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REDUCTION OF GHG EMISSIONS FROM SHIPS

Speed Reduction – the key to the fast and efficient reduction of greenhouse gas emissions from ships

Submitted by the Clean Shipping Coalition (CSC)

SUMMARY

Executive summary:	This document describes the advantages that are to be gained from reducing the speed of ships, addresses some of the concerns and argues that speed reduction should be pursued by the IMO as a regulatory option in its own right and not just as a possible consequence of market-based instruments or the Energy Efficiency Design Index
Strategic direction:	7.3
High-level action:	7.3.2
Planned output:	7.3.2.1
Action to be taken:	Paragraph 12
Related documents:	MEPC 59/4/7, MEPC 59/INF.10 and MEPC 61/5/3

Introduction

1 It is commonly recognized that speed reduction is the most readily available means of reducing GHG emissions in the shipping sector. The Second IMO GHG Study 2009 included speed reduction as a factor in all scenarios for emissions reductions out to 2050. Slow steaming is already being deployed by industry to save costs (and because of overcapacity) during the economic downturn.

2 The scale of possible emission reduction is considerable. One study (Corbett *et al*, 2009) found that emission reductions across a range of containerships could be up to 70% if ship speed was halved. Another (Psaraftis *et al*, 2009), points out that the most fuel hungry ships identified in the IMO study are large containerships (3-8,000 TEU). While they represent just 4% of all vessels, they are responsible for 20% of all CO_2 emissions from ships.

3 It is important to recognize that capturing the GHG savings of speed reduction is not the only emission reduction option to be considered, as technical and operational savings remain key to lowering the long term impact of shipping on climate change and ensuring that emissions do not continue to grow and undermine wider attempts at keeping climate change well below a 2 degree rise in global average temperature. The purpose of this document is to highlight the importance of ensuring that the undoubted savings that exist through speed reductions are fully and permanently captured. Even when speed reductions are large enough to require the addition of new ships to the fleet, there are still substantial GHG savings (Corbett *et al*, 2009). Current fleet overcapacity as a result of the economic crisis presents an additional opportunity to reduce speed substantially and quickly without having to build new ships (CE Delft, 2010).

Historic regulation of speed

4 International shipping and aviation are unique in having no regulatory restrictions on operating speed, despite speed reduction being an obvious and proven means of fuel reduction in other transport modes.

5 The vehicle speed limit of 55 mph introduced in the United States after the 1973 fuel embargo saved 0.2 to 3 per cent of annual gasoline consumption (Government Accountability Office) while current US Department of Energy estimates put fuel savings from a national speed limit of 55 mph at about 175,000 to 275,000 barrels per day. A recent study (CE Delft, 2010. "Why slower is better") noted that the optimal speed limit for minimizing CO_2 emissions per vehicle-kilometre from passenger cars is about 80 km/h while reducing the speed limit from 100 km/h to 80 km/h on Dutch highways would reduce CO_2 emissions on highways by 30% in the longer term. Speed limiters on lorries (90 km/h) were made mandatory on all heavy trucks in Europe following legislation adopted in 1992 (for trucks >12 tonnes) and 2002 (for 3.5-12 tonnes). Immediate emission reductions have been estimated at 3 to 11% per annum. Perhaps more importantly, the trend towards ever heavier engines and higher operating speeds was halted. At EU level, debate is starting on extending the speed limiter obligation to vans, where a recent study (CE Delft, "Speed limiters for vans in Europe. Environmental and safety impacts" 2010) estimated that a 100 km/h limit would produce at least a 6 to 7% reduction in CO_2 emissions.

6 Speed reduction has a far greater impact on reducing GHG emissions at sea than on land because of the approximately cubic relationship between speed and ship power and thus fuel consumption. The exponential relationship is even greater for some ships at speed reductions higher than 10%.

7 Slower ship speeds for voyages in proximity to land and for coastal shipping will also bring undoubted benefits to human health, air quality and the environment as a result of reduced emissions of such air pollutants as NO_x, SO_2, PM, and PAHs, as well having an additional climate effect through reductions in emissions of the short-term climate forcer black carbon.

