FreightBestPractice

Fuel Saving Tips

Pocket Guide

Department for Transport

For free copies, contact the Freight Best Practice Hotline on **0300 123 1250** or visit the website at **www.businesslink.gov.uk/freightbestpractice.**

This booklet can save you money..... by helping you cut your fuel costs.

Saving fuel makes sense for everyone, but having the right advice to hand can sometimes be difficult when you're out on the road.

This guide has been designed so you can carry it in your jacket pocket or cab.

It is aimed in particular at small-fleet operators and owner-drivers.

It includes top tips from fellow professionals on how to save fuel.

So keep it handy, use the information provided..... and cut down your fuel bill.

Refuelling is time consuming and expensive. This booklet can help you reduce the number of times you need to visit the pumps.

Contents

Know Your Costs

We all want to cut our costs. Whether you drive a 7.5 tonne GVW box van, own and drive a maximum weight artic, or run of a fleet of 30 eight-wheeler tippers, the first step is to know exactly what your costs are right now. Sounds obvious doesn't it? But you would be surprised at how many professional truck operators and drivers can only guess at how much they spend per month per vehicle on maintenance, tyres, insurance and, crucially, fuel.

Setting a target to cut your fuel costs by 5% would be a good place to start. For many truck operators even this small saving could easily mean £1,000 less spent each year on fuel. That saving is going to be magnified in the bottom-line profit

Tip:

Do the sums to work out exactly what your trucks cost to run. Then you'll be ready to start saving fuel and money.

This is the definitive guide to improving the fuel performance of your fleet. It gives step-by-step explanations of the key elements of fuel management, how to measure performance and how to implement an effective improvement programme.

For a **FREE** copy of the Fuel Management Guide and all the publications signposted in this pocket guide, call the Freight Best Practice Hotline on **0300 123 1250**, or visit our website **www.businesslink.gov.uk/freightbestpractice**

Consider this Example

Table 1 Profits from Fuel Savings

Profits form Fuel Savings	
Total Fleet Costs	£800,000
Fuel Costs (30% of total)	£240,000
Profit	**£40,000**
5% saving in fuel costs	£12,000
Profit after fuel saving	**£52,000**

Figure 1 Costs for a 44 tonne GVW Artic Tractor, covering 70,000KM p.a.

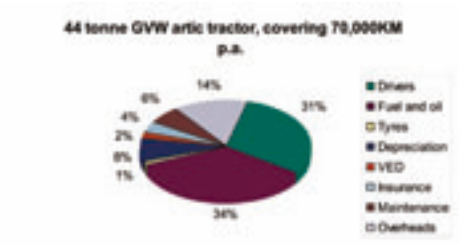
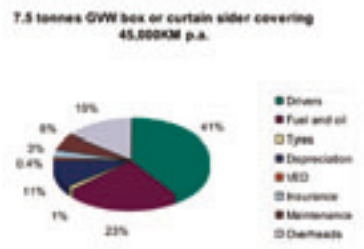


Figure 2 Costs for a 7.5 tonnes GVW Box or Curtain Sider covering 45,000KM p.a.



Source: Road Haulage Association (RHA) Vehicle Operating Costs April 2006

Fill in Your Truck Operating Costs

Table 2 Operating Costs

Stranding Costs	£
Overheads	
Vehicle excise duty	
Insurance	
Depreciation	
Finance	
Driver	
Total	
Running Costs	**£**
Fuel (and oil)	
Tyres	
Maintenance	
Total	

- **You cannot manage what you do not measure**
  Time spent gathering accurate information on fuel consumption will pay handsomely later

- **Be systematic - keep accurate records of all costs**
  Use a checklist to ensure all costs are properly accounted for (see Table 2)

It is important to keep a close eye on your costs and ensure they are recorded.

Sources of useful information on truck operating costs

Trade Associations:

- Freight Transport Association
- Road Haulage Association

Trade Press:

- Transport Engineer
- Motor Transport
- Commercial Motor

It is important to keep a close eye on your costs and ensure they are recorded.

Where Does the Fuel Go?

Exactly how much of the diesel you put into your truck's fuel tank ends up earning you money? Probably nothing like as much as you imagine. Only about one third of the energy in a tank of fuel is translated into useful mechanical effort at the wheels.

