

<http://www.toyota.co.jp/marine/>

- Abide by applicable laws and common courtesy, give all consideration to the environment, and strive for safe cruising.
- Ensure regular inspections and maintenance, and carry out careful inspections and maintenance before departure.
- Check weather forecasts and pay close attention to the conditions, and operate the boat in a sensible manner.
- For passenger safety, ensure life jackets are worn.
- Do not exceed passenger capacity limits. ■ Do not disturb fishermen.
- Trash should be brought home and disposed of properly. ■ Strive to prevent pollution of the sea.

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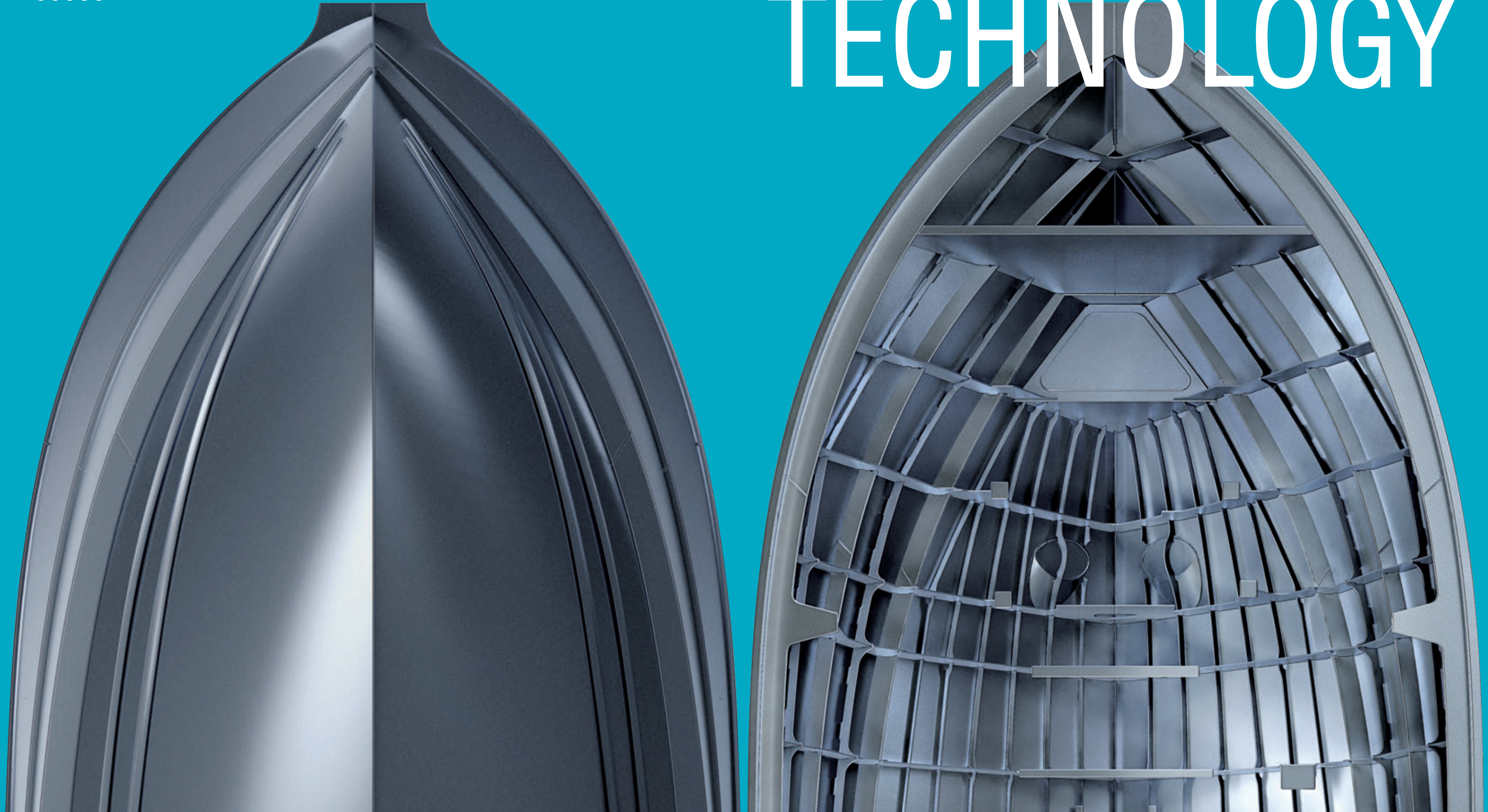
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**Wear your  
life jacket!**  
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TOYOTA *MARINE*

