

FITTING AN OUTBOARD

SURVEY OF POSSIBLE METHODS

PROS AND CONS OF FITTING AN OUTBOARD

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This paper results from a request that I review the literature held by the Class Association on a number of different methods of fitting an outboard engine to a GP14 dinghy. It surveys the various methods that have been used, examines the pros and cons of doing so, and for several methods it provides reference details to specific plans for that method which are held by the Class Association office.

TILTING

It is vitally important that the outboard be mounted in such a way that it is free to tilt (“trip”) if it hits an obstruction. If not free to tilt in these circumstances there is the potential for serious damage.

With some mounting methods and some engines, careful attention to dimensions and angles is vital in designing the mount, in order to ensure that not only is the leg of the motor vertical when down, and free to trip, but the power head also has room to tilt without fouling the transom or stern deck.

RECOMMENDED LIMITS:

The maximum power and mass should not exceed about 4 h.p. and 20 kg (or 45 lb) respectively.

Afficionados of the once ubiquitous British Seagull outboards may like to note that the larger popular models were quoted as having power outputs in excess of this limit, but that the “Saving Old Seagulls” website indicates that these ratings were more than a little optimistic! These engines had a great many very real virtues (including near indestructibility and the ability to withstand immersion and even outright abuse), but high power output was never one of them; in practice, any British Seagull outboard that appears sensible for the boat will not overpower her.

SHAFT LENGTH

If buying an outboard specifically for the boat, as opposed to using one which you already own, measure up to determine what shaft length you require. One owner reported on the Discussion Forum that with the motor mounted on a box on the rudder hangings (Method 5 in this document), the propeller of his newly purchased standard shaft Honda 2.3 h.p. motor was not deep enough in the water to work properly, and that he had to trim the boat down by the stern - to the point where the water was half way up the transom flaps - before it would work properly. He could not lower the motor on its mount because it would not then clear the sheet horse.

He therefore asked our advice whether to trade this in for a long shaft motor.

He also made the point that if he were to go for a longshaft engine, and then sit further forward in the boat to trim it, he would have to also buy a tiller extension.

Finally he raises his concerns that with the longer shaft the propeller would be at greater danger of striking the bottom in shallow water.

My reply on the Forum was, with very slight editing:

“You refer to your mainsheet horse, from which I presume that your boat is a moderately early one, since it has fallen out of favour with modern boats, my own one being a rare exception there.

“You don't tell us which version of the GP14 you have, but I presume that you have chosen a box mounted on the rudder hangings as the most suitable method for your boat. However if this question is still open, you may perhaps be able to mount the motor off-centre, using either a mounting board bolted to the transom ("the original Seagull mounting board") - Method 2, or by using a proprietary bracket mounted to the transom - Method 4. If it is off-centre this will enable it to be lowered slightly and still clear your mainsheet horse. The proprietary bracket, if of a type designed to allow you to raise and lower the motor, may give even more scope, and may perhaps fully solve your difficulty - but at the cost of permanently remaining on the transom, or permanently marking it if removed.

“The reason for your considering a longer shaft is not to put the prop any lower in the water. Rather, it is to put it at the same height as you are currently using, but to enable the transom to be returned to its correct height relative to the water, instead of the transom having to be ballasted down to the point where it is dragging in the water.

“Since the prop is intended to be no lower in the water than you are currently using, the likelihood of it hitting the bottom should not be any different. However the one exception there is that the prop will very temporarily be lower in the water on occasions when you go aft to attend the motor.

“In any case, do ensure that the motor is free to tilt if it does strike the bottom.

“On the plus side, I suggest that the longer shaft engine would therefore be more efficient, since the boat will be trimmed more efficiently, provided you use the tiller extension (a need which you have already identified).

“On the other side of the coin, trading in this motor for one with a longer shaft would also be the more expensive option. It will be a slightly larger engine to stow and to transport, which may or may not present you with a problem. And if you choose to stow it in the boat (rather than on the transom) while sailing it will take up slightly more length; that may make all the difference between it fitting into your intended stowage location and not fitting.