EEDI and speed

8 The delegation of Japan's excellent presentation at the recent Intersessional Meeting of the Working Group on Energy Efficiency Measures for ships (EE-WG 1) prompted an interesting and welcome debate on various aspects of speed reduction. IMO must ensure that speed reduction remains an option in meeting EEDI targets. But the necessary long-term cuts in GHG emissions will only be possible through a combination of speed reduction and technological improvements in the efficiency of ships so the EEDI targets need to be set in a way to ensure that there are proper incentives for technological improvements

in ship design as well as an incentive to reduce speed. Speed reduction, whether through lower design speeds or some regulatory measure, should result in a reduction in installed power over time; and, the combined effects of slower speeds and reduced engine power on potential GHG reductions warrants further examination.

The benefits of speed regulation

9 Were IMO to adopt a global market based instrument, the large number of smaller ship types might well involve a complex and considerable administrative burden. There might well be a role for speed regulation in addressing emissions from these ships. As pointed out by the delegation of Japan and others during EE-WG 1, measures to improve the EEDI are limited for small vessels. Speed restrictions for such vessels could be an option.

Industry concerns

10 While there has to-date been no specific discussion of limiting ship speed to reduce GHG emissions, the issue of speed has arisen in discussions in respect of the EEDI and some concerns have been voiced. It's worth addressing these here:

.1 it is claimed that slower speeds would require major changes in the supply chain and in procedures. Such changes appear to have been successfully implemented to accommodate slow steaming during the current recession so in principle there is little reason why these procedures could not be instituted more widely and on a permanent basis. Indeed average operational speed has increased in recent years and industry has been able to adapt the supply chain logistics to accommodate it;

.2 it is claimed that the additional ships required to perform the same transport work at slower speeds would involve a double GHG penalty in terms of extra fuel burnt and the additional GHG penalty of new ship construction. Studies have already shown that even when ship speed reductions result in a need for additional ships (and this is not always the case as slower speeds can be complemented by improved port operation and other compensating logistical changes) there is still a net reduction in GHG at slower speeds (Corbett *et al*, 2009). The carbon footprint of building additional new ships also needs to be assessed taking account of the improved fuel efficiency of new builds and the effect of their addition to the fleet on long term emissions projections. New ships built will be more fuel efficient than existing ships particularly once the EEDI is adopted and these savings would need to be offset against the additional emissions generated in constructing new ships. In the short term, the current massive fleet overcapacity presents a unique opportunity to make very substantial reductions in speed without having to commission new vessels. One recent study (CE Delft, 2010) estimates that for the three main classes of ships (containers, bulker and tankers) emissions could be cut by 30% by slowing down only to the extent necessary to utilize existing fleet overcapacity;

.3 concerns have been expressed that speed reductions could compromise rudder control and ship safety. It seems to be clear where the safety limits concerning design speed and ship power reduction lie but this in itself should not prevent a frank examination of the role of limiting speed in GHG reductions; and

.4 it has also been suggested that slower ship speed would affect the carriage of perishable goods. This question should be examined thoroughly and individual cases investigated but given modern refrigeration methods and previously slower ship speeds it would not appear to be a significant or insurmountable issue.

Conclusions

11 Studies and literature on the effects and impacts of slow steaming and speed reduction are now starting to emerge. Given the prospect of economic recovery, shorter supply lines and reductions in overcapacity, it is critical that serious attention be given to speed reduction in future options, including regulatory options not limited to the EEDI, to reduce GHG emissions from shipping. It is insufficient to say – as was said at the EE-WG, that the market sets the speed. That is not the case for land transport and will likely be challenged closely in current work at ICAO on a CO_2 standard for new aircraft. It would be interesting to examine the role that average operational speed and design speed increases have played in shipping emission growth trends over the past 20 years. The trend in higher design speeds for containers and general cargo is clearly evident in the IMO 2009 study (figure 5.1 and chapter 9). IMO should consider the question of slower ship speed and possible regulatory approaches in greater detail as a matter of priority given the clear evidence that slower speeds can bring quick and substantial reductions in emissions.

Action requested of the Committee

12 The Committee is invited to note the above information and take action as appropriate.