Technology bringing people and the sea closer together

TOYOTA MARINE TECHNOLOGY



Enjoy the sea even more Enjoy the sea for even longer

Technology that lets you enjoy boating with more comfort and peace-of-mind, technology that is environmentally-friendly, and technology that surpasses what we are used to in boats. Here, we use the technologies refined for use in automobiles, and constantly underpinning our work is the idea of "bringing people and the sea closer together." Here at Toyota Marine, we keep this unwavering ideal firmly to heart, and will keep continuing to develop marine technologies.



TOYOTA **MARINE**

Aluminum Hull

Recycling for a Happier Tomorrow

Toyota Marine hulls are manufactured using aluminum.

One reason for this is that aluminum is recyclable.

We work closely with the sea, and taking care of the sea for future generations is a major responsibility for us.



To begin with, what is a "hull"?

The "hull" indicates the bottom of a boat, minus its upper structure and engine. In aircraft, the role of the hull is played by wings. In boats, the hull is the most important part, as it influences the comfort, ride, and safety of the boat.

When selecting a boat, design and equipment are important, but hull materials and configuration should also be considered important factors.



Toyota Marine is very particular about using aluminum hulls.

We have focused on aluminum hulls not only for their comfort and ride characteristics, but also because of how easy they are to recycle.

The A5083 aluminum alloy used in Toyota Marine hulls can be recycled, and compared to refining new aluminum, reprocessing into new aluminum requires much less electricity. This contributes to lower levels of CO2, the main cause of global warming.

Toyota Marine will continue in its efforts to promote the usage of aluminum hulls, so that we can continue to enjoy the beauty of the sea.

Aluminum Hull

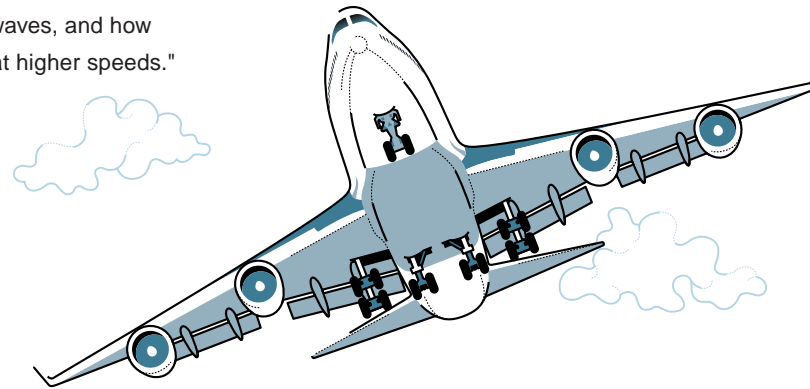
Peace-of-mind Born of Strength

Peace-of-mind is essential if we are to truly enjoy the sea. In its hulls, Toyota Marine uses the same high-strength aluminum alloy as used in aircraft and Japan's bullet train "Shinkansen." This strength provides increased peace-of-mind.



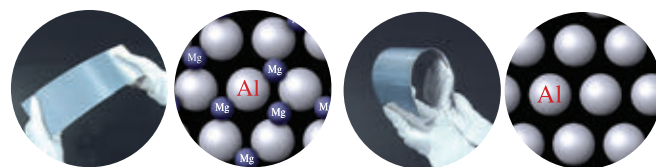
"I was surprised at how well it handled waves, and how different it was. This lets me troll safely at higher speeds."

(PONAM 35 owner, male, 40 yrs.)