“I suggest that you consider all these factors, and consider how much time you actually expect to spend motoring. Then you can make an informed choice whether you prefer to live with the limitations of your present engine, or prefer to change it.”

FITTING METHODS:

First, some general points about fitting an outboard may be helpful. I have to say that this is from general knowledge rather than first-hand experience; I have several times considered fitting an outboard to my various GP14s, but have always decided in the end that (for me) the disadvantages outweigh the benefits, and so I have never actually done so.

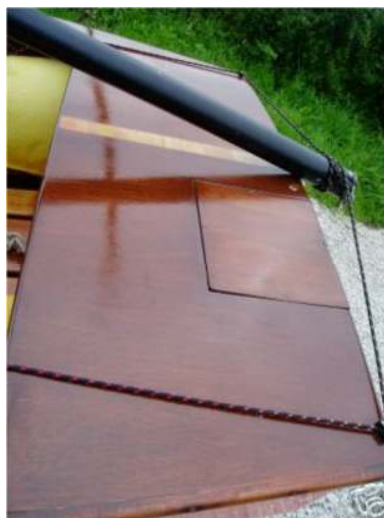
There are a number of options for mounting an outboard, but perhaps the first thing to mention is that the structural design of the boat has evolved over the years, and on modern wooden boats the transoms are made of comparatively thin plywood, and so are lighter (and less strong) than the originals which were made from a substantial thickness of solid wood. The problem is even more acute with GRP and FRP boats; essentially, modern GP14s are not structurally designed as standard to take the load of an outboard. Thus if fitting an outboard to a modern boat I would recommend reinforcing the transom with a wood pad on the inside face. If you are having a boat built, and anticipate even the mere possibility that you may one day want to fit an outboard, this reinforcement is best done during building. However if you already have a boat, or if you buy secondhand, it is still possible to reinforce the transom retrospectively.

A second consideration is that it is virtually impossible to mount an outboard on any sailing dinghy without permanently marking the boat, however the motor is attached. For me, that is a fundamental disincentive.

1. A hatch cut in the stern deck

One method originally used was to cut a hatch in the stern deck to allow an outboard to be clamped directly to the transom. The design for this, which appears to be possibly an extract from the original plans, is available from the Class Association.

This was widely used in the fifties, but in my view it was rarely satisfactory because it was almost impossible to create a really neat job for the closed hatch. The hatch illustrated below is a lot better than many, but it is still glaringly obvious, and I would not personally regard it as acceptable.



In particular, a great many of these decks and the corresponding hatches seem to have been rubbed down over the years as two separate items, or perhaps rubbed down by hand without the use of a wood block to back the abrasive paper, with the result that the mating edges have been more heavily sanded than the surrounding wood. This produces a noticeable valley along the join.

Additionally, if the hatch is made from the wood cut out of the deck, however well the job is executed the gap is never going to be less than the width of a saw blade all the way round; that is clearly visible, and does not meet my standards of neatness. If, alternatively, the hatch is made from a separate piece of ply, although with care one can then achieve a hairline joint it is almost impossible to obtain a satisfactory match for the grain.

This hatch went out of fashion when full-width sheet horses became popular in the sixties, and perhaps because of the above problems it has never returned to popularity even though more modern sheeting arrangements do again enable such a hatch to be fitted.