So it surely makes sense to do all you can to make the most out of every litre. There is not much drivers and operators can do about the fundamental efficiency of truck engines (except to ask manufacturers and dealers to provide fuel consumption figures and then to take these into account when making purchasing decisions).

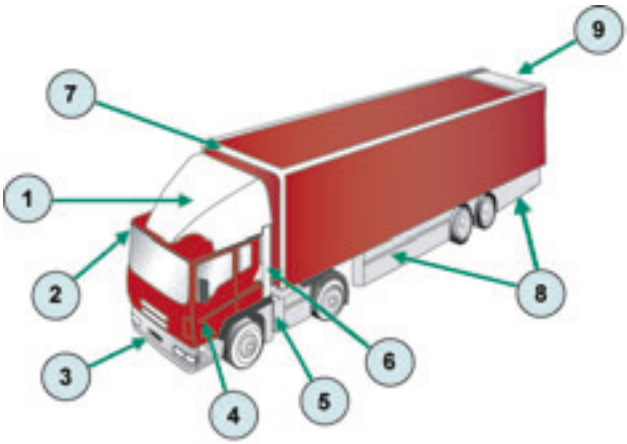
A Fuel Management Programme will raise drivers' awareness of their own fuel consumption.

Resistance to Movement

The total resistance to a truck's forward motion comes from rolling resistance, air resistance and gradient. The only influence you can have on the last of these is to choose less hilly routes wherever possible, but there is plenty more you can do to keep rolling resistance and air resistance to a minimum.

Aerodynamics is a complex subject but you certainly don't need to be a high-flying aeronautical engineer to improve the efficiency of your truck and make worthwhile fuel savings.

Figure 3 Examples of Truck Aerodynamic Styling.



- 1. Cab roof deflector
- 2. Cab sun visor
- 3. Air dam
- 4. Cab side edge turning vanes
- 5. Tractor side panels
- 6. Cab extension panels / collar
- 7. Trailer front fairing
- 8. Side skirts / panels
- 9. Roof tapering

Truck Aerodynamic Styling

This guide offers practical information on aerodynamically effective styling for trucks including appropriate add-on features.

Did you know?

- As much as 80% of the fuel economy benefits of an artic tractor's air-management equipment comes from just three components: the roof-mounted air deflector, side collars at rear of cab and under-bumper air dam
- Assessment of individual aerodynamic aids by the University of Huddersfield has shown that most drag reduction (nearly half the total) comes from a cab roof-mounted air deflector
- Sheeting tipper bodies even when empty can produce significant fuel savings. Tests show that a correctly sheeted empty tipper body at 56mph could yield improvements of over 8% (BTAC/IRTE technical evaluation event 2003)
- A 10% variation in fuel economy can be expected from one season of the year to another (the wet roads and high winds of winter will take their toll in fuel economy)
- A typical 420hp heavy-duty truck engine consumes fuel at the rate of around two litres an hour with the truck stationary and the engine idling

Table 3 The Effects of Speed on Fuel Consumption of a Heavy Duty Truck Engine

Speed (mph)	Distance (km)	Fuel Used (liters)	Fuel Consumption (MPG)
0 (idling at 480 rpm)	0	1.9 per hour	
37	22.2	4.1	15.2
50	22.2	6.6	9.5
56	22.2	8.4	7.4

Source: BTAC/IRTE technical trials of June 2000

- A complete set of the latest low-rolling-resistance tyres can give fuel economy gains of up to 6% on long-haul work
- Check all tyre pressures regularly (including trailers). If pressure falls below recommended figures, rolling resistance increases and fuel is wasted. A 10 psi (lb per square inch) fall in tyre pressure is likely to result in a 1% fall in fuel economy

Fuel Management Guide See Chapters 2 and 6 of the Fuel Management Guide.

SAFED for HGVs: A Guide to Safe and Fuel Efficient Driving for HGVs

This guide outlines the elements of the Safe and Fuel Efficient Driving (SAFED) scheme and explains the content of the one-day SAFED training course.

Save Fuel with Lower Rolling Resistance Tyres

This case study contains examples of the positive effects that lower rolling resistance tyres have had on fuel consumption.

Why Drivers are VIPs

When it comes to delivering fuel economy, the driver is king. For the vehicle operator the benefits of fuel efficient driving style are not just lower fuel bills but also lower maintenance costs and lower insurance costs. The best way to illustrate this is with real-life examples.

