

Pictured: a specimen of Sabella spallanzanii – the European Fanworm, native to northern seas and the Mediterranean, it has been found in Australia and was likely introduced via biofouling. Photo Credit: credit Diego Delso of Delso Photo, CC-BY-SA.

New biofouling rules are being enforced in Australia

Australia has entered into the 'enforcement' phase of its new biofouling regulations for commercial ships.

Biofouling in shipping is the buildup of plants, algae, and small animals on the wetted areas of a ship which includes the hull, around rope guards, inside sea chests, and other intake pipes and valves.

The Biosecurity Amendment (Biofouling Management) Regulations 2021 entered into force in June 2022 but the Department of Agriculture ran an 18-month education period.

In summary, commercial vessel operators have a choice of one of three different options. They can either implement an effective biofouling management plan, or clean all biofouling (including the niche areas) within 30 days before arriving in Australia or implement an alternative method of biofouling management that has been pre-approved by the Department.

Consequences of non-compliance

Non-compliant vessels will be subject to additional risk management, will be required to provide additional information prior to arrival and will be subject to a detailed assessment upon arrival in Australia.

Compliant vessels with proactive biofouling management practices will be rewarded with lower intervention.

Time is money; depending on charter rates particularly, along with fuel costs, ships that are not actively engaged in freight transport (so e.g. drifting up and down the coast) can cost anywhere from a few tens of dollars a minute to more than a couple hundreds of dollars a minute.

For example, a smaller two thousand TEU box ship, largely not engaged in freight transport (so, at anchor say, or drifting), in mid-May 2024 could have roughly cost about AUD\$28 a minute, AUD\$1,664 an hour and just under AUD\$40,000 a day. Readers should note that it would be a massively different cost if the ship was underway (i.e. burning a lot of fuel) and that these costs can change on a daily basis.

If such a vessel was held up for a few days because of biofouling issues then the costs would be prohibitive, and that's before we start considering other issues such as opportunity cost, disappointing customers, consequences of a lack of capacity, getting back on schedule and the like.

Benefits of having a clean hull

Apart from not being targeted for extra inspections and not wasting money on delay, a clean hull delivers a range of fuel savings and, in these days of heightened climate change sensitivity, benefits from less carbon dioxide emissions.

Biofouling makes rough the smooth areas of the ship and as the vessel travels through the water it will create more turbulence and drag than a smooth hull would have generated. In very simple terms, turbulence includes the chaotic eddies, and the changes of pressure and velocity, in a fluid which causes irregular mixing. Drag is the force acting on a ship in opposition to its motion through the sea.

Over time, biofouling-induced turbulence and drag will create a performance penalty. A fouled ship will either lose speed at a given power or it will have to increase power to maintain speed. In the former, it will be harder for a ship to meet deadlines and that could cause it to arrive late to port which can incur some hefty penalties in terms of delay, along with customer dis-satisfaction.

A fouled hull will therefore cause ship's fuel bill will escalate and (assuming the ship isn't running on green fuel) there will

be more carbon dioxide emissions from the ship because it is burning more fuel. The IMO / GloFouling reports that even a deteriorated coating or a light slime could cause a 25% step-up in emissions. If the hull is really fouled, for example there is extensive barnacle encrustation, then there can be up to a 55% increase in emissions, the IMO / GloFouling reports.

That's pretty expensive. At the time of writing, the price for a tonne of Very Low Sulphur Fuel Oil ranged from USD\$597.50 at Fujairah in the UAE to USD\$638 at Los Angeles in the USA. And that's a relatively cheap price – there have been times when the fuel price at Singapore has been near USD\$1,000 a tonne.

Biofouling could also adversely affect various systems and machinery inside the ship, such as the engine, if the fouling blocks a seawater intake used for cooling. Meanwhile, the ship will be less likely to receive a passing grade on its next Carbon Intensity Indicator assessment. While (currently) there is no government sanction from the authorities for failure to pass the CII other than to take corrective action, there could well be market-based sanctions if charterers refuse to hire the ship.