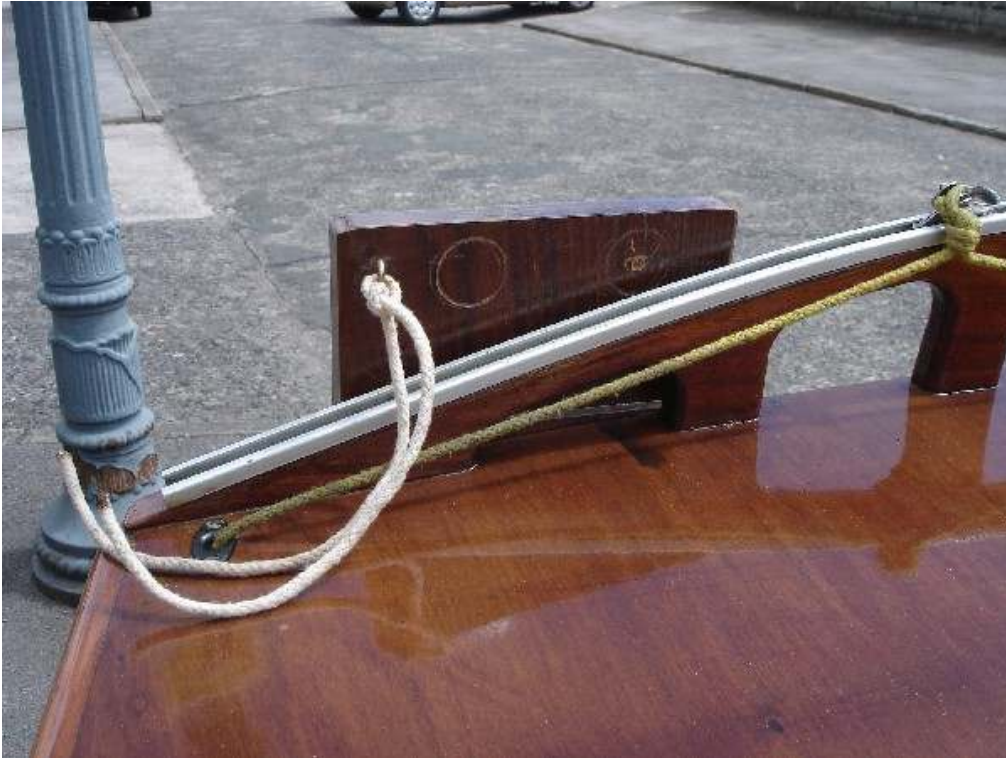
This option is not available on GRP and FRP boats; the thickness of the transom is not sufficient to take the load, and the necessary cutting of a hatch (and probably also the stiffening of the transom) would be in breach of class rules and would take the boat out of class. Quite apart from precluding the current owner from racing her, it would also take her out of class as regards any future owners, and thus it is likely to have a significant effect on her resale value. If the boat is reasonably young, and hence valuable, this drop in value could be very substantial.

2. A mounting board bolted to the transom

Although this is an obvious possibility, it is only very recently that I have come across any actual examples. The first example, of two, was on a boat from the mid-fifties advertised on eBay, whose owner claimed it to be the very rare original Seagull mounting board. Then, out of the blue, when I had the good fortune to be able to buy one of the very first GP14s, from 1951, albeit somewhat modernized, in beautiful condition, she came with one of these boards. I therefore accept that it probably was in fact one of the original official options, and not merely an *ad hoc* DIY method.



Set up for purposes of the photo only; lower pair of coach bolts would of course be fitted in normal use, but I was a little lazy in setting up this photo shoot!