High-strength aluminum alloy A5083

A5083 (JIS H-4000), which is used by Toyota Marine for their aluminum hulls, boasts a particularly high strength among the many types of aluminum. This aluminum contains approximately 4.5% magnesium. The surface of aluminum has a strong intrinsic rust-resistant property since it is protected with an oxidized film; however, by adding magnesium and other alloy components, the corrosion resistance and strength of the aluminum have been dramatically increased. By using aluminum alloy A5083, Toyota Marine's aluminum hulls quickly absorb the impact, vibrations and noise of waves, providing comfortable cruising.



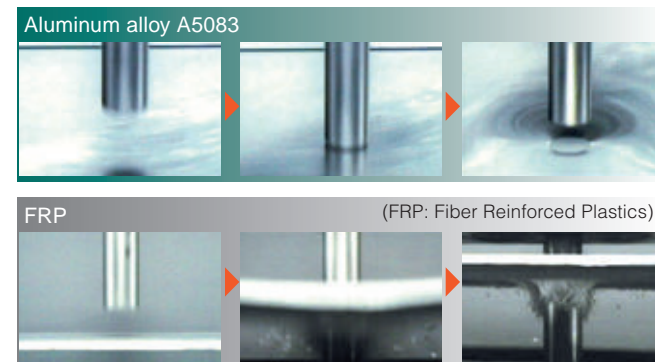
Model of aluminum alloy A5083

Model of pure aluminum

Another Secret to its High Strength Rolled Aluminum

In order for the aluminum hull to be imparted with the optimum strength and impact resistance, Toyota Marine uses rolled aluminum alloy sheets. Since rolled aluminum not only has excellent strength but also is resistant to external stresses as well as fractures, compared with other materials such as fiber-reinforced plastics (FRP), it is safer and the optimum material for vehicles traveling at high speeds.

[Impact comparison testing]



We want to make every trip a comfortable trip

Our use of aluminum for our hull material is only part of the story. With the aim of providing an even more comfortable ride, we are constantly pursuing ways in which to make use of this aluminum, and searching out new structures.



"When compared to boats with FRP hulls, you definitely feel much less in the way of impacts and vibrations. A 35 ft boat feels similar to a 40 ft class boat."

(PONAM 35 owner, male, 50 yrs.)



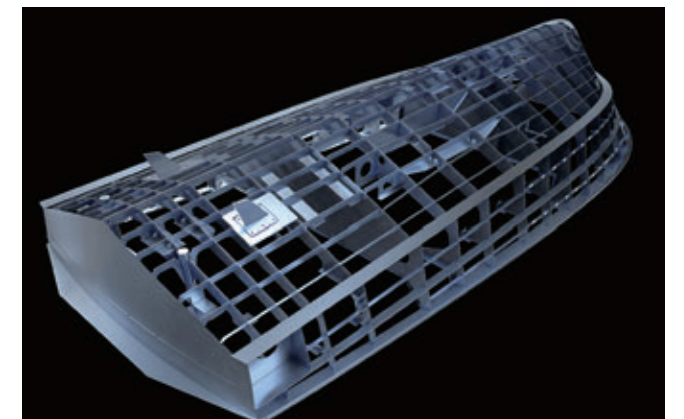
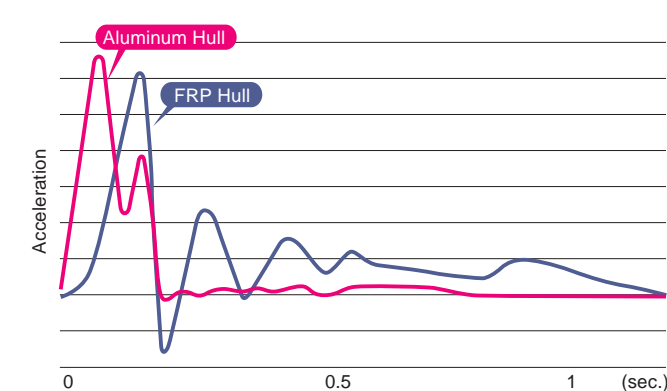
Outstanding Impact Absorption

Aluminum hulls have superlative sea-worthiness, and even when battered by waves, the whole hull absorbs this shock. This means that the impact of the waves is minimized more quickly, meaning less shock and vibration is transmitted to occupants of the boat, providing a more comfortable ride.