Driving Down Fuel Costs

- The SAFED course consists of a full day off the job training course, which includes practical assessments, theory based papers concerning accident prevention and reduction and fuel efficient driving

- Clugston Distribution trained 23 of their drivers in SAFED and was rewarded with an average fuel consumption improvement of 7.33%. The average number of gear changes also fell from 91 to 68 helping to reduce driver fatigue. They were also impressed by the fact that most of the SAFED course was safety related, as it is well known that safer drivers will lead to lower maintenance and insurance costs

- Winfield Transport, Cannock, saw a 3.2% improvement in fuel economy that amounted to an annual cost saving of £6,500 from 16 drivers receiving SAFED training

SAFED training offers fuel efficiency and road safety

Checklist for Fleet Managers

- Assess fuel efficiency as part of driver recruitment process
- Run a continuous development programme
- Consider a bonus scheme based on fuel efficiency
- Request up-to-date training from vehicle manufacturers
- Communicate effectively with drivers
- Run driver league tables based on fuel economy averages
- Use on-board computers
- Appoint a Fuel Champion
- Apply an agency driver training policy

Checklist for Drivers

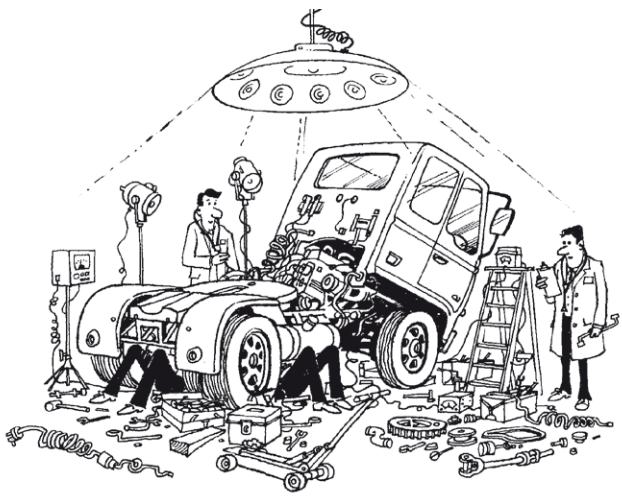
- Always be ready to learn, no matter how experienced you are
- Know your average MPG
- Follow vehicle manufacturer recommendations
- Read the vehicle handbook
- Use tachometer green zone
- Skip-shift (block-shift) gears where it is safe to do so
- Always do systematic pre-driving and daily checks
- Report defects promptly
- Take care filling fuel tanks and avoid filling to the brim
- Park up in a way to avoid early-morning manoeuvring with cold engine - this wastes fuel
- Pull away in the right gear
- Use cruise control
- Use the engine's 'sweet spot' (the speed at which fuel economy is at its best)
- When refuelling, never leave a fuel nozzle unattended

Who Cares Wins

Where does vehicle maintenance fit in? It is pretty obvious that a well-maintained truck is certain to be more fuel efficient than a neglected one. But there is more to this than simply booking your truck into the workshop on time for routine services and safety inspections.

Once again, drivers have a crucial role since they are likely to be first to spot tell-tale signs of trouble and cost ahead. For example, a driver is likely to be the first to notice dragging brakes because of their immediate effect on vehicle performance.

Over the page is a checklist (by no means exhaustive) of tell-tale signs that a commercial vehicle needs workshop attention to stop it wasting fuel. Workshop and office staff – anyone involved in the vehicle operation, should be watching out for these signs and alerting the person responsible for vehicle maintenance.



See **Preventative Maintenance for Efficient Road Freight Operations** for more details.

Maintenance Checklist

- Any fuel or oil leaks
- Missing seal in fuel tank cap or signs of fuel spills around filler neck
- Low tyre pressure (twinned tyres kissing)
- Tyre wear suggesting faulty steering or axle alignment (such as feathering of tread in tyre shoulder area)
- Missing tyre valve caps
- Steel caps are much better than plastic ones, providing an effective second line defence against leaking valves
- Maintenance records showing rapid wear of clutch or brake friction material
- Traces of black smoke in exhaust suggesting fault with engine's air-intake and/or fuel injection system
- Tears in body curtains
- Any body damage
- Missing or damaged air-management equipment
- Excessive engine oil consumption (no leaks) suggesting oil is being burnt as a result of internal wear

REMEMBER:

Effective preventive maintenance procedures don't cost you, they pay you.