Effective biofouling plan; effecting cleaning

Anyway, back to the biofouling regulations.

Commercial ship operators have to accurately report how biofouling has been managed prior to arriving in Australia in accordance with section 193 of the Biosecurity Act. The information must be provided to the Department via the Maritime and Aircraft Reporting System (MARS) between 12 and 96 hours prior to arrival.

Ships with an effective biofouling management plan must be able to prove the effectiveness of that plan in a record book to certain standards. The plan must be ship-specific, feature a range of details about that exact ship, report the dates of the last and next dry-docking, given an operating profile (i.e. typical speeds, routes, operating areas and the like), describe where biofouling is most likely to accumulate, describe the nature of the anti-fouling system, the inspection and cleaning schedule and so on. Details of cleaning and inspections need to be

described such as general observations on the amount and nature of fouling, details of the hull cleaned and more.

Ship operators opting to clean have to complete a similar report with vessel particulars; details of cleaning including what, when, where and how, provide photos of videos and make general observations on the fouling before and after cleaning.

Industry concerns

While various parts of the shipping industry do understand the need for managing biofouling, and the need to protect the Australian eco-system(s), and it supports policy to that end, there are a variety of concerns about how it is being implemented. A key concern is that the rules don't specify what, exactly, constitutes a ship clear of biofouling. This gives rise to uncertainty. Shipping is therefore concerned that vessels could be targeted for extra attention (which costs both time and money) on top of any cash and time already spent in an attempt managing biofouling. One serious concern – because it has happened in the past – is for a ship to meet Federal requirements only to be turned away from its next port of call because it cannot meet State or Territory requirements.

There are also concerns about whether or not there is a solution if a ship is found to be non-compliant. So far, it seems, the solution is for the authorities to send the ship away. But, to where? The answer appears to be “away from the Australian coast”.

One theoretical solution is to have in-water cleaning where either robots crawl along the hull, or human divers do, and they clean the vessel. This creates a massive host of challenges itself as there are only a handful of companies that do in-water cleaning. Such cleaning has to be done offshore, so the vessel is subject to wind, swell, and wave. That makes cleaning potentially dangerous to human divers. It's also very inefficient as everything has to be transported out to the ship – wherever it may be located – and taken back again. In a 16-hour day, most of the hours are going to be taken up just getting to and from the ship. And, once you go far enough south, there's simply no point attempting to do in-water offshore cleaning as the sea is too rough.

Pre-cleaning

Pre-cleaning is one permissible option. Vessels that routinely enter and leave Australian waters, such as box ships, are less affected as they can get a good clean done overseas. Singapore – surrounded by calm and sheltered water, with good year-round weather, is often a favoured location especially as there are relatively cheap in-water cleaning services available.

Busting biofouling: why bother?

Apart from the obvious – that fighting the introduction of alien species is legally required (article 196 of the UN Convention on the Law of the Sea and the Australian Biosecurity Act and associated regulations), alien species are bad news. Really bad news.

Species prevalent in their native range often have predators and other systems that keep their numbers in check. When released from their home range, population numbers of transplanted species can spiral out of control. Invasive species become pests in large numbers because, among other things, they can alter habitat, foul marine or riverine intake pipes, out-compete local species for food, eat the local wildlife, spread disease, disrupt fishing, release toxins, can foul beaches (thereby affecting tourism) and can result in a variety of other unpleasant effects.

Apart from the damage to precious eco-systems, and loss of biodiversity (which can itself cause cascading failures through the eco-system), invasive species cost a lot of cash.

Aliens have cost the global economy at least USD\$345 billion (2017 US dollars) since 1972, according to a multi-national team of academics. The researchers in “Global economic costs of aquatic invasive species,” Cuthebert et al, 2021, examined 5,682 records from the InvaCost project. That US\$345 billion figure is definitely an underestimate as many regions of the globe known to be experiencing invasion from underwater pests had no records in the InvaCost database. ▲