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BOAT REVIEW

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Well-being afloat

Mental health tips for life on the water

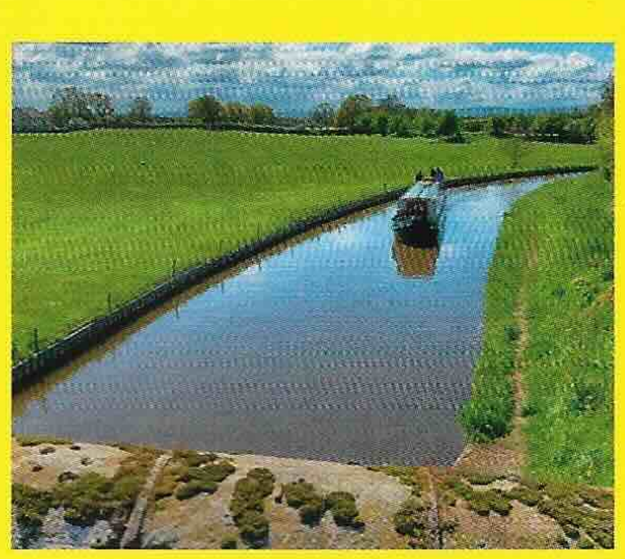
8-PAGE PULL-OUT

THE WARWICKSHIRE RING

Boating through the heart of England

Getting your share

Investing in a shared-ownership narrowboat

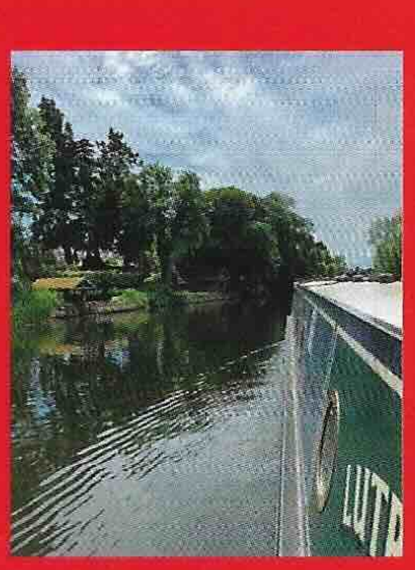


Great Haywood Junction

The story of the canal hotspot

River cruising east of Stratford

Exploring the navigable limit of the Avon



BOAT-OWNERSHIP

GAS SAFETY: the need for servicing

Don't rely solely on your BSS exam for onboard gas safety. Research by **Tom Keeling** – a registered gas engineer and Chartered Marine Engineer – shows why it's no substitute for regular servicing

Modern gas regulators will have a date marked somewhere; this one is 10/2018.