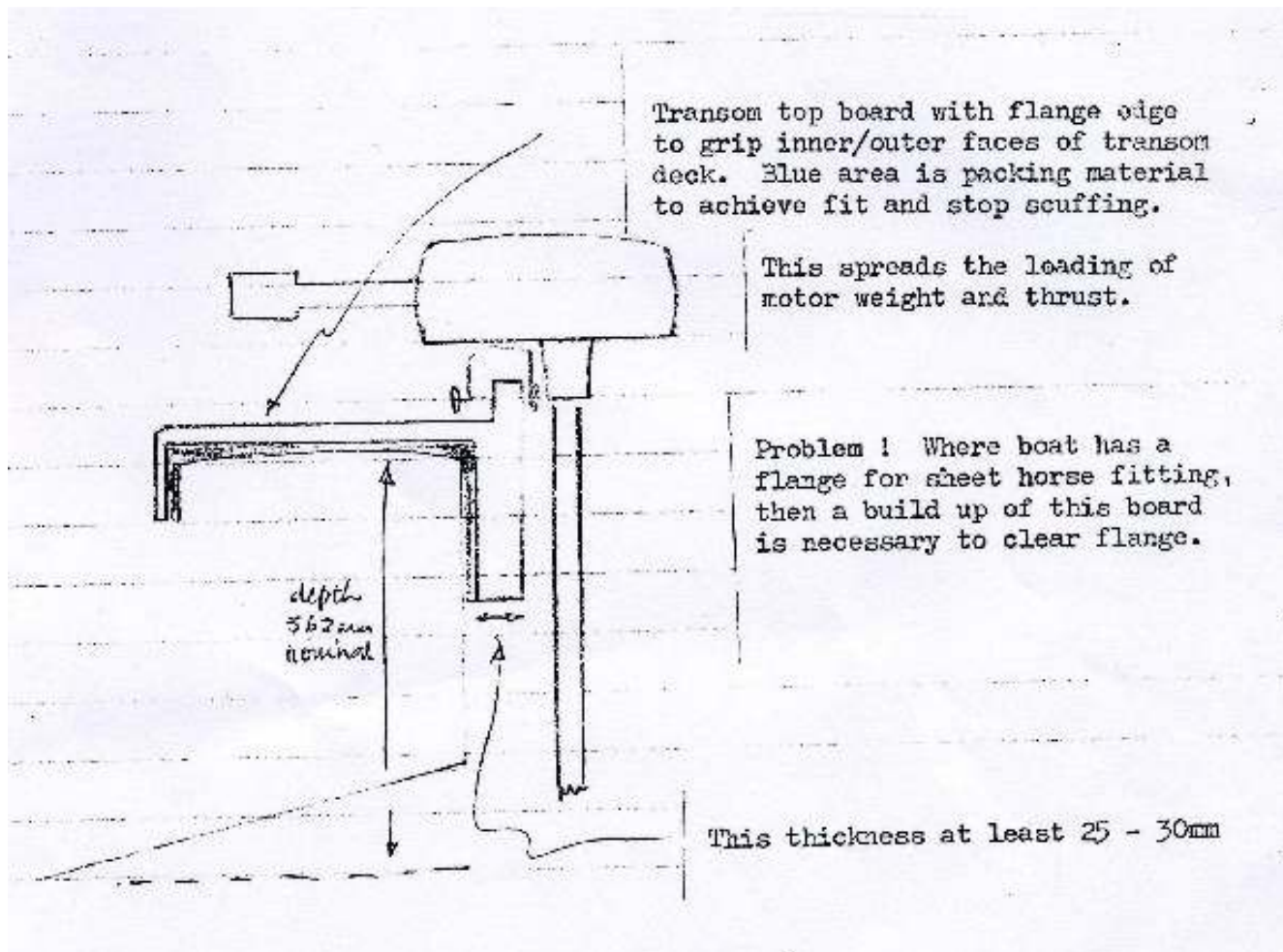


When demounted, and if used only occasionally, the defacement to the transom is kept to a minimum - but still expect some degree of pressure marking if used regularly. Note also the safety line for the board, and you should also have one for the motor.



3. Bracket spanning the stern deck

This unusual alternative is a specially fabricated bracket that clamps across the full length (front to back) of the stern deck. Again the track record is that this was in use on at least one of the very first GP14s; in my early boyhood I knew one of the very first GP14s, owned by the parents of one of my regular holiday friends, sail no. 23, "Hawk", and she sported a big Seagull mounted in just that way. I have never seen anyone else do this, but with a bit of engineering fabrication it should nonetheless be possible, and the Class Association do offer a design for the equivalent bracket in timber, which is reproduced here.



4. Proprietary Bracket on Transom

This is a reasonably neat approach, and fairly popular in other cruising classes. If you want to be able to remove this easily, it should be possible to mount it to sliders running in a pair of vertical stainless steel tracks; all that will be left on the transom when the bracket is removed is then the tracks and their end fittings. However the tracks may have to be custom made by your local friendly engineering firm.



The model shown above is adjustable, but there are also slightly smaller fixed ones available (below). However if bolted permanently to the transom even a small and neat one does permanently deface the boat.



An occasional option for British Seagull owners only.

Now as rare as rocking horse droppings, British Seagull in their heyday offered a bolt-on transom bracket for their engines (cast bronze for the 40-series and nylon for the century series), and if you are very lucky you may find one second-hand; but these are of course both make-specific and model-specific, so they are no use for other makes of outboard, or even for the wrong model of Seagull. As of late September 2017 there was just one brand new 40-series one remaining in stock, on the shelf at Saving Old Seagulls - and at the time this writer had first option on it for another club member, although in the end he did not wish to buy it.

