment of the front wheels is not correct.

The following angles are included in the Steering geometry.

a) Toe-in & Toe-out: Toe-in is the parallelism of the wheels when seen from the front of the Vehicles. For both Tata & Ashok Leyland Vehicles Toe-in of upto 3 mm shall be maintained. If this is not maintained, the front Tyres, wear very fast causing 'Featheredge' on the tread in one direction. This is a serious mechanical defect, which shall be checked during Schedule-II and corrected. While checking the Toe-in & Toe-out, the vehicle shall be parked on level ground, the inflation of Tyres shall be ensured for correct pressures and the alignment gauge shall be placed at correct position in a horizontal plane on both sides of the Tyre.

b) Camber: Camber is the vertical tilt of the wheel. Normally, the lower edge of the Tyres is slightly tilted inside which is called positive camber. The Tyre tends to be straight under loading and will have proper rolling in operation with the normal positive camber. If there is too much of positive camber, the inside of the Tyre will be tilted excessively causing faster wear on outer edge of the Tyre. If the Vehicle is having negative camber, then the lower edge of the Tyre is tilted outside and the inner edge of the Tyre will wear very fast. Thus, normally incorrect camber can be visualized from the faster wear on one side of the Tyre only.

c) Caster Angle: Caster is the backward or forward tilt of the top & bottom of the kingpin. This can be visualized by the inclination of the kingpin when viewed from side of the Vehicle. This is mostly provided for centering of the steering and keeps the wheels in straight-ahead position. If the Caster is not correct, the steering will have one side pulling and wander which effects the wearing pattern of the Tyre. Though the above angles are the design aspects of the Vehicle, they may tend to alter with the mechanical defects like kingpin play, hub bearing play, ball joints play etc.

Following mechanical defects are normally seen on Vehicles, which effects the Tyre wear.

- Excess play in hub bearing causes spotty wear on Tyre.
- Play in kingpin bushes changes the camber angle and causes one side wear.
- Weak suspension also alters the Camber angle and causes one side wear.
- Worn Tie-rod ends & bent steering linkage cause either Toe-in or Toe-out effecting the Tyre with featheredge wear.

- Oblonged holes of wheel disc/out of round wheel disc & improper mounting of Tyre on the wheel disc causes uneven wear.
- Brake drums with ovality or taper, mismatched brake liners causes brake grabbing. With this, Tyre wears faster at particular place on the tread.
- Brakes binding owing to improper adjustment will result in faster wear on the tread on opposite sides of the Tyre. The Tyre Mechanics shall identify such uneven wear on the Tyre during the weekly checking program and bring it to the notice of the shift supervisor for corrective action duly recording the same in the RG register.

6.06 ROTATION OF THE TYRES:

The uneven and faster wear of the Tyre due to any of the reasons like mismatching, mechanical defects, improper inflation etc., can be compensated to some extent by rotating the Tyre to some other position. Thus, Tyre rotation is essential to obtain optimum life from the Tyres. Following guidelines shall be followed in rotation of the Tyres.

a) New Tyres shall be initially fitted in front position only. Tyres shall be rotated from FOS to FNS and vice-versa (as per the programme generated by VEMAS – during every sch-III for Nylon tyres and at every 8000 kms for Radials). While doing so, the wheel disc shall be reversed, so that the outer edge of the Tyre becomes inner edge and vice-versa after rotation.

b) Tyres fitted in Rear position shall be rotated from near side to off side and vice-versa. While doing so, the inner Tyre shall be rotated to outer side and vice-versa. This will facilitate in shifting the inner edge of the Tyre to the outer edge, and vice-versa even without rotating the wheel disc.

c) After attaining 5 mm NSD the new Tyres in front shall be rotated to rear position of the Vehicles.

d) It is advisable to rotate the Tyres as explained above on the same Vehicle. This will facilitate in identifying the mechanical defects on the Vehicle for taking corrective action.

e) In case of Tyres operated on bad road, the Tyres shall be rotated to some other Vehicles operating on good roads, after obtaining 50% of life.

f) 'F' mark Tyres, which are meant for front fitment on Ordinary Vehicles shall also be rotated as in the case of new Tyres.