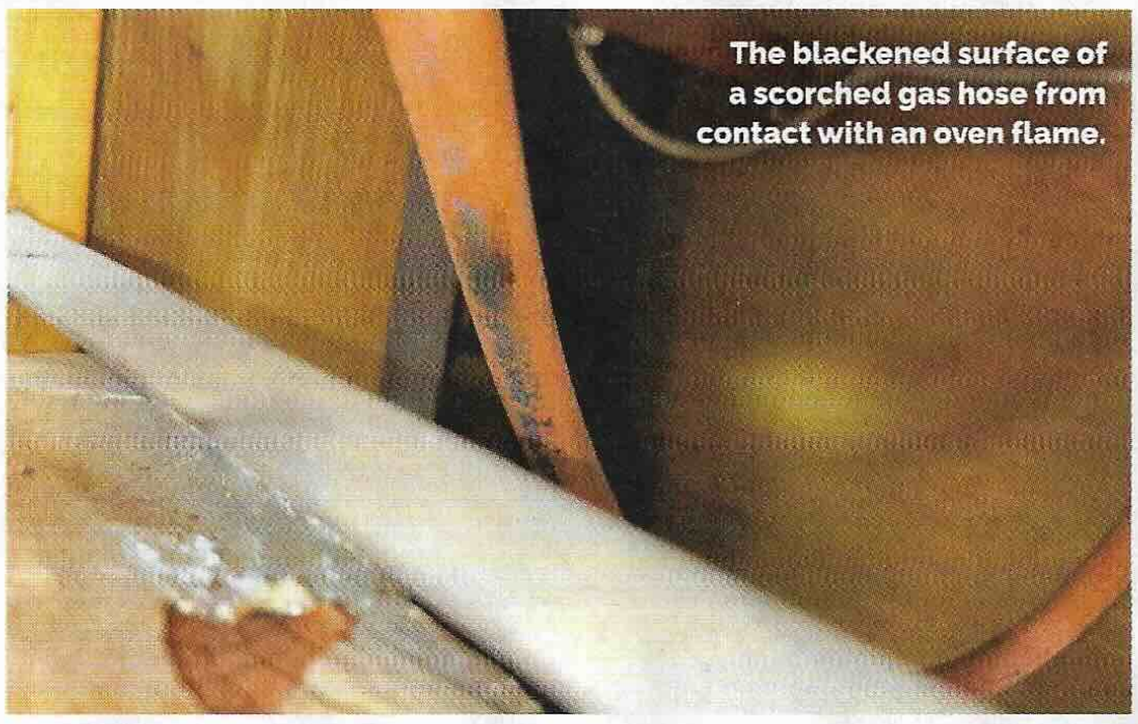
LIQUEFIED PETROLEUM GAS (LPG) IS GREAT; it's portable, quick start, high energy and makes a cuppa in no time. No wonder it's so popular on boats.

Most boaters benefit from four-yearly BSS examinations, which include checking the gas system. In contrast to the domestic private dwellings, where there are no requirements for periodic inspection, boaters here have the advantage. However, recent research I undertook for a Master of Science degree project, highlights that there is no room for complacency.

Hidden risks

Beginning with lockers or housings, most boaters realise the importance of securing cylinders, not storing loose items and keeping drains clear. However, a common finding during inspection of steel boats is excessive corrosion. Out-of-sight spaces in boats are often last on a list of jobs but keeping the locker good stops any leaked gas entering the boat. This becomes even more crucial where the gas lockers are wet lockers and deterioration can sink the boat.

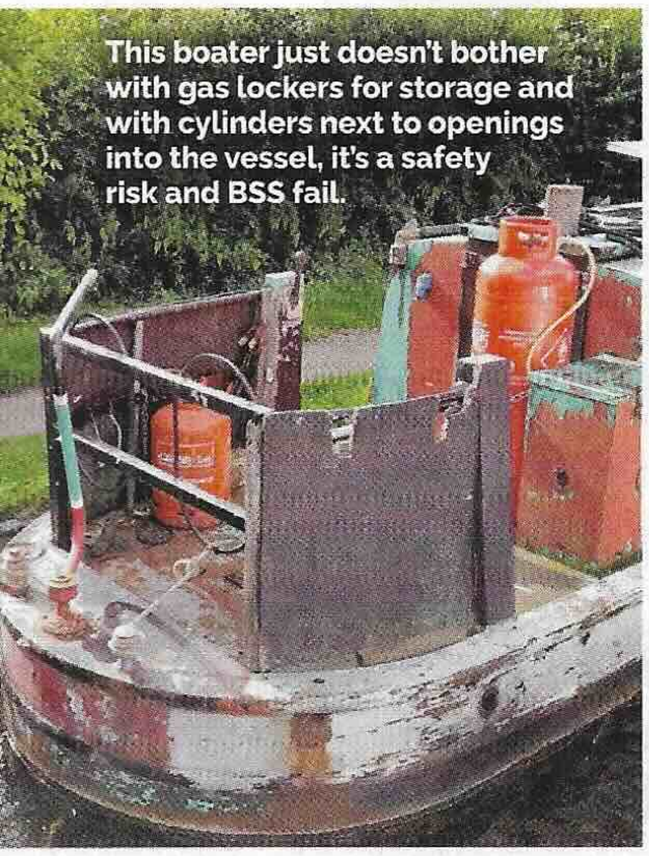
Hoses and regulators need regular inspection and periodic replacement. A faulty regulator can lead to excessive gas pressure causing damage to appliances and a risk of fire and explosion. Conversely, low pressure can lead to poor appliance operation and a potential carbon monoxide (CO) risk. The industry struggles to give a timeframe for replacement but seems to agree on a ten-year service for regulators. Hoses may last for longer or shorter periods – look out for cracks on