Highly rigid aluminum frame construction absorbs even the fear of waves

The aluminum frame construction adopted by Toyota Marine for the hull, while absorbing as much as possible of the impact load from waves, effectively disperses it to the entire hull frame to minimize warping and bending of the entire hull.

[Attenuation of speed of vibration from wave shock]



Marine Engine

Engines easier for everyone to get along with

Our marine engines use computer control to ensure the engine always runs in its optimal state, meaning they are easier for occupants, the sea, and even the environment as a whole to get along with.



"Put simply, the fuel efficiency and quiet operation are what we have come to expect of Ponam. Inside the cabin, we can enjoy quiet, comfortable cruising."

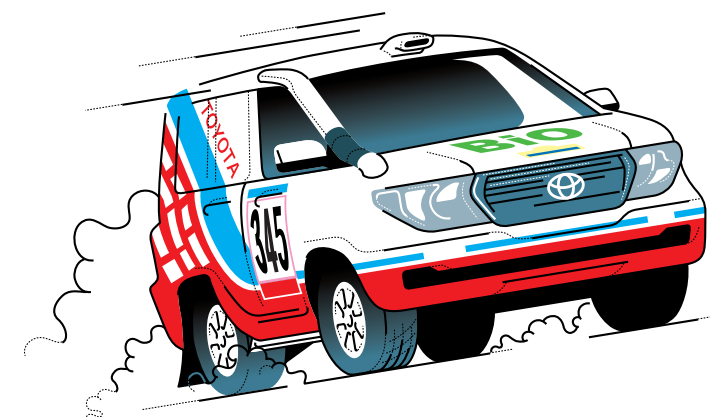
(PONAM 28 III owner, female, 30 yrs.)



Advanced automotive technology, also at sea

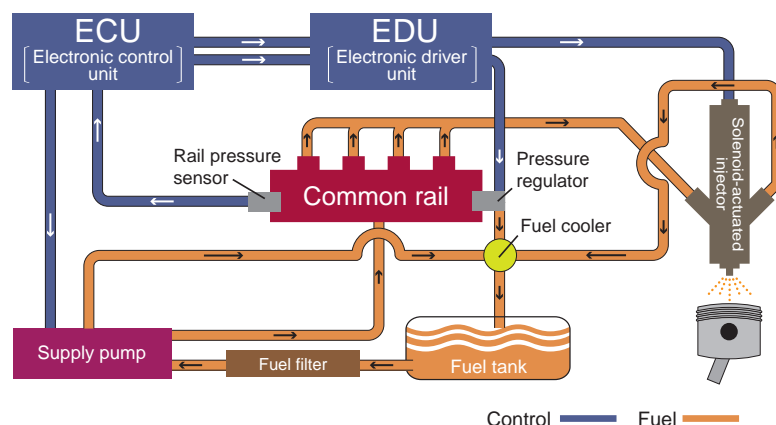
We are making use of the advanced technologies developed for use in automobiles in boats as well. This includes engines.

Given that it provides preeminent performance even in harsh environments, the diesel engine in the globally-acclaimed Land Cruiser has been marinized to make the most of its performance and reliability.



► Common rail system

The common rail system stores high-pressure fuel in the common rail supplied by the supply pump, then injects the fuel through the solenoid-actuated injectors. Sensors detect the engine condition and a computer controls the fuel injection timing, quantity, pressure, and frequency in order for the engine to operate under ideal conditions. This achieves "clean operation, high output, low emissions, and low noise," while greatly reducing the production of black or white smoke at engine startup or during acceleration.

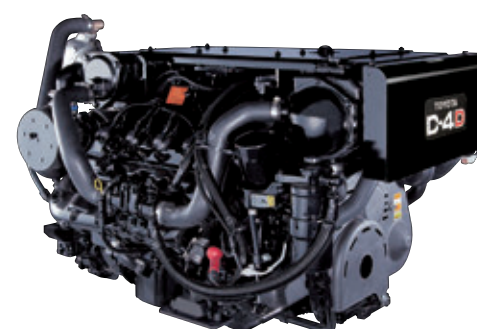


► Using the same diesel engine as in

the Land Cruiser, a vehicle that has earned the trust of drivers around the world

