

# Eco-driving for forklift trucks





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Just by changing the way they drive, European drivers could cut CO2 exhaust emissions by 10%\*.

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**TOYOTA MATERIAL HANDLING**

has developed the following checklist of techniques to help drivers adjust their driving behaviour according to the driving context.



**ECO-DRIVING**

is not only about cost reduction and energy savings; it is an attitude centred around respect for society as a whole.

\*Source – Climact

# New technologies

Using the latest technologies can help cut exhaust emissions.

## AC motors vs DC motors

AC motors require less maintenance than DC motors (no carbon brushes to change).

## Li-ion batteries

Li-ion batteries are 30% more energy efficient and they have up to 3 times longer lifetime than standard lead-acid batteries, furthermore they require less maintenance than standard batteries.

## Internal combustion engines

CNG (Compressed Natural Gas), Hybrid and Hydrogen cells can be considered as valid alternatives to LPG and Diesel.

## I\_Site

Toyota Material Handling Fleet Management System, Smart Access and pre-operational checks help identify improvement areas to optimise your forklift's operating performance.

## Automated forklift

Logistics automation is a way to optimise processes, safety, wear of components, and energy consumption.



# Before driving



## Keep up to date with maintenance

Make sure your trucks are maintained in compliance with the maintenance schedule. Poorly serviced machines will use more fuel. Proper maintenance of engine oil and air filters keeps vehicles running efficiently. Use the appropriate fuel as recommended by the manufacturer to keep the vehicle engine clean and to ensure efficient performance.



## Diesel

Check for black smoke: black smoke is abnormal (engine not properly tuned, issues with the type of fuel or the filter...). In the event of black smoke, contact service.



## Battery maintenance

Make sure that the battery electrolyte is in good condition:

- No damaged cells
- Proper water refilling
- Electrolyte level as recommended by the battery supplier in the owner's manual.



## Lead-acid battery discharging/charging

Do not overdischarge the battery. Avoid opportunity charging. Do not disconnect the battery while the vehicle is powered on. Never interrupt a charge cycle unless strictly necessary. If you swap batteries, use a completely recharged battery first.



## Pneumatic tyres

Inflate pneumatic forklift tyres correctly, respecting the inflation pressure recommended by the manufacturer. Just this can reduce the average fuel consumption by 3-4 %. Underinflated tyres increase rolling resistance which impacts fuel consumption. Insufficient air pressure also causes excessive tyre wear.



## Plan your trip ahead

Study your work plan in advance before moving your forklift. Think about the best way to reach your destination(s) considering obstacles (changes in layout, repairs and maintenance, etc.).



# When driving

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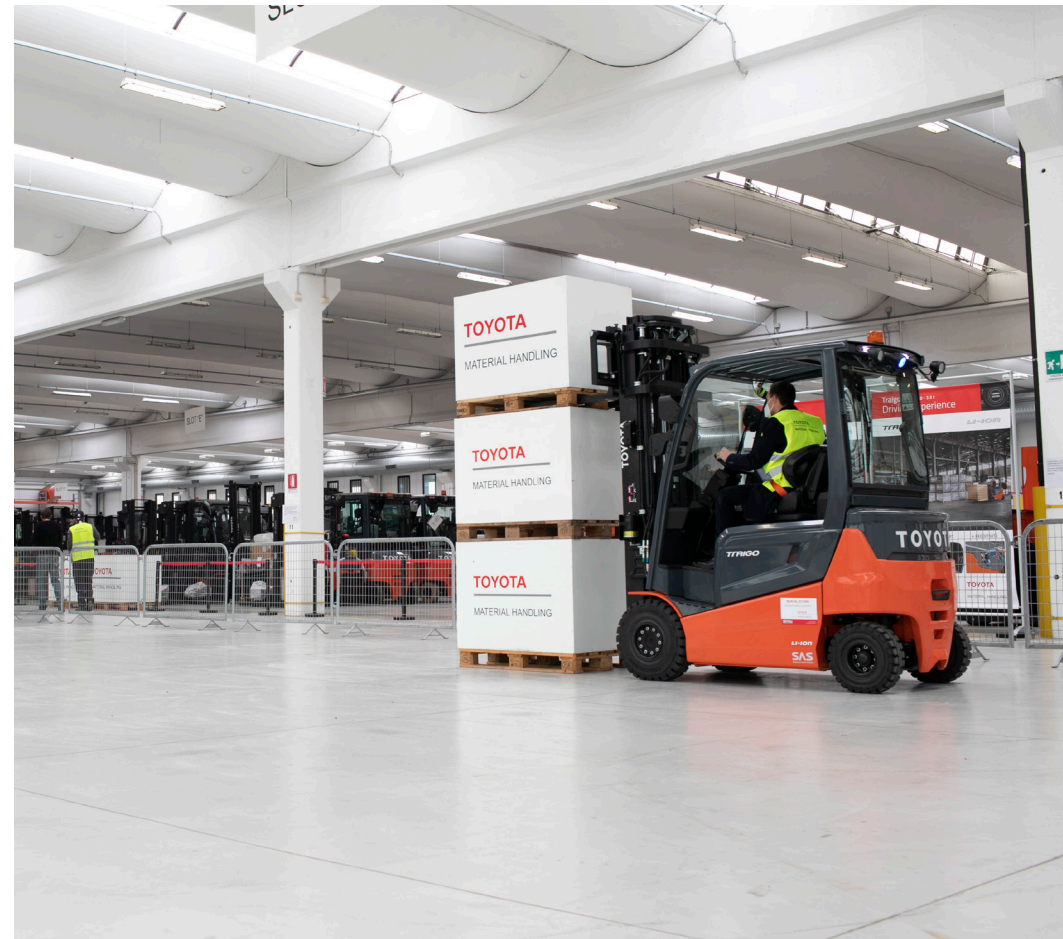
## Drive at a constant speed