Another option

As an alternative to stainless steel tracks and sliders, albeit rather less neat, some proprietary brackets are designed to drop into a mounting plate in order to be removable when not in use. This mounting, for such a system, was seen on a Wanderer dinghy (smaller sister to the Wayfarer). Again, however, it permanently defaces the boat.



As of April 2020 this type of bracket is again being manufactured by British Seagull (now owned by Sheridan Marine), newly re-introduced to their range.



https://www.sheridanmarine.com/product/british-seagull-outboard-removable-auxiliary-bracket?utm_source=britishseagullcom&utm_medium=website&utm_campaign=seagull_spares&utm_content=text

Before bolting the bracket to the transom, do measure very carefully that the motor will clear the transom and the stern deck, both when down and when tilted, and that the propeller will be in a suitable position when down. Then re-check your measurements; you don't want to deface the transom with incorrect holes because your first attempt was in the wrong place. It won't do any harm to do a mock-up first on a piece of scrap timber.

5. Mounting to the Rudder Hangings

Some owners have relied on the strength of their rudder hangings, which absolutely must be through-bolted for this, and have made up a wooden box which mounts to the rudder hangings, and to which the outboard can be clamped. This seems to be the method best suited to minimizing any permanent marking and disfigurement of the transom, but the strength of the rudder fittings is then crucial, and that in turn probably imposes lower limits on the power and weight of outboard than some of the other methods, and it is essential that these fastenings be through-bolted.

It is also desirable that so far as possible the rudder hangings should be required to do little more than locate the mounting box, and that the main thrust should be transmitted by side pieces bearing directly on the transom. I would personally suggest also that the design be modified to allow the weight to be taken by a top piece to the mount bearing directly on the stern deck or the sheet horse as appropriate to the particular boat.

The detailed design of the box embodies some initially surprising sophistication in order to circumvent certain difficulties which are found in practice. This design is available from the Class Association as a separate document; **ask for “Boxing Clever” by Tim Pettigrew** (as distinct from an entirely different document with the same title by John Collins).

Rather more basic designs for this method appear in **The Basic Boating Book (3rd Edition)**, and also in **“Boxing Clever” by John Collins**, both available from the Class Association.

Note that two different articles on this idea, by different authors, happen to have the same title, so you will need to specify the author as well as the title in order to get the one you want.

Mounting the outboard to the rudder hangings also raises major problems for using the outboard as an auxiliary for sailing:

1. Where do you stow the outboard while sailing? Perhaps under the sterndeck, if small enough, but probably only on a Series 2 boat (or the equivalent late GRP or FRP or epoxy boats); for all others the reserve buoyancy in that space is likely to preclude stowing an outboard there. And even for these more modern boats where it is physically possible this is already a prime space for stowing cruising kit, and you can't exceed its capacity. It is also important not to unduly obstruct the free flow of water to the transom scuppers, and not to obstruct the fair line of the shockcords holding the flaps closed; if the latter is obstructed the flaps may then leak, and sometimes severely. Alternatively at the aft end of the cockpit on the floor. In either case it must be well lashed down, and it might be worth having a special bag made for it - to keep sea water out of the engine, and to keep any oil leaks out of the boat.

2. Where do you stow the mounting box while sailing? Possibly with the engine, perhaps still clamped together; alternatively loose under the sterndeck, but the same comments about space still apply.

3. You have to unship the rudder before you start motoring; where do you then stow it? Bear in mind that the boat may already be cluttered because you will also need to stow the boom and the sails somewhere. One solution to that is to furl the headsail (roller gear is needed for this, but in my view it is well worth fitting anyway, as part of your safety requirements for cruising), and rig the main halliard to the boom end as a topping lift so that the boom can be left up, and sheeted in, with the sail lashed down along it.