■ TOYOTA M1VD-VH

- Cylinder arrangement/number: V / 8
- Cylinder stroke × bore: 86 × 96 mm
- Displacement: 4,461 cc
- Maximum power: 272 kW (370 PS) at 3,800 rpm
- Maximum common rail pressure: 180 MPa
- Valve train: DOHC 4-valve chain & gear drive
- Supercharging method: Turbocharger (twin)



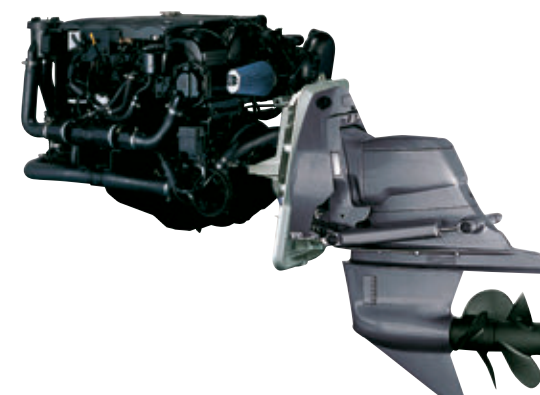
This is a marinized version of the 1VD engine used in overseas specification Land Cruiser 200 vehicles, which have even participated in the Dakar Rally.



Land Cruiser 200 (Dakar specifications)

■ TOYOTA M1KD-V

- Cylinder arrangement/number: In-line / 4
- Cylinder stroke × bore: 96 × 103 mm
- Displacement: 2,982 cc
- Maximum power: 136 kW (185 PS) at 3,400 rpm
- Maximum common rail pressure: 180 MPa
- Valve train: DOHC 4-valve belt & gear drive
- Supercharging method: Turbocharger



This is a marinized version of the 1KD engine used in overseas specification Land Cruiser Prado vehicles.



Land Cruiser Prado (Overseas specifications)

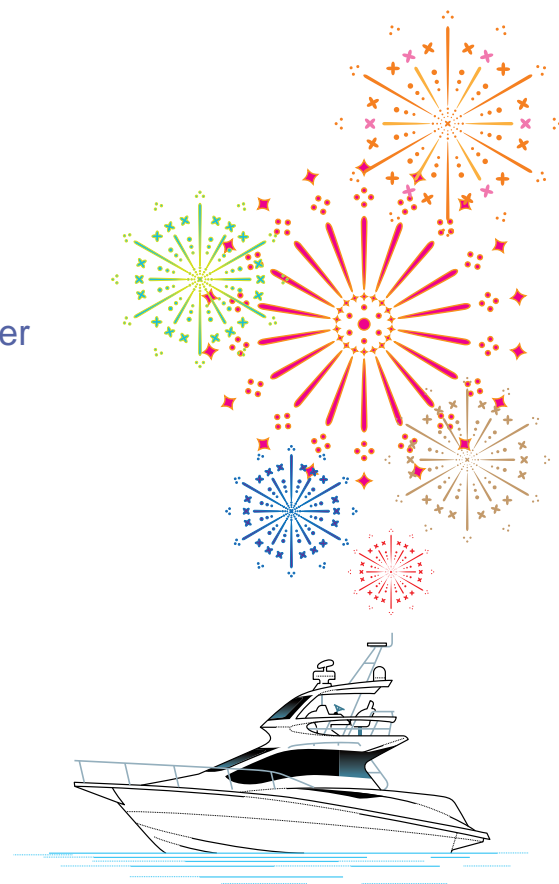
Anchoring Without an Anchor

Anchoring for staying fixed in a single location. Virtual anchor mode is a system for automatically maintaining the boat's position, just as if you are really anchored. One-touch control replaces bothersome anchoring operations, letting you better enjoy your time on the water.



"This is so convenient. I can stop the boat without having to wind the anchor up and down every time."

(PONAM 35 owner, male, 50 yrs.)



TOYOTA VIRTUAL ANCHOR SYSTEM TVAS

Toyota's virtual anchor is a navigation support system in which a computer assesses the position, wind, and current, and using automatic control, maintains the boat's position and orientation. This provides one-touch switching between these three modes, letting users more fully enjoy their time on the water.