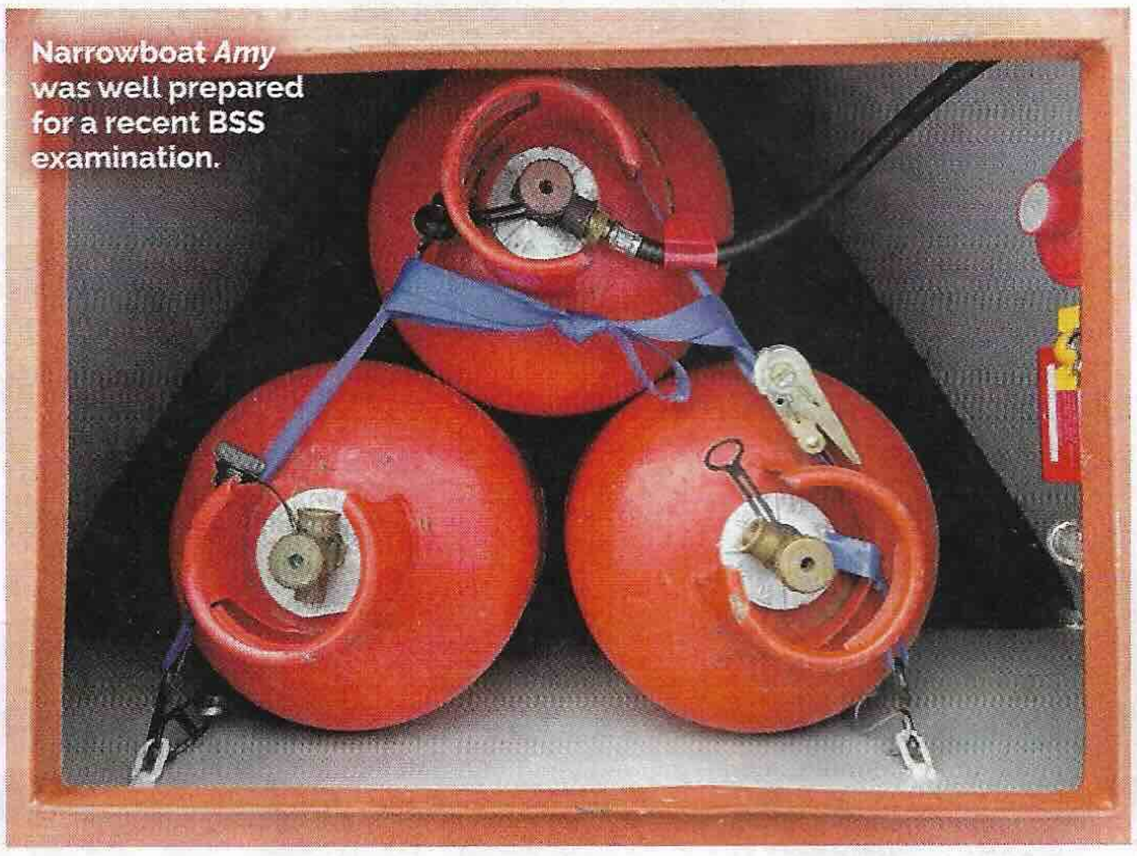
The blackened surface of a scorched gas hose from contact with an oven flame.