6.07 TIMELY REMOVAL OF TYRES:

Tyres give more number of retreads and maximum overall life only when they are removed in time without subjecting to injuries and casing deformation. In view of the importance, it is strictly recommended to remove the Tyres on attaining 2 mm NSD and send them for retreading. It is important to note that the NSD (non-skid depth) shall be checked at a place where the Tyre wear is more.

It is also essential to remove the tyres for repairs immediately on observing any deep cuts. If neglected, the injury extends to the breaker plies in case of Bias ply Tyre and steel belts in case of Radial Tyres. Further, entry of dust & water into the plies through deep cuts would lead to separation and scrapping. In case of Radial Tyres, if the steel wires are exposed to moisture and get rusted, the tyre becomes unserviceable.

6.08 MANAGERIAL CONTROLS IN IMPROVING THE TYRE LIFE:

a) Ensuring the availability of Tyres, Tubes & Flaps as per norm:
Additional Tyres @ 0.8 per Vehicle are required as float at Depots. This is meant for transaction of Tyres from Depot to Tyre Retreading shop and vice-versa and for easy rotation of Tyres among the Vehicles. If sufficient quantities of Tyres are not available in the Depots, it becomes difficult to keep the Tyres in advance after preparation. Further, Tyres will be forced to run beyond the limits causing damages.

A float of 0.7 tyres per vehicle is provided for J-ward/TRS for processing tyres.

b) If the Tyres are in excess to the requirement i.e., beyond the given norm, some of the Tyres will be stranded for longer periods in Depot stock, thus subjecting the casing to ageing.

It shall be ensured to have sufficient float of Radial Tyres depending upon the number of special type Vehicles available in the Depot.

The availability of float Tyres has to be crosschecked once in a quarter and if any shortages are found, it shall be recouped by taking the sanction of competent authority. If the Tyres are found surplus, then to that extent action has to be taken to surrender to 'J' ward. Requisition shall be made for additional float whenever new vehicles are received against augmentation.

The availability of Tubes & Flaps both New & serviceable shall be ensured in proportion to New, F mark and RC/Repair Tyres.

c) Monthly Tyre census reports (i.e., Depot stock Tyres, Stores stock Tyres, spare Tyres & Vehicles-wise Tyres fitted status) are generated through computer. These reports have to be reviewed by AE (M)/DM every month to know the following.
   - Depot Stock Tyres statements indicate the idling of Tyres if any on the floor for longer periods.
   - Stores Stock statement helps in ensuring use of Tyres on "first in first out" (FIFO) basis.
   - Spare Tyres statement will indicate number of Vehicles without spare Tyres and non-rotation in every Schedule -III/IV maintenance.
   - Tyre census report can be used to review the fitment of non-F mark Tyres (mostly III/IV RC tyres) in the front position of Vehicles and also mismatching.

d) Correct posting of mileage in history cards is very important because this will help in taking appropriate procurement decisions of New Tyres & Tread Rubber. With the computerization of Tyres management, the following procedures help us in ensuring correctness of the data entry.

- All tyre transactions recorded in the field register shall be entered into VEMAS data entry register everyday and subsequently entered into computer.
- Before entering the Tyre transaction data and generation of Tyre history cards the log sheet challan preparation has to be ensured.
- All the transactions between the J ward and Depot i.e., MTD-68D & MTD-68E have to be done through computer only
- The data relating to the Tyres of the Vehicles received on transfer from head office or other Depots shall invariably enter into the Tyre Master.
- The functioning of ADC (Tyres) for updating of data entry can be reviewed by verifying the 'Vacant Position Statement' generated after every transaction (i.e., fitment & removal particulars of Tyres). Ideally, no Vehicle shall be available in the report with vacant positions.

e) Inspection of Tyres at the time of dispatch to TRS will give the feedback on Tyre maintenance practices at the Depot. Depot Manager and Garage In-charge shall invariably inspect all the Tyres, which are ready for despatch to Tyreshop to know the reasons for low mileages, increase in Repair etc., and take corrective actions.