Fuel Management Guide

For more information, see chapter 6 of the Fuel Management Guide

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Vehicle Specification

Get it Right First Time

There's no such thing as a bad truck any more, they say. Maybe so, but it's not hard to find examples of badly-specified trucks that are wasting fuel and costing more to operate than necessary. Time and effort spent deciding on the right vehicle and body specification before the vehicle goes into service will pay off handsomely throughout the vehicle's life.

No operator should simply accept an off-the-shelf truck and body without first ensuring that the specification really does suit the operation.

Practical Examples

- BOC Gases improved fuel consumption by 3.6% or 0.51 MPG by replacing wide single tyres on the steer axle with standard tyres. This resulted in a cost saving of almost £1,000
- By setting cruise control speed to correspond to the best specific fuel consumption speed of an 11 litre Cummins engine, BOC Gases raised the average fuel economy of an ERF artic tanker from 7.9 to 9.7 MPG
- Business Post replaced the standard vehicle manufacturer's roof-mounted air deflector on a tractor unit with one built to its own specification and raised average fuel economy from 8.5 to 9.3 MPG

Vehicle Specification Checklist

- Make your choice based on whole-life costs, not simply initial cost
- Have you considered all available cab, engine and driveline options?
- Is the fuel tank size and position right for your operation?
- Have you asked the dealer and/or manufacturer to advise on gearing based on computer simulation of your operation?
- Have you and/or your drivers tried demonstrator vehicles?
- Have you thought carefully enough about tyre specification, including tread patterns, aspect ratio and low rolling resistance options?
- Have you considered self-steering/lifting axles?
- Is your new sleeper-cabbed truck fitted with a night heater as standard? If not, why don't you specify one?

Truck Specification for Best Operational Efficiency

A step-by-step guide to the process of correctly specifying an efficient and 'fit for purpose' vehicle

Truck Aerodynamic Styling

This guide offers practical information on aerodynamically effective styling for trucks

Smarter Loading and Better Bodies

Just a little more thought in the specification and use of truck bodywork by operators and drivers can make a big difference to fuel consumption.

Flat platform bodies for loads that require roping and sheeting are no longer common, but are still needed from time to time on some operations. Some loose cargo lends itself to neat, low-profile loading on a flat rigid body or semi-trailer. With others it is more difficult but it is definitely worth putting effort into arranging the load so that aerodynamic drag is kept to a minimum, especially before setting out on a long motorway journey.

Do not just accept the body or trailer specification suggested by a bodybuilder without first questioning whether it could be optimised to improve fuel economy without compromising operational and load-carrying requirements. Check what height of body you really need.

Tip:

Take care when specifying vehicle and body dimensions, gross weights and load-handling equipment and your rewards will be better fuel efficiency and bigger profit margins.

Practical Examples

- Montgomery Transport's Preston-based European operations manager found that the fuel economy of tractors pulling 13.6 metre semi-trailers was between 1.3% and 7.6% better than that of tractors pulling 12.2 metre trailers, simply as a result of the smaller cab-gap with the longer semi-trailers

- When overall trailer height was changed from 4.0 metres to 4.2 metres fuel consumption worsened by between 4.4% and 11.4%

- Montgomery's comparison of tractors working at 32.5 and 38 tonnes GVW showed that they were between 2.9% and 4.9% more fuel efficient at the lower weight

- An Oxfordshire-based operator uses tail-lifts on his box-bodied trucks. Power for the tail-lifts used to come from the vehicle's standard electrical system, driven by the engine. Then someone came up with the bright idea of fitting separate batteries to power the tail-lifts. This allowed engine running time to be reduced by 27 hours a week. The cost of the battery system was £700 but the annual fuel saving amounted to over £4,000, even before lower maintenance costs were taken into account

DO

- Think about aerodynamics in specifying bodywork
- Keep overall body height as low as possible
- Fit air-management equipment where it is cost effective (see Truck Aerodynamic Styling)
- Sheet empty tipper bodies
- Ensure that curtain straps and buckles are kept taut
- Get any body damage, especially nicks and tears in curtains, repaired promptly
- Adjust sliding fifth-wheel couplings to keep the tractor/trailer gap as small as possible (but take care that axle weight limits are not exceeded)
- Adjust a tractor's roof-mounted air deflectors to suit the particular trailer being pulled

Don't

- Specify a taller body than is really needed
- Fit additional lights, air horns or other ornamental accessories where they are going to spoil smooth airflow over the cab and body and add to fuel consumption
- Ignore small tears in curtains
- Specify heavily-ribbed bodywork where it can be avoided

Make Every Drop Count

Fuel Management Systems

What exactly is a fuel management system? You might be surprised to hear that it can be based on anything from manual records to sophisticated computer software. So we're not only talking about expensive computer systems that only the biggest fleets can afford.