A cracked gas hose.

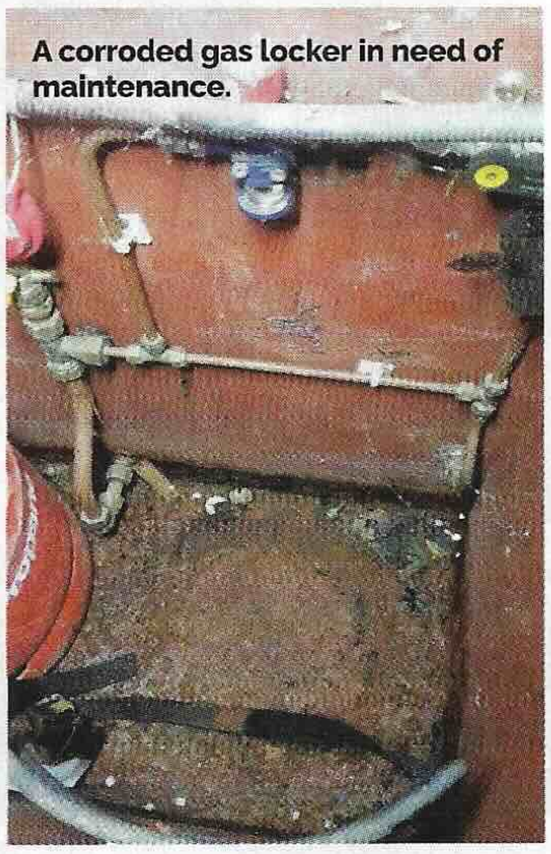
"Gas leaks can occur at any time, particularly given the physical nature of boating"



This boater just doesn't bother with gas lockers for storage and with cylinders next to openings into the vessel, it's a safety risk and BSS fail.