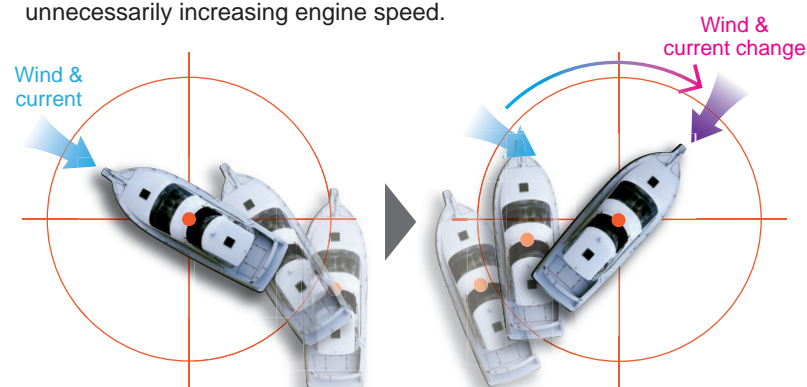


TVAS Operating Panel

Note: When using the Toyota Virtual Anchor System, the boat is in operation. Please ensure the area around the boat is safe. Do not enter the water around the boat, as this is very dangerous.

1 Virtual Anchor Mode

Computer control keeps the bow of the boat pointed into the wind and current, and maintains the position of the boat where it is stopped. Even if the wind and current changes, the orientation of the bow is automatically adjusted. This enables maintenance of the boat's position using low thrust, low fuel consumption, and low noise, without unnecessarily increasing engine speed.



Automatically points the bow into the wind and current, and maintains the set position.

If the wind and current change, automatically changes the heading of the bow, and maintains the set position.

**Graphical representation. Actual boat movement will differ.*

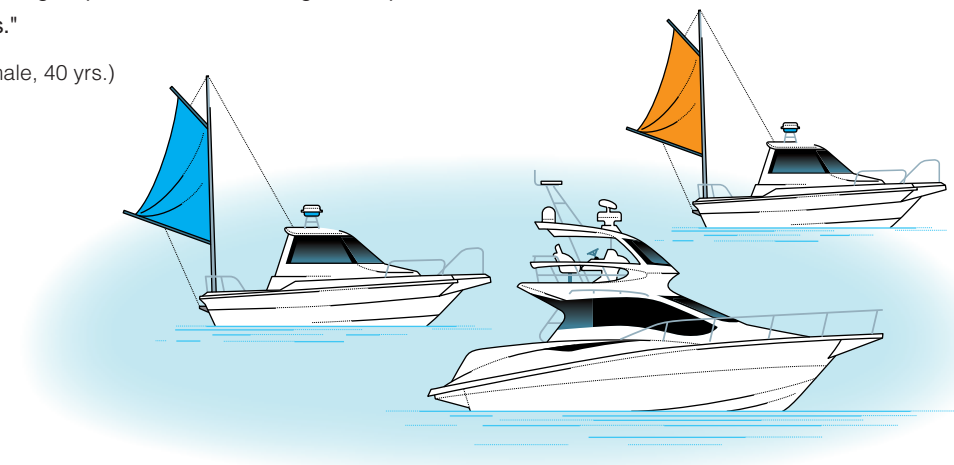
Trolling Made Easy

Trolling using a sparker sail requires considerable skill, but by using virtual sparker sail mode and virtual compass modes, the touch of a button enables piloting of a leisure fishing boat with the same levels of a veteran captain, meaning more enjoyable trolling.



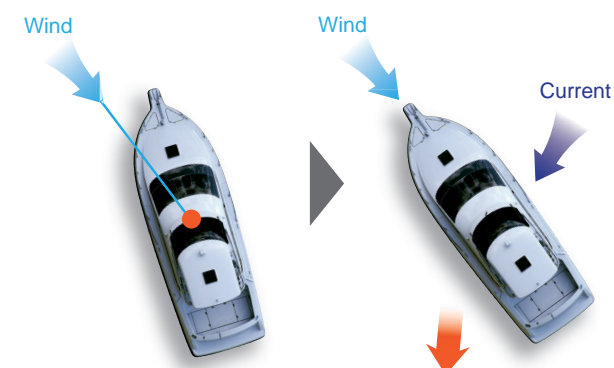
"This is easy to operate, and the boat holds the same position and drifts the same way as when using a sparker. I like watching the surprise on the faces of fishing boat captains."