Tip:

A good fuel management system will allow you to monitor fuel consumption effectively in less than one minute a day per vehicle.

In every case the essential ingredient is accurate raw data. You will need a means of identifying errors, such as inaccurate odometer readings, and correcting them at source. This is always much easier than trying to find and correct inaccurate basic information later on:

- Being alert to the risks of leaks, fraud, theft and fuel spillage can result in worthwhile savings
- BOC Gases cut £100,000 from its annual fuel bill simply by better stock control
- A small leak around the fuel filler neck of a truck's fuel tank could easily result in the loss of a litre a day, or about £120 worth of fuel a year wasted
- Diesel leaking from tanks onto the road poses a serious road safety risk to other road users

- One fundamental decision with any fuel management system is whether to hold your own bulk stocks or to rely on fuel cards, bunkering, or perhaps a simple arrangement with a local filling station

Before deciding which of these routes to follow, you will need to think about:

- Convenience of refuelling trucks at their home base
- Supply availability
- Reliability and quality of supply
- Cost per litre of bulk supplies
- Cost of on-site equipment
- Environmental and security management

Fuel Management Guide

For more information, see chapters 3,4 and 6 of the Fuel Management Guide.

DO

- Collect and retain raw data, not just averages such as miles per gallon, in a computer database or speadsheet
- Think about better ways of collecting this information
- Check the accuracy of odometer readings
- Take tyre wear and rolling circumference into account to improve the accuracy of your fuel consumption calculations
- Encourage drivers to calculate MPG figures for their own vehicles and make use of any on-board computers
- Think about using fuel cards and management systems provided by oil companies and others

DON'T

- Average out MPG figures instead of basing your calculations on overall fuel used and distance travelled
- Overfill tanks, on vehicles or bulk tanks at refuelling sites (because fuel needs room to expand as it warms up)
- Rush into choosing a fuel-management system by buying the first one you see
- Forget to change fuel filters (on vehicles and bulk tanks) at recommended intervals
- Make the excuse that you do not have time to operate any complex fuel-management system: it should take less than one minute per day per vehicle to monitor fuel consumption effectively

Chips with Everything

On-board Computers, Telematics and Fleet Management Systems

Don't be put off by all the fancy acronyms and high-tech terminology littering the world of on-board computers. You really don't need to understand how any of this equipment works to be able to use it to good effect in improving truck fuel economy. The list of ways in which information technology can help you save fuel is almost endless, but here are a few practical examples:

- Armitage Shanks, the sanitary-ware manufacturer, switched from manual planning to computer-assisted load planning and vehicle routing for its truck fleet, cutting mileage by no less than 25%
- Queens Motors, a Croydon, south London-based vehicle recovery company, not only saved fuel and improved fleet management control of its 60 vehicles but improved response time to call-outs by 25% with an on-board satellite navigation system from Siemens VDO

Satellite Navigation can keep drivers on route, saving you time and money whilst ensuring customer service is not compromised

DO

- Try to exploit the latest computer technology to run your vehicles as fuel-efficiently as possible
- Ask vehicle manufacturers and independent suppliers to demonstrate what their systems can do for your truck's fuel economy

DON'T

- Develop technophobia when presented with an on-board computer system or telematics
- Assume that simply fitting the latest satellite tracking or remote condition-monitoring system will automatically result in lower MPG (you have to actually use the data provided by such systems)
- Ignore what on-board computers can tell you about fuel economy. While you are driving remember not to be distracted by the equipment vehicle to monitor fuel consumption effectively

Information Technology for Efficient Road Freight Operations

Telematics Guide

This guide provides information on the basic ingredients of telematics systems, highlights how to use this technology, the information obtained from it and how to select the right system for your needs.