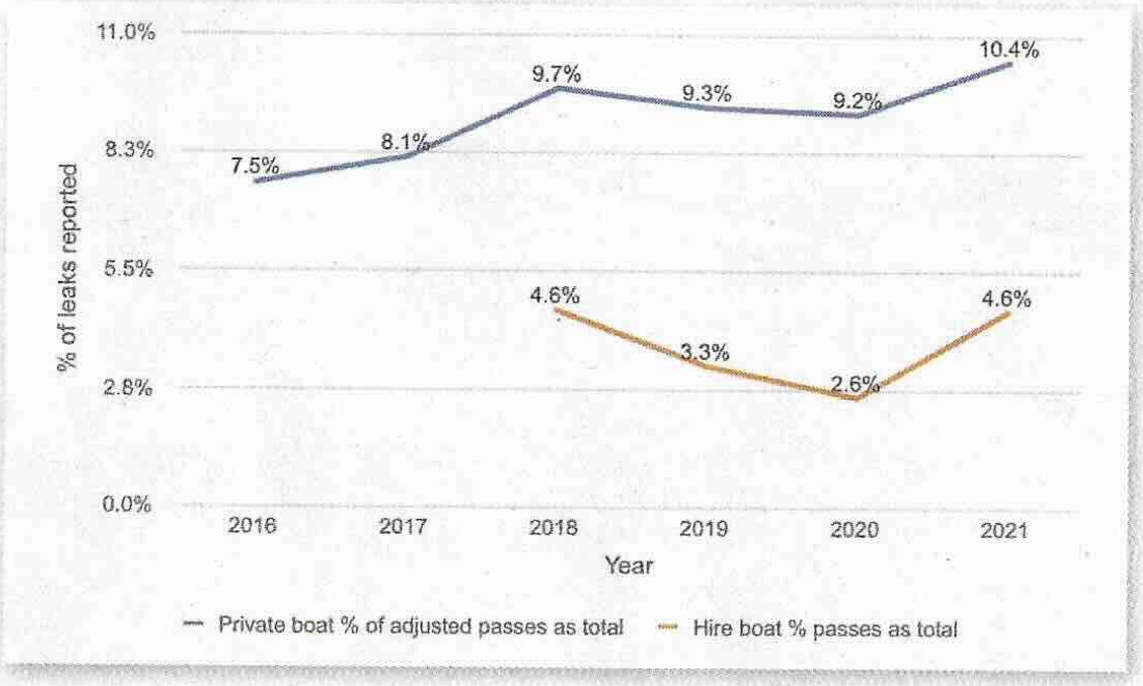


Narrowboat *Amy* was well prepared for a recent BSS examination.



A corroded gas locker in need of maintenance.

Soft-soldered jointing is not suitable for gas on boats due to the low melting point of solder.



"A gas hose found recently on a boat was from 1973"

A badly made joint: the hose is connected directly to the copper tube with no nozzle fitting.

DATA ERRORS

Some stark facts emerged from the research. Firstly, data errors in published standards and teaching guides have caused miscalculations in gas pipe size to be widespread. For this and other reasons, 62% of boats tested were found to have low gas pressure (pressure below the minimum of what the appliance manufacturer states). Data errors have been largely corrected at source now.

bends. The oldest in-service hose found recently was from 1973.

Piping needs to be in good condition and secured against movement; aim for support every 500mm. Joints – mainly compression or screwed – need to be correctly made and supported within 150mm of each side. Research showed a direct correlation between piping/jointing faults and gas leak rates, when compared to other system aspects, such as hose failure.

Demand

Gas appliances that are not maintained become dangerous, yet the research identified that boaters are unsure when to complete appliance servicing. Seventy-four per cent admitted that they do not have gas appliances serviced, most not realising there is a need and others relying on the four-yearly BSS examination. There are key misunderstandings here; the BSS is mainly looking for third-party risk and shouldn't be used as a substitute for regular servicing. This is a red flag because if consumers don't know, they don't act.

The research also showed that boaters don't know where to find relevant gas information, and it's true that it's not overtly obvious on the internet. Modern boats have owners' manuals and come with handbooks, but these get mislaid. There is no central resource that deals with gas safety for boaters, so it slips away into obscurity for another four years.

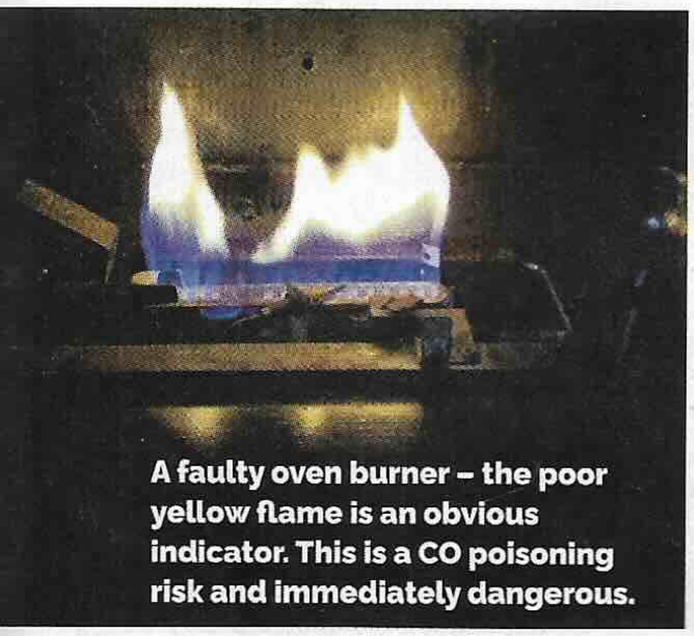
The importance of professional input

Gas leaks can occur at any time, particularly given the physical nature of boating, but a well-installed and maintained gas system is less likely to leak.

