

SESSION 4

Paper (a)

GETTING THE BEST FROM WHAT WE'VE GOT

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FUELS - OILS

Since 1973 the subject of conserving petroleum products has become a very significant part of a machine operators viewpoint when discussing the purchase and operation of equipment. If we consider that in 1972 it was calculated that fuels and oils represented 10% of an average plant operating budget costs whereas in 1980 this had increased to 33% it is easy to see the cause of extra concern.

Considering fuel economics first. You will know your fuel bill is too high but how many of you know where you are wasting fuel, and because of the great number of variables involved how many would be able to recognise savings if you managed to achieve them? To answer these questions some system of record keeping is required to act as a base line for your operation. The more comprehensive the record system you adopt the more you will achieve but initially it helps to know the difference in actual fuel consumption of each type of machine you operate in other words what you are earning for each dollar spent on fuel. The oil companies already tell you how much fuel they deliver to you and it should not be too difficult to instigate a system of recording how much fuel was supplied to each item of equipment. Compare this with the work carried out by that machine and you have a starting point to work from.

Because of the competitive nature of the equipment supplying trade all engine manufacturers have gone to great lengths to improve the fuel economy of their engines. If we consider that 60% of the potential energy within the fuel is lost before it reaches the crankshaft because of the inherent characteristics of the diesel engine it is easy to see there are great potential economies to be made with efficient design. For this reason all equipment manufacturers will be only too glad to quote on ideal fuel consumption figure under different load and work conditions.

By matching your actual figures with these ideals supplied by the manufacturer it is possible to see where the biggest gains can be made.

Below is a list of possible areas of fuel saving of which you can take advantage. I must stress though that in each of your cases it is an individual consideration and every piece of equipment and operation must be taken on its own and considered seperately, but still let us consider the options you have.

1) OPERATE EQUIPMENT IN ECONOMY RANGE

Every engine has an ideal efficient torque range and it is best suited to operate within this range whenever possible.

2) REDUCE EXCESSIVE POWER USEAGE

Control the use of power do not 'throw away' valuable energy.

3) REGULAR ENGINE MAINTENANCE

Clean air filters, top tunes and other fuel saving work should be carried out on a planned regular basis.

4) AVOID EXCESSIVE IDLING

This is an old one but it always helps to stress the point that machinery is only earning a living if it is moving making a profit, sitting consuming fuel is only costing you money.

5) OPERATE IN RECOMMENDED TEMPERATURE RANGE

Too cold or too hot an engine besides causing mechanical problems is an inefficient engine.

6) REDUCE ACCESSORY LOADS

Two points; remove all unnecessary equipment, time spent in uncoupling may well pay back in reduced fuel, and secondly if you carry accessories don't waste energy driving them unless they are being used.

7) REDUCE ROLLING AND GRADIANT RESISTANCE

The fuel consumed by a vehicle increases dramatically when operating off highway or on steep inclines, bear this in mind when planning your operations.

8) INCREASE PAY LOAD FACTORS

Fuel consumption does not increase in proportion to load therefore plan your loading so that where ever possible you are working with a maximum load.

9) DO NOT TOP OFF FUEL TANKS

This is particularly important when working off highway where fuel can spill out of an over full tank on a steep grade. Expansion in hot weather should also be considered but this is not as great a problem with diesel as with petrol.

10) KEEP RECORDS OF FUEL CONSUMPTION

We have discussed this one already.

11) MAINTAIN EQUIPMENT

Just as power loss can take place in the engine so can it take place in the other parts of the drive train, tracks etc. if regular maintenance is not carried out.

Unlike fuel where there has been no great advance in fuel technology, the major lubricant manufacturers have kept in pace with modern industrial science both in lubricant life and reduction of friction. Approximately 11% of total fuel energy is lost in drive train friction in a wheeled vehicle. By the use of correctly applied lubricants a substantial saving can be made in this section.

As far as lubricant life is concerned you must appreciate that when an equipment manufacturer or lubricant supplier is providing an oil change period recommendation, this recommendation has to apply to the worst possible case and therefore has to err on the very conservative side. If you wish to extend your oil drum periods and still receive maximum lubricant protection the safest way is to consult with your lubricant supplier and equipment manufacturer. It is possible with modern lubricants to achieve very long periods between oil changes and to achieve the maximum oil life the only safe way is by regular analysis of the oil in each machine, as every case is different depending on operation and operator as much as equipment design.

Having said that there are of course systems on the market such as by pass filters which will assist oil drain extensions but once again their effectiveness varies and carefull control should be exercised.

Extending oil drain periods is one way of reducing lubricant useage but the other way of course is to reduce consumption and to this end records are once again invaluable assistance in spotting equipment which has higher than normal useage patterns. It is an old saying that oil can only go up or down and therefore if you suspect high oil consumption it can only be going up past the piston and be burnt or go down to the ground via leaks. This is the big advantage of a clean piece of equipment as leaks can easily be spotted on a clean surface. I appreciate this is very difficult in your type of operation but at least it should be one aim of every conscientious operator to spot and rectify leaks on any oil system as soon as they become visible.

As far as piston ring leakage is concerned every engine is designed to consume some oil but this should be kept to a minimum and any increase in the rate of consumption without an obvious external cause should be rectified before other problems such as loss of power become evident.