The Fuel Champion

The best of intentions on fuel saving can easily get forgotten when truck drivers and fleet operators are under pressure. No matter how big or small your firm, without a fuel champion to act as a focal point, your fuel-saving programme will stand less chance of being successful.

The fuel champion is someone who is chosen to take the responsibility for tracking the progress of the fuel management programme and this ensures it is implemented correctly and successfully.

Who makes a good fuel champion? Here's what they need to be able to do:

- Understand how fuel consumption figures are generated, how errors occur and how to correct them
- Recognise the potential for fuel saving and how to fulfil it
- Understand how on-board fuel-monitoring equipment can be used to encourage fuel saving

- Communicate freely and easily with everyone involved in the fuel-saving programme, which probably means everyone in the company

And when the fuel champion's job is done well, everyone shares in the success that follows, saving fuel and money.

Save It! DVD

An introduction to Freight Best Practice and two programmes designed to encourage fuel efficient driving and promote the benefits of fuel champions.

Useful Telephone Numbers and Websites

Freight Best Practice
Tel: 0300 123 1250
www.businesslink.gov.uk/freightbestpractice

Society of Operations Engineers
Tel: 020 7630 1111
www.soe.org.uk

Freight Transport Association
Tel: 08717 11 22 22
www.fta.co.uk

Road Haulage Association
Tel: 01932 841515
www.rha.net

Skills for Logistics
Tel: 0870 242 7314
www.skillsforlogistics.org

Chartered Institute of Logistics and Transport (UK)
Tel: 01536 740 104
www.ciltuk.org.uk

SAFED in the Aggregates Sector
Tel: 0800 783 7434
www.safed.org.uk

SAFED in the Van Sector
Tel: 0800 190 8440
www.safed.org.uk and click on the SAFED for Vans logo

SAFED on a Commercial Basis

If you wish to subscribe to SAFED training and funding is not available, then training can be provided on a commercial basis by trained instructors principally based throughout England. To locate a commercial instructor, visit www.safed.org.uk

Conversion Factors

To Convert	To	Multiply By
Miles	Kilometres	1.609344
Kilometres	Miles	0.621371
Litres	Gallons (uk)	0.21997
Gallons (uk)	Litres	4.54609
Gallons (us)	Gallons (uk)	0.83268
Gallons (uk)	Gallons (us)	1.20094
Horsepower (James Watt) - abbreviated to hp	Killowatts (Kw)	0.746
Kilowatts	Horsepower (hp)	1.341
Horesepower (hp)	Metric Horsepower (PS)	1.0139
Metric Horsepower (PS)	Horsepower (hp)	0.9863
Tons (imperial)	Tonnes (metric)	1.016
Tonnes (metric)	Tons (imperial)	0.984

To convert fuel consumption expressed in miles per gallon (MPG) to litres per 100 kilometres (lt per 100km) divide 282.5 by the MPG figure. To convert the other way divide 282.5 by the lt per 100km figure to find the MPG figure.

Freight Best Practice publications, including those listed below, can be obtained FREE of charge by calling the **Hotline** on **0300 123 1250** or by downloading them from the website

www.businesslink.gov.uk/freightbestpractice

Saving FUEL

Fuel Efficient Truck Drivers' Handbook

This pocket guide provides information for truck drivers on fuel efficient driving techniques, details of the SAFED course and useful forms for daily use.

Performance MANAGEMENT

Monitoring and Understanding CO2 Emissions from Road Freight Operations

This guide provides step by step advice for creating a comprehensive CO_2 inventory and the benefits this can bring. It provides templates to enable the reader to monitor the amount of CO_2 produced by its Vehicles, Warehouses and MHE

Developing SKILLS

Safe Driving Tips

Written especially for commercial vehicle drivers, this pocket-sized guide provides essential safety hints and tips on all aspects of driving safely.

Transport Operators' Pack - TOP

TOP provides practical 'every day' support material to help operators implement best practice in the workplace and acts in direct support of tasks essential to running a successful fuel management programme

Equipment & SYSTEMS

Concise Guide to Computerised Vehicle Routing and Scheduling (CVRS)

This quick guide shows the latest routing and scheduling software products and developments.

Case STUDIES

Engine Idling – Costs You Money and Gets You Nowhere!

This case study provides evidence from 4 operators that by implementing anti-idling strategies an operator can save money by reducing fuel consumption and at the same time decrease CO_2 emissions.

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Saving FUEL