The graph above shows gas leak data as reported to the BSS defined by boat use (private or hire). Overall, it shows private boat gas leak incidence increased, dipping slightly during Covid-19. The data shows private boats experience greater amounts of gas leaks; hire-boats are required to be assessed annually. The increase in leak incidence can generally be attributed to more intense use coupled with poor workmanship. A registered gas engineer can visit your boat and complete a safety check of the gas system on board, including testing for gas tightness; typical costs are £60 to £150, plus VAT. Engineers can be found via the Gas Safe Register website.

They can assess if appliances are working safely; this involves taking pressures of the appliance and regulator, and ensuring safety devices are operating. These crucial factors affecting user safety are in excess of the BSS remit, but used in tandem with the BSS will keep you safe.

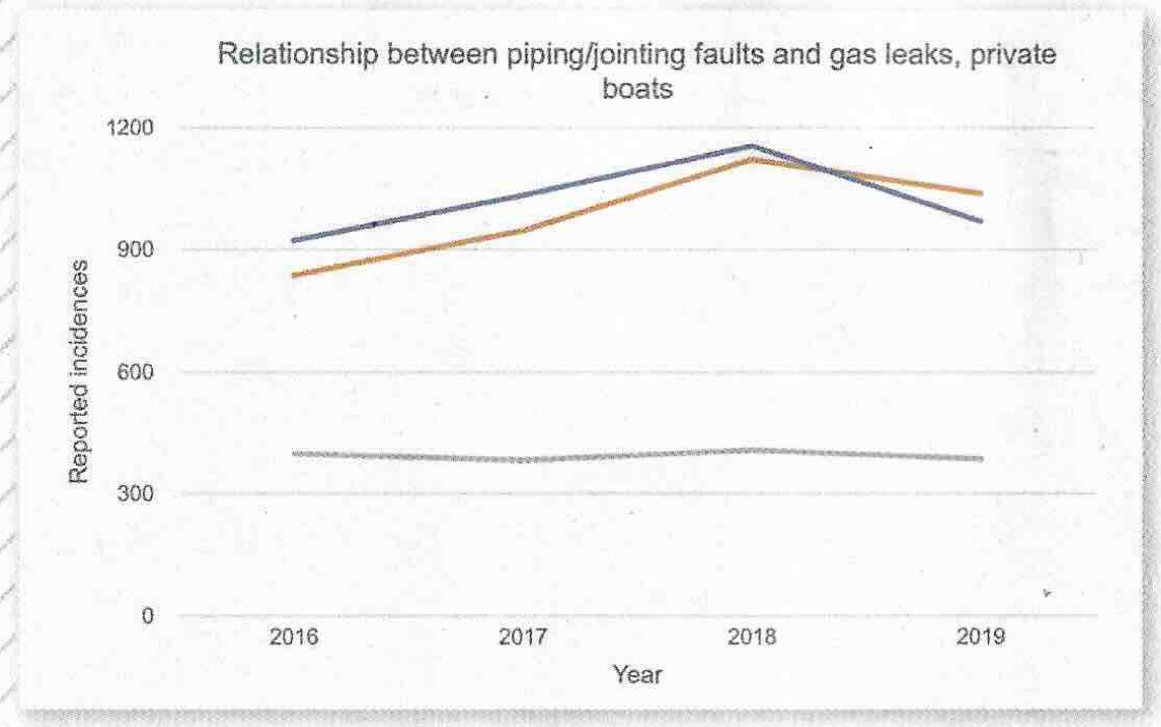
It's true that visual indication of a problem can be a good signal to the consumer that action is required. The point of routine gas safety checking is to prevent problems before they become incidents. Registered gas engineers point out they are usually called upon to fix problems rather than prevent them. The figure overleaf shows the answers 30 boat gas engineers gave when asked why gas leaks occur, with consensus that poor workmanship/jointing and physical damage are the main causes.

