

## Introduction

Maritime traffic safety is a big issue, in particular in port areas. Though external factors have been considered as probability parameters in some maritime traffic models (Fowler et al., 2000), it is still not clear that how external factors affect vessel behavior.

To investigate the influence of external factors on vessel behavior, an analysis has been performed based on Automatic Identification System (AIS) data under various external conditions.

## Methods

The study area includes a junction and a slight bend with high maritime traffic density within the port of Rotterdam, the Netherlands. Vessels are classified in different categories based on their type and gross tonnage (GT). Five container vessels are investigated in in this poster.

69 cross-sections in Sea-Nieuwe Maas in Sea-Nieuwe Maas (Figure 1), which are approximately perpendicular to the navigation direction, are used in this research. Unhindered vessel speed, which is vessel speed without influence of wind and visibility, is given for five container categories on each cross-section. Two thresholds for strong wind ( $\geq 8$  m/s) and bad visibility ( $\leq 2$  km) are selected to investigate the influence of wind and visibility on vessel speed by comparison with unhindered vessel speed, respectively.

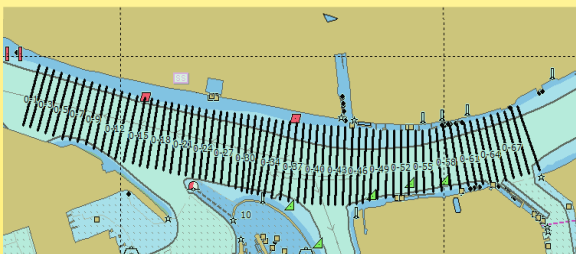


Figure 1. 69 cross-sections in Sea-Nieuwe Maas.

## Results

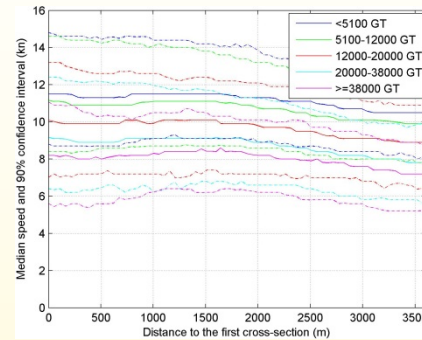


Figure 2. Container vessel speed in Sea-Nieuwe Maas.

In Figure 2, unhindered vessel speed for container categories in Sea-Nieuwe Maas is given. The results on cross-section 2 of category 2 (5100-12000 GT) are used for comparison as shown in Figure 3.

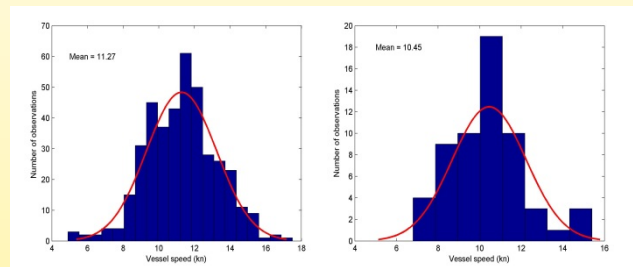


Figure 3. Influenced vessel speed of container category 2 on cross-section 2 with strong wind (left) and bad visibility (right) in Sea-Nieuwe Maas.

Figure 3 shows that mean vessel speed under strong wind is around 10.27 kn and mean vessel speed with bad visibility approximately equals 10.45 kn. Statistical tests indicate that the former case has the same mean value as unhindered vessel speed (10.25 kn), but the latter one does not.

## Conclusion

Vessel speed is influenced by vessel size and waterway geometry. Wind has no effect on vessel speed, but visibility can influence vessel speed.

## Reference

Fowler, T.G. and E. Sørgård. Modeling ship transportation risk. Risk Analysis, 2000, 225-244.