(PONAM 35 owner, male, 40 yrs.)



2 Virtual Sparker Sail Mode

The boat always faces into the wind, and drifts with the current. The direction and speed of boat drift is controlled with a button.

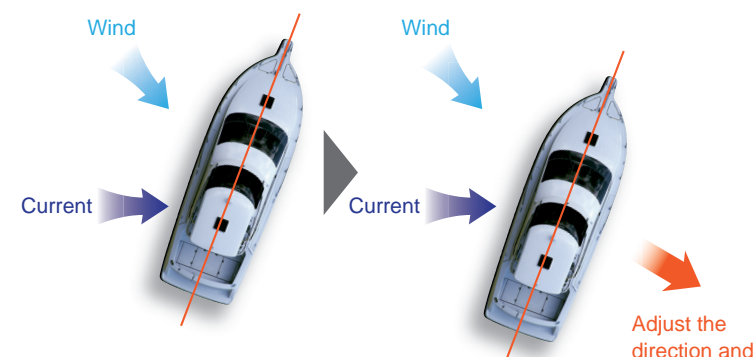


Set the bow into the wind

Adjust the direction and speed of drift

3 Virtual Compass Mode

Drift while always keeping the bow pointed with a set heading, regardless of wind or current direction. The direction and speed of boat drift is controlled with a button.



Set the bow to the desired heading

Adjust the direction and speed of drift

The complicated made easy

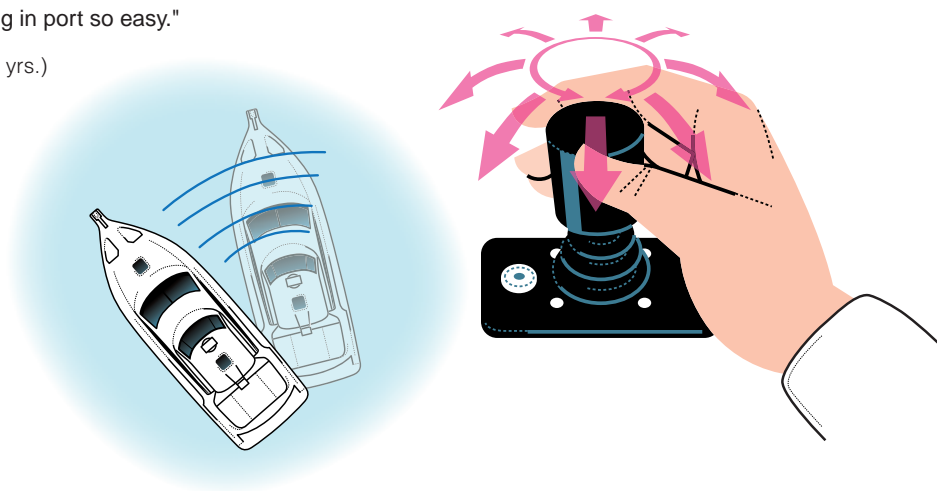
Mooring and casting off are some of the more challenging operations facing a boat captain. However, the Toyota Drive Assist system is an entirely new concept in navigational support systems, overturning all of these assumptions. A single joystick provides unprecedented freedom of boat movement.



User's Voice

"Using the joystick lets me move the boat exactly where I want it to go. This makes maneuvering in port so easy."

(PONAM 35 owner, male, 60 yrs.)



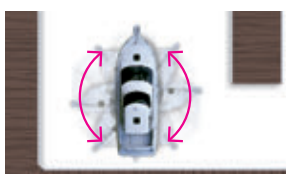
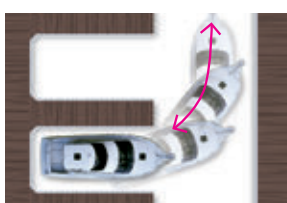
TOYOTA DRIVE ASSIST **TDA**

Toyota Drive Assist allows you to move the boat forward and backward as well as in all other directions with a single joystick, so you can safely and smoothly perform docking and undocking operations which are difficult with inboard engines, while observing the current and wind direction in a marina. Toyota's bow thruster rotational control technology keeps battery consumption low, providing stress-free docking and undocking. Furthermore, you can make subtle speed adjustments depending on how much you move or rotate the joystick.