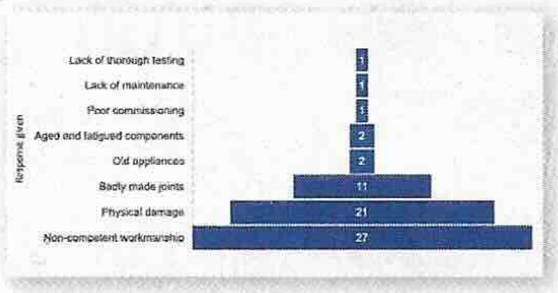


A faulty oven burner – the poor yellow flame is an obvious indicator. This is a CO poisoning risk and immediately dangerous.

Another CO-producing hob burner.

This hob was in good operational condition except that spiders had moved in to the front left burner over winter, causing it to become dangerous.





Chronic issues

When the majority of boaters were practical hobbyists with a simple cooker and limited leisure use, it was a low-use/low-risk environment. The demographic has changed, however. CRT data indicates that, proportionally, liveaboard numbers grew from 15% (2011) to 27% (2020), something certain to have increased since. Boats are used all year and gas systems are subject to increased demand. Budgets are stretched and rather than call for professional help, many rely on assistance from those not necessarily qualified to offer it.

Eighty-four per cent of boaters were able to confidently discuss acute CO poisoning symptoms; deaths have been well publicised, and successful awareness campaigns by authorities have brought the issue to the fore. In 2019, CO alarms became a BSS requirement on all classes of boat with an accommodation space, bringing a reliable warning device to the boater, protecting not only against issues inside the boat, but also from a neighbour's CO, perhaps from a petrol engine/generator or solid-fuel stove.

What they don't protect against is long-term exposure to low levels of CO which can cause chronic CO poisoning. A faulty fossil fuel-burning appliance can be operating poorly (low or high gas pressure, leaking flue, faulty solid-fuel stove) and be continuously releasing low levels of CO into a cabin. But being below the activation level of a CO alarm, no alert sounds. Academic research (Professor Ben Croxford) proves this happens in domestic environments, mainly in low-income housing where people sacrifice appliance servicing to fund other needs, e.g. food. It follows that some boaters could be similarly exposed, but symptoms often take years to present and are similar to neurological illness, such as Parkinsonism. It's clear then that there is a job to do in bringing awareness to the boater; 73% of those interviewed had never heard of chronic CO poisoning, but nor had 83% of gas engineers.