Try to maintain speed by avoiding unnecessary acceleration and braking (keep a steady speed). Drive smoothly, speed up gently and always look in the direction of travel to anticipate potential problems in the flow of other traffic and to see obstacles ahead which limits sudden braking.



## Speed up and slow down gradually

Avoid fast acceleration and hard braking. This wastes fuel and wears out vehicle components such as brakes and tyres more quickly. Keep a safe distance between vehicles, normally 3 truck lengths, and keep an eye on traffic conditions ahead to allow enough time for braking and accelerating. Brake smoothly and speed up gradually after stopping.



## Brake smoothly

Every time you use the brakes, you waste energy (electric forklifts are often equipped with a regenerative braking system). Try to use the vehicle's motion energy as much as possible. When you have to slow down or stop, brake smoothly by releasing the accelerator in good time. This will also reduce wear on the brakes, lower exhaust emissions, cut off fuel supply and make the ride more comfortable for your goods.



## Limit your speed

Stick to the site's recommended speed limits and do not overtake other vehicles. Environment authorities estimate a 10-15 % improvement in fuel economy by following this tip. Aim for a constant speed. Doing so also creates a safer work place.

**Check dashboard alerts**

Today's vehicles have sophisticated on-board diagnostic systems. Check and promptly report any abnormal dashboard alerts to your maintenance expert or your supervisor.

**Minimise use of heating and air conditioning**

Limiting the use of the air conditioning can help you save 10-15 % of energy. Parking your vehicle in the shade also reduces wear and tear.

**No idling (engine/motor powered-on while not operating the vehicle)**

Switch off your engine if you have to wait longer than 30-60 seconds and don't start the engine until you are ready to go. Today's engines do not need a warm up. Move off slowly immediately after starting the vehicle. Prolonged idle time increases CO2 emissions and wastes fuel. Therefore try to avoid engine idling. Keep out of congested areas and find an alternative solution to reach your destination. This might take a few seconds but will allow for savings on fuel consumption while minimising driver fatigue and reducing the risk of accidents.



### Drive safely

Even under time pressure, always prioritise safety. Be gentle with your forks, attachment and pallets. Protect the load, do not push pallets with the mast and apply safe driving rules. Practice pre-use inspection before each work shift, follow your workplace safety guidelines and be aware of all risks around driving a specific category of machine.



### LPG

LPG cylinders – Did you know that a substantial amount of all gas purchased in cylinders is returned to the supplier? You can save money by ensuring that your operators fully empty the bottle before they change it. If you use more than around eight LPG cylinders per week it may be worth considering a bulk tank facility. This could save up to 10% on your annual LPG bill. When purchasing gas in either bulk or bottles, make sure you use a quality approved supplier – poor quality LPG can cause expensive breakdowns and poor fuel economy.

## After driving

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- Park the truck correctly in designated area.
- Correctly switch off the engine and remove the key (if applicable).
- LPG/battery: do not change the LPG tank unless it is fully empty/do not charge the battery if not necessary.
- Report any incident and near-incident.



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You can make a difference  
it's all about attitude

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To learn more about eco-driving and advanced driving techniques, please contact your local Toyota training provider.





# Toyota Material Handling in Europe

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## Total coverage

The Toyota Material Handling network extends to over 30 countries in Europe with more than 5000 mobile technicians.

## Always local – with global support

Wherever you are located in Europe, we are always local, due to our extensive coverage, but with the stability and back-up of a worldwide organisation.

## Made in Europe

Over 90% of trucks we sell are built in our own European factories, in Sweden, France and Italy – all to TPS quality standards. We employ over 3000 production staff in Europe and work with over 300 European suppliers.

Approximately 15% of our European production is exported to other parts of the world.