Moving the joystick forward moves the boat forward; moving the joystick backward moves the boat backward. Since you have full command of backward movement, you can dock as though you were parking a car.

Moving the joystick diagonally moves the boat in the joystick direction without changing the orientation of the bow. Since the boat can be moved in any direction, docking operations can be performed smoothly.

Turn the boat by rotating the joystick knob in the direction that you wish to turn. The propellers on both sides rotate in opposite directions turning the boat 360° on its center.



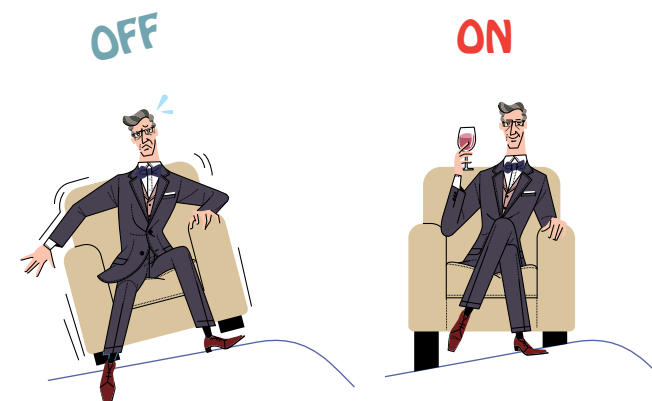
Joy stick

Bow thruster

Technology for occupant comfort

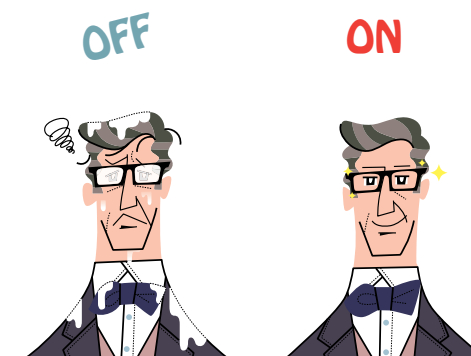
Auto flaps

These automatically keep the boat always in an optimal position, and lessen impacts from waves, promising guests a more comfortable ride.



Marine air conditioner

Utilizing advanced technology refined for automobiles, this also provides dehumidification which has up until now been difficult, promising even more comfort while on the water.

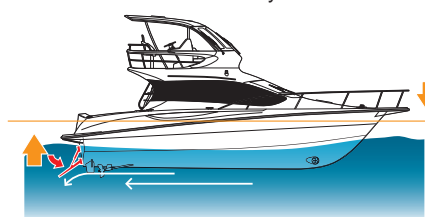


Auto flaps

Sensors detect listing of the boat, and operate the flaps automatically. These make sure the boat is always in an optimal position, lessening impacts from waves.

These automatically adjust the trim angle to maintain the optimum planing attitude

When the boat takes off, the flaps activate to prevent the bow from rising. In addition, the optimum planing attitude is maintained while underway.

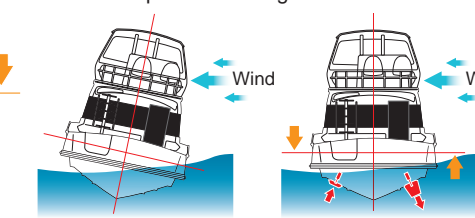


This lowers the flaps to encounter water resistance, automatically adjusting the boat to its optimal planing attitude.



Automatic control of tilt angle, maintaining optimal position

The hull tilt that occurs as a result of crosswinds or countersteering is automatically detected by the auto flap system, which operates the left and right flaps to adjust the boat to its optimal traveling attitude.



Boat tilt due to countersteering

Auto flaps controlling tilt angle

Marine air conditioner with dehumidifier

Adapting advanced automotive technologies. This high-performance air conditioner exceeds common expectations for a cruiser, and the dehumidification (defogging) control makes cabin life comfortable throughout the year, while allowing safe cruising.

