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Air Emissions Regulations Explained

A paper presented by Professor Kate Lewins of Murdoch University, Western Australia, at last September's MLAANZ Annual Conference in Auckland on the topic of the regulation of air pollution from ships was very timely, in view of the scheduled implementation, from January 1, 2020, of strict new regulations deriving from MARPOL Annex VI. Australia was already a party to the annex, whereas New Zealand was considering its position at that time but has subsequently announced intention to commit.

Professor Lewins detailed the nature of the regulatory problem that gave rise to the new regulations. The heavy fuel oil traditionally used in shipping has a high sulphur content, much higher than car fuel, containing high concentrations of metals and other contaminants. This has been judged to create risks for port and coastal communities in particular.

The range of polluting gases generated by combustion of fossil fuels was described as including oxides of nitrogen (NOx), oxides of sulphur (SOx), carbon dioxide (CO2), methane and volatile organic compounds. SOx and NOx emissions can have significant adverse health effects on animals and humans and can contribute to acid rain, ocean acidification, photochemical smog and ozone depletion.

The presentation explained the various classifications of particulate matter (with classifications according to median aerodynamic diameter, in microns) and their potential health effects. These include potential exacerbation of asthma, stroke, heart condition and cancer risks. Research has also been indicating associations with diabetes, Alzheimer's disease and impaired cognitive function.

The international regime for regulation of ship emissions under the United Nations Convention for the Law of the Sea (UNCLOS) obliges parties to protect the marine environment and the International Convention for the Prevention of Pollution from Ships 1973, as modified by its 1978 and 1997 protocols (MARPOL), governs ship-based maritime pollution control and prevention. The International Maritime Organization (IMO) Marine Environment Committee has oversight.

The original 1997 protocol introduced regulation of air emissions via its Annex VI which came into force in 2005. This introduced a cap on the sulphur content of marine fuel of 4.5% mass by mass, created emission control areas (ECAs) where 1.5% sulphur fuel or equivalent technology was to be used and required ships built after 2000 to be designed to reduce NOx emissions.

Professor Lewins' presentation recounted the series of "step downs" in sulphur levels in Annex VI that had been prescribed since 2008 (both within ECAs and more generally). This culminated in the latest set of amendments, implemented from January 1, 2020, which specify that the sulphur content of fuel oil used or carried for use onboard a ship may not exceed 0.5% mass on mass. In addition, effective March 1, 2020, a ban was to be introduced on the carriage of non-compliant fuel oil for use onboard a ship, unless it was onboard a ship installed with an approved scrubber.

There was discussion as to the high level of activity required to be carried out by ship owners to comply with the new sulphur limits and of the wide range of measures ship owners were implementing in order to comply, including use of low-sulphur fossil fuels (including blends and LNG), deployment of "dual-fuel" engines and use of various kinds of scrubbers. There was also mention of the extensive research and development now underway to explore alternative fuels and sources such as biocells, hydrogen fuel cells and electrics/batteries.

Furthermore, Professor Lewins drew attention to a range of emerging issues. First, the need for more comprehensive compliance, inspection and enforcement measures at governmental level, as Annex VI imposes obligations on flag states, port states and ship and bunker suppliers. Second, there are a range of issues associated with the more widespread use of scrubbers of various types as flag states are the "approvers" of scrubbers (using IMO guidelines) – a need has been identified to standardise rules around scrubber use – and it is unfortunate that scrubbers are not currently required to be efficient at removing particulate matter. A third emerging issue derives from recent scientific studies which suggest there should be health concerns about the high level of "ultra-fine" particles that may be produced by low-sulphur heavy fuel oil under certain conditions.

Finally, the presentation highlighted the unfortunate circumstance that particulate matter emissions themselves are not the subject of international regulation. Instead, the regulations seek to manage particulate matter emissions "by proxy" with sulphur. But the evidence suggests that reducing the sulphur content of fuel is not a suitable proxy for reducing the harm from particulate matter emitted by ships.

The topics covered in this presentation are the subject of a recently-published journal article by Kate Lewins & Matthew Loxham "Controlling PM by proxy? International regulation of sulphur and PM emissions from shipping" (2020) *Lloyd's Maritime & Commercial Law Quarterly* 44-85.

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