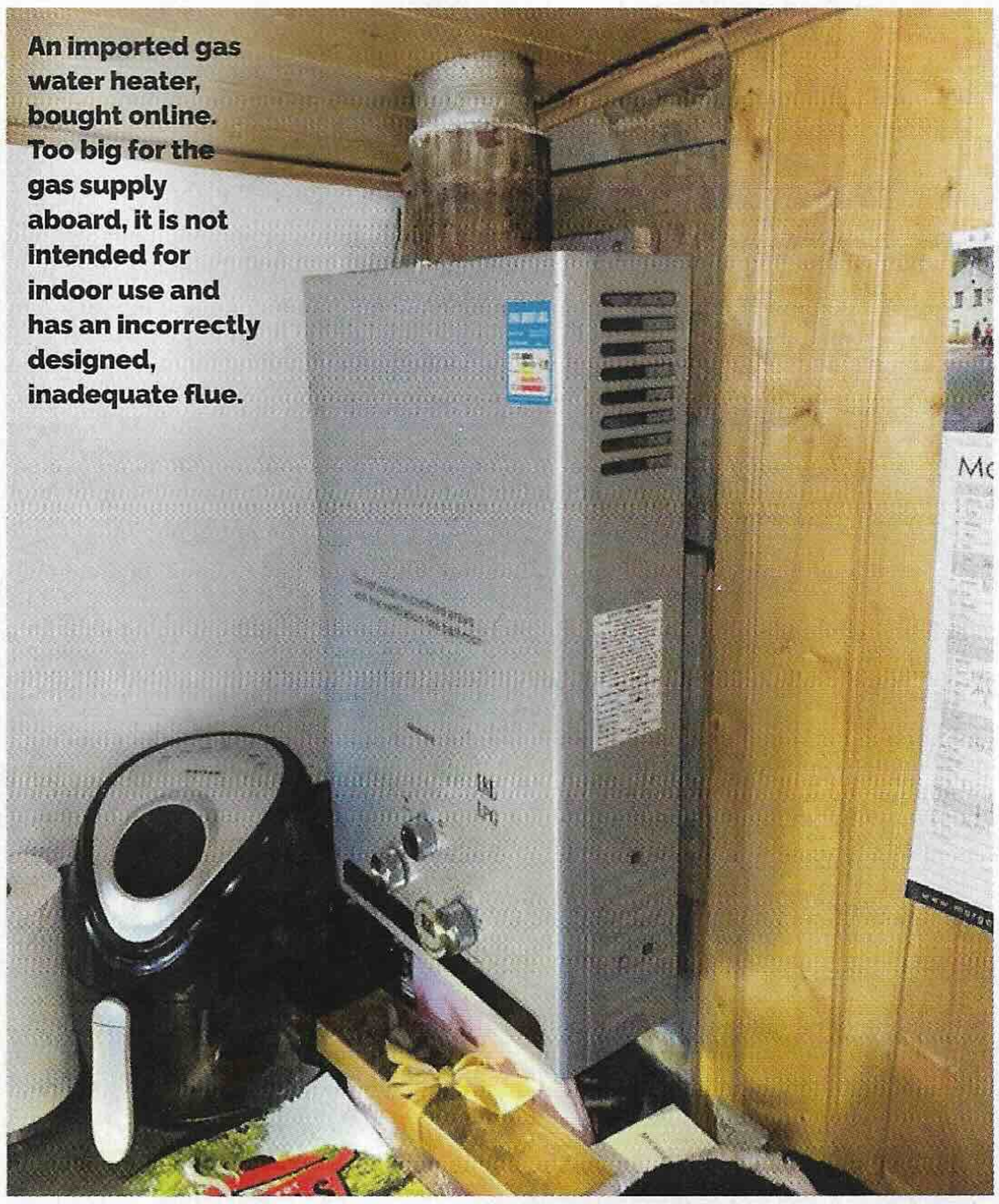
Ventilation

Ventilation is of key importance in preventing harm – fresh air in at low level for breathing and appliance use, with waste expelled at high level. It also helps disperse and dilute any leaked LPG. Nineteen per cent of boats with gas were found to have a ventilation shortfall and this can be easily rectified in most cases by increasing openings.


This unflued gas water heater dates from 1970 and was in use in December 2023, having never been serviced.

Cheap appliances

The availability of cheap appliances from abroad is concerning. Such products are generally completely unsuited to boats, being intended for outdoor use only, and with such huge power ratings they pose a risk to users due to gas demand. Flues have to be improvised. Installing them in a liveaboard vessel is against the law, yet we see many of them. Couple this with the changing demographic (increased use) and reduced income (fewer professional services bought) and the sector has an emerging problem.


An imported gas water heater, bought online. Too big for the gas supply aboard, it is not intended for indoor use and has an incorrectly designed, inadequate flue.

An imported gas water heater, bought online, is likely too big for the gas supply aboard, is not intended for indoor use and has an incorrectly designed, inadequate flue.

Decarbonisation might bring the end of LPG. Boaters report success with induction cooking, powered by batteries (when solar can be harvested). Renewable LPG exists, and while gas is portable, quick start and high output, it will continue to be used where solar and liquid fuels cannot.

The truth is that a well-installed gas system, with quality appliances that are maintained, will provide indefinite reliable service with no significant risk – thankfully, we have a very safe industry with very few serious gas emergencies or explosions. However, raising awareness among boaters can only help.

"Routine gas safety checking is to prevent problems before they become incidents"