f) Zero scrap rate in New stage is the aim of the Corporation. Majority of New Tyres are scrapped due to rash and negligent driving by the Drivers. Proper analysis and taking prompt actions as per rules in force on the concerned will help in controlling the scrapping of Tyres in New stages.

g) Maintenance of registers/records upto date with full entries and periodical review will help the managers/supervisors for understanding and ensuring the correct Tyre maintenance practices at the Depot. Some of the important records to be maintained are furnished in the Cir No.11/2005-MED

6.09 SPECIAL ATTENTION ON RADIAL TYRES:

As of now, instructions are in vogue to fit Radial Tyres on all special type Vehicles. Besides, the advantages in saving of the fuel, the Tyre performance of Radials is far superior to bias ply Tyres.

As Radial Tyres are sensitive to the mechanical condition of the Vehicle, the following measures have to be taken in addition to the regular Tyre maintenance practices.

a) Ensure fitment of Radial Tyres in all positions of the vehicle (including spare) to get optimum results. Combination of Bias ply Tyres with Radial shall be completely avoided.

b) Follow the system of using Radial tubes only in Radial tyres so as to withstand the flexing characteristics of Radial tyres.

c) As Radials are more sensitive to mechanical defects, it shall be ensured to correct all the defects like, misalignment, king pin play, Brake binding, Hub bearing play, weak springs etc., on the Vehicles before fitment of the Radial Tyres.

d) Uneven wear is predominantly seen on Radial Tyres when slightest mechanical defects are there on the Vehicles. Thus, ensuring rotation of Tyres with uneven wear even before Schedule III/IV maintenance is very important.

e) Unlike Bias ply Tyres, most of the cuts on Radial tyres will be upto steel belts only and may not result in Tyre punctures. Hence, these deep cuts may go unnoticed on the Radial Tyres by Tyre Mechanics during routine inspection. Therefore, special attention is required for Radial Tyres in identifying the 'deep cuts' which affects the steel wires due to rusting and such Tyres shall be removed immediately and sent to Tyre shop for attention at this stage.

6.10 IMPORTANT CIRCULARS ON TYRE MAINTENANCE:

- Circular No.11/2005-MED, dt.03.09.2005 – Comprehensive guidelines on tyre maintenance at depots
- Circular No.03/2009-MED , dt.21 .02.2009 – Inflation pressures for Radials
- Circular No.20/2008 – MED, Dt : 15.09.2008 – Deriving maximum benefits from Radial tyres
- Circular No.16/2008-MED, Dated. 04.07.2008 – Optimum tyres circulation & Subsequent corrigendum vide Lr.No.TR1/815(24)/2008-MED, dt.24.7.2008
- Circular No.12/2008-MED, Dated. 16.06.2008 – Timely removal of tyres
- Circular No.06/2010-MED, Dated. 29.03.2010 – Standardization of Automatic Tyre inflators for Depots.
- Circular No.13/2010-MED, dt.27.05.2010 – Calibration & maintenance of Air compressors at depots
- Circular No.24/2010-MED, dt.08.09.10 – Use of software reports to avoid idling of tyres.
- Circular No.04/2011-MED, dt.18.03.11 – Exclusive tyre inflation bays at depots.

All the field managers and Depot maintenance incharges are advised to implement the above guidelines for improvement of key mechanical parameters.

VICE CHAIRMAN & MANAGING DIRECTOR

To
All Depot Mangers.

Copy to: Director(V&S), ED(E&IT), ED(O&MS), ED(A&P), FA, CAO & ED(T&C) for infmn.
Copy to: All Executive Directors(Zones) for necessary action.
Copy to: All Regional Managers for necessary action.
Copy to: All HODs for information.
Copy to: All Dy.CMEs & Dy.CTMs for necessary action.
Copy to: All WMs, COS', Dy.CAOs for information.
Copy to: All AOs for information
Copy to: All Principals, ZSTCs & TA/Hakimpet for information
Copy to: All Maintenance incharges of the Depots for n.action.
Copy to: Manual Section/Head Office for filing
Copy to: AG Audit section, Bus Bhavan, Hyderabad for information.