Saving of Fuel by Proper Tyre Maintenance

D H J Senadhira

Mr. D.H.J. Senadhira is the Genral Manager of the Uva Peopolised Transport Service and has extensive experience in route design both in Sri Lanka and the UK

01. The world is heavily dependent upon petroleum and its products for energy needs. Even though many stationary applications such as factories and electricity generating facilities are switched to coal and other non-petroleum energy sources, transportation is still almost 100% dependent upon petroleum fuels. For Sri Lanka expenditure on petroleum is very vital as it involves foreign exchange which is scarce. Also the price of petroleum fuel has risen in many fold since 1974 and would increase further in coming years. As such well planned and continuous programme in fuel conservation is of utmost importance.

02. Fuel - Energy and Work done

Energy in fuel is converted into mechanical work and heat. Mechanical work is used to overcome resistance in vehicle movement and heat is wasted. Basically there are four types of resistance to overcome in vehicle movement.

i.e. 2.1 Inertial Resistance -
To start and accelerate vehicle

2.2 Rolling Resistance -

2.2.1. Engine and drive line friction

2.2.2 Engine Accessories friction'

2.2.3 Axle bearing and friction in tyres

2.3 Aerodynamic Resistance -
Friction by air in pushing through it.

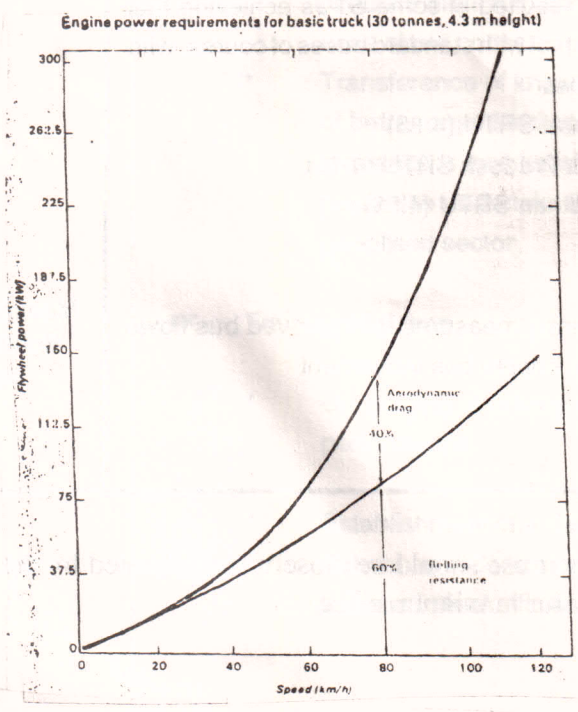

Figure - (1)

2.4 Grade Resistance -
Resistance against weight component in an incline.

03. Rolling Resistance and Aerodynamic Resistance

These are major resistances which involve in operating a vehicle on a level plain at a constant speed. These increase with the speed of the vehicle.

3.1 Wheels and Tyres

Wheels and tyres support the weight of the vehicle and transmit driving, braking and steering forces. Tyres also act as the first springing medium between road and vehicle and provide a good non skid contact area with the road.

04. Maintenance of Tyres

Proper maintenance of tyres is very important as it can conserve energy in two ways. by -

4.1 Improving fuel efficiency of the vehicle.

4.2 Giving better tyre kilo meterage and there by conseve energy in production /rebuilding.

4.3 With the above benefits in view Badulla Peoplised Transport Service - Board of Directors at their 04th Meeting held on 10th May, 1995, decided to appoint a Tyre Cum Service Inspector and launch a programme to improve maintenance on tyres.

05 The Programme Launched in July, 1992 included following activities

5.1 Supervision on fitment of tyres on to wheels.

5.2 Correcting air pressure of tyres of all vehicles twice a week .

5.3 Frequent side change of tyres.

5.4 Matching of rear dual tyres .

5.5 Be alert on damages .

5.6 Timely removal of tyres .

06 At the first check of air pressure it was found that 30% of the vehicles had under inflated tyres. This was surprising, even the Forman in-charge did not expect so much error . Within a month the entire operating fleet of 95 buses was regularized.

07. Improvement of fuel performance of the fleet during the exercise was measured in two ways . .

7.1 Fuel cost per kilo-metre of the total fleet during the period compared with the cost per kilo metre prior to the exercise.

	Fuel Cost per Kilo Metre (Rs)	
Three months prior to exercise	April -	3.29
	May -	3.32
	June -	3. 32
During the exercise	July -	3.00

7.2 Fuel performance of 50 selected buses were compared with that of the previous two months and found 62% have shown better performance. The buses selected have not under gone any major engine or fuel pump repairs .

7.3 Cost saving on fuel to the organization during the exercise, compared with the previous months had been as follows

Saving per kilo metre	Rs 0.32
Operated kilo metres during the exercise	482892
Total saving during the exercise	Rs 154525.00
50% of This saving may be on tyre maintenance i.e	Rs 77262.00

08 Cost saving on tyres cannot be calculated directly as

8.1 Tyre cost on the fleet for the month depend on the number of tyres replaced during the month and tyres removed as wasted during previous months.

8.2 Tyres of different makes and different rebuilders are used and performance differs.

8.3 Prices of tyres and rebuilt charges change from company to company.

09. Use of steel - Radial tyres reduce the tyre rolling resistance and thereby save fuel. Use of wide base single radial tyres instead of cross-ply duel tyres offer still further reduction in tyre rolling resistance.

10. Suggestions

10.1 Most of the drivers do not know the optimum pressure, the vehicle they drive should have. This is true in case of professional drivers also. Twelve drivers out of twenty five questioned at Badulla Peoplised Transport Service did not know the answer. As such some action should be taken to educate drivers. The tyre manufacturers could look into the possibility of engraving the required tyre pressure on the body of the tyre if possible.

10.2 50 Petrol Sheds were checked to find the availability of the tyre inflating facility and found that at 19 sheds the equipment were defective. Action should be taken to repair them early.

10.3 Publicity campaigns should be launched to educate drivers and the owners of vehicles that " maintenance of tyres would improve fuel efficiency too".

Acknowledgement

I thank Mr. Palitha Subasinghe of Kelani Tyre Company and Officers of Badulla Peoplised Transport Service and Transport Board ,who helped me to prepare this presentation.

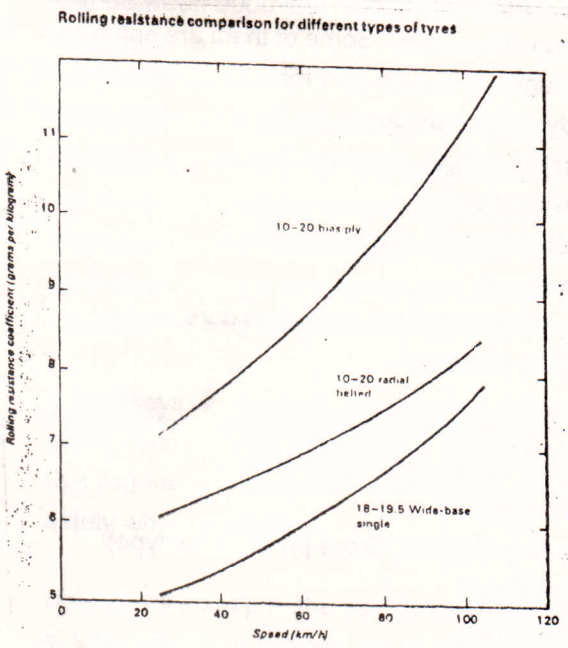

Figure - (2)