4. Motorsailing would seem to be ruled out; if there is significant drive from the sails as well as the engine I would doubt whether the motor would generate sufficient steering moment while the boat is moving much faster than normal for that throttle setting. Also an outboard does not lend itself to the

frequent sensitive but small helm adjustments that happen almost continually while sailing; the outboard tiller is usually much shorter, and there is comparatively massive friction in the steering swivel.

FURTHER POINTS

Unless the motor is permanently bolted to the boat (which will be the case only very exceptionally, if ever) I strongly recommend the use of a safety line, to tie the outboard to the boat, as well as the normal securing clamps. Then if the engine shakes itself off the mounting board or bracket, you don't lose it overboard.

The motor adds weight at the stern of the boat, which even on its own will tend to trim her down by the stern. If additionally you sit far enough aft to be able to control it with a standard tiller, this will put even more weight at the stern. Unless you have counterbalancing weight up forward the end result will be to drag the transom in the water.

Two points then arise.

First, the hull then becomes less efficient; it requires additional thrust (and hence power) to drive her at any given speed because of the drag of the transom.

Second, the transom flaps are not normally designed to be fully watertight, and may now leak, particularly at slow speeds or when stopped. There are three possible ways to approach this problem: either you accept it and live with it, or you redesign your transom flaps so that they are fully watertight, or you reballast the boat to keep the transom out of the water as her designer intended. The last of these is probably the best option, but it may have implications for the shaft length, as discussed at the start of this paper.

PROS AND CONS OF FITTING AN OUTBOARD:

I personally suggest that there are two fundamentally different circumstances in which an owner might wish to use an outboard; as an auxiliary for sailing (e.g. in case the wind fails), or as the primary means of propulsion on an occasion when you have no intention of sailing. These uses have a number of fundamental differences.

In the latter case, e.g. a fishing trip, or on certain rivers and canals where sailing is not viable (either because of frequent low bridges, or high banks - and thus little wind, or insufficient width for convenient tacking), the motor is rigged for use from the moment you set out until the moment you return, and you may well not even have the sails and boom and rudder aboard. The boat is then used purely as an outboard motor dinghy; the motor has a clear use, there are clear benefits in having it, and the problems are purely those of suitability and the means of attaching it.

However using an outboard as an auxiliary to sailing adds some quite major problems, although it is fair to say that some owners have solved them to their satisfaction and feel it is worth doing so.

Advantages (as an auxiliary to sailing):

- The family sailor with young children, or the inexperienced sailor, may not feel able to cope under sail with worsening weather, even if appropriately reefed.
- Very useful in a flat calm, or when trying to cheat a foul tide in light winds. This is particularly relevant if you expect to be crossing shipping lanes, and these are not always offshore; such popular cruising areas as the Thames estuary, the Clyde, and Milford Haven, for example, all have shipping lanes which the cruising dinghy sailor may well wish to cross.
- It is fair to say that there is a considerable body of opinion within the Dinghy Cruising Association that one should routinely carry an outboard, if only for just these situations.
- Emergency propulsion in the event of catastrophic gear failure

Disadvantages (as an auxiliary to sailing):

- For the vast majority of the time that you are sailing the motor is likely to remain unused, simply as a dead weight and a bulky encumbrance. This raises some important questions:
 - Where do you stow it while it is not in use?
 - How will you ensure that it doesn't get unduly in the way?
 - Does it matter if it lies on its side? (Some motors will tolerate this and some won't.)
 - Does it matter if the propeller is sometimes higher than the engine? (Same comment.)
 - Will the engine suffer expensive damage if you have the misfortune to capsize?
 - Is there a risk of oil leaks marking your beautiful pristine boat? That depends partly on the choice of engine; Seagulls in particular, for all their many virtues, are notorious for oil leaks.
 - Where will you stow the spare fuel?
 - How inconvenient will the extra weight and unwieldy bulk be?

- For many dinghy sailors, if an outboard is carried at all it has to remain on the transom at all times; stowing it inside the boat is simply a non-starter. If the main is sheeted to the transom, this is an open invitation for the sheet to get wrapped around the motor at inopportune moments, such as during a gybe.
- If left mounted while sailing, the engine will necessarily be mounted to one side, and when that side is to leeward it may be at risk of being swamped if sailing in a heavy following sea.

Be aware that it is easy to give too much weight to the stated advantages, for the following reasons (in the same order):

- In conditions that make continued sailing hazardous, even if hazardous only in the context of weaker or less experienced crews, there is likely to be significant wave action, and the boat will be thrown about under motor, and may also have difficulty making headway under the comparatively small outboard that is appropriate for the boat. It will also be quite a hazardous operation rigging the outboard at sea in such conditions. It would be better and safer to come ashore well before conditions deteriorate to this point.
- Flat calms seldom last all that long, and oars are a good alternative - and give all members of the family in turn something specific to do. The requirement to cross shipping lanes applies to only a fairly limited number of cruising passages.
- Foul tides can be largely avoided by appropriate passage planning, and when you do need to sail against them there is real skill and satisfaction to be had from working the shallows and the eddies to best advantage.
- Catastrophic gear failure should not normally be allowed to happen, and in a well-found boat such occasions are so extremely rare that carrying an outboard is a bit like the sledgehammer to crack a walnut. If it does happen then there are always the oars, or at least the boat should be carrying them, and in any case in most such situations you should have the means on board to effect a jury rig to get you home (see footnote).

In the specific context of its role as an auxiliary when sailing, it is then worth considering how much use you expect to actually make of the motor. Using it as the primary propulsion on a fishing trip, for example, is an entirely different situation, and the use of the motor then is in line with that aspect of your use of the boat.

FOOTNOTE: Jury Rig

The boat will in fact sail, on any point of sailing, under either main alone or genoa alone; an immediate tack will save the mast in the event of a broken shroud, and the spinnaker halliard or the genoa halliard can then be pressed into service to allow the boat to be nursed home under reduced sail; it is possible to sail with no rudder, by careful balancing of the sails and the weight distribution; etc. etc.

A broken centreboard might be more of a problem, but a paddle (or two) might perhaps be pressed into service, and in 2008 I successfully made a passage (on all points up to and including a fine reach) back from Porth Ceiriad to inside St Tudwal's Islands with the centreboard jammed in the "fully up" position, accepting a tow only for the final windward leg into Abersoch. Allowing the lee chine to dig in can help. Leeway becomes significant on a fine reach, but progress is still possible, leaving just the windward leg to be done under oars (if no outboard is carried, and no tow is available).

Note in passing, since I have referred several times to reefing, that **I regard the ability to reef as an absolute essential for cruising, for reasons of safety, including the ability to do so at sea;** preferably the ability to reef both sails. (See my articles “Rigged For Cruising” and/or “Reefing Systems”.) For most boats that have previously been used only for racing, or for “pottering”, that means adding the appropriate kit, but for me personally that kit rates vastly higher up the scale of importance than does an outboard.

At the end of the day, the question then has to be asked; is it worth the extra weight and the inconvenience of shipping the engine aboard for such very little use, and is it worth the permanent disfigurement to the transom. I haven't finally decided for my own boat, but I think the answer is most likely to remain no; I have an old Seagull that was originally bought for my yacht tender, but I have never fitted it to any of my successive GP14s, and so far I have never regretted leaving it ashore.

But that is essentially a very personal decision, and your decision may well be different from my one.

And using it as the primary form of propulsion for occasions when you never intended to sail in the first place is a very different situation, and if that is your thinking then the only considerations are how do you mount it and how do you minimise the permanent disfigurement to the transom and perhaps to the stern deck.

SUPPLEMENTARY DOCUMENTS

ALL AVAILABLE FROM THE CLASS ASSOCIATION

1. Design for hatch in stern deck (2 sheets; possibly an extract from the plans for the boat).
2. “Boxing Clever” by Tim Pettigrew. Fully worked design for mounting box to attach to rudder hangings; article, illustrated with photographs, and full working drawings.
3. “Boxing Clever” by John Collins. Short article on both a mounting box to fit the rudder hangings and a permanent mounting board. No dimensions or working drawings.
4. “The Basic Boating Book”. A wealth of information contained in a number of articles on a wider range of topics. 3rd Edition contains an article by Bill Haldane, with working drawings, describing a simple mounting box to attach to the rudder hangings.