



Picture: Beeldarchief Rijkswaterstaat

Longitudinal Training Dams in the Waal River and their effect on the use of the fairway

As part of the final evaluation of the pilot project Longitudinal Training Dams (LTDs) in the Waal River, MARIN was asked to conduct an analysis on their impact on inland shipping using AIS data.

Three LTDs were constructed in The Waal over a length of 10 kilometres at the section Wamel-Ophemert. Unlike traditional groynes, LTDs are parallel to the riverbank, which divides the river into a navigational and a side channel.

Ministry for Infrastructure and Water Management) and is part of a larger project to tackle various river system related problems such as riverbed erosion and sedimentation, (extreme) low and high water and its impact on the freshwater supply, flood safety, and the use of the river as a waterway. At low water, the water concentrates in the fairway, improving

Sita Indah
s.indah@marin.nl

This pilot project was launched in 2015 by Rijkswaterstaat (part of the Netherlands

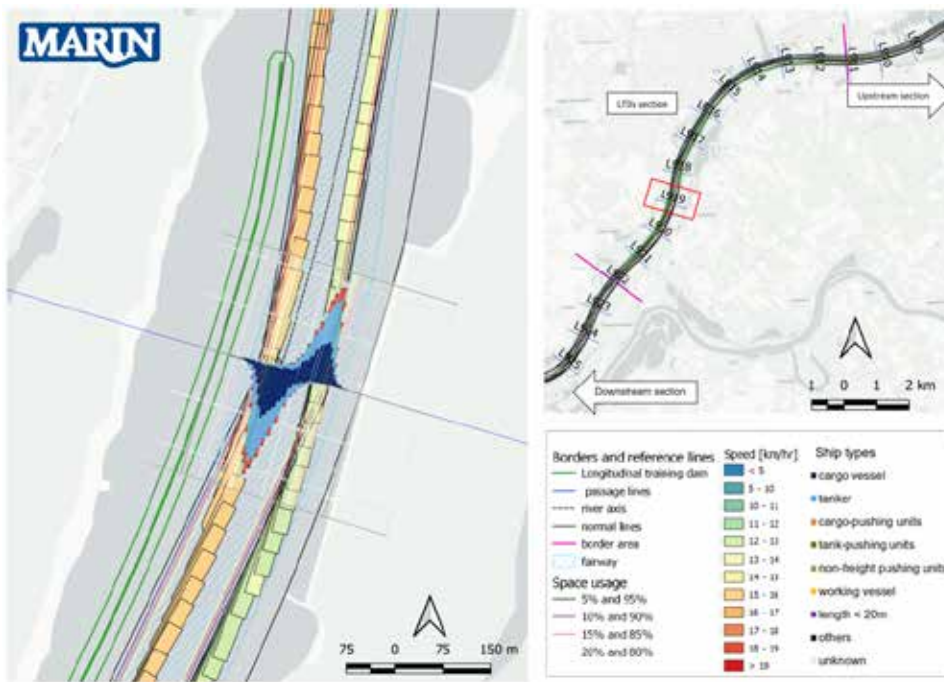


Figure 1 Ship passages analysis at the level of the longitudinal dam

navigability, while at high water, the water flows away easily, enhancing flood safety. In addition, the river ecosystem is expected to benefit greatly from a side channel being established for recreation and nature development. The final evaluation of this pilot project was carried out by Deltares.

The main question addressed by MARIN is to what extent the constructed LTDs have an influence on the behaviour of ships. To answer this, AIS data was analysed to compare navigational behaviour at the level of the LTDs section with the upstream and downstream sections of these longitudinal dams.

In total, a 67-kilometre river section was analysed by drawing a virtual passage line on every kilometre (see Figure 1). The number of ship passages per ship type and direction in one year is shown as a stacked bar chart, together with the ships' contours and the use of space. Other influencing factors such as the river discharge and ship's loading condition were also included.

Based on the analysis, although the presence of LTDs reduced the available width of the fairway, the dams do not lead to significantly different navigational behaviour. This can be seen from the plot of the average speed profile along the three river sections in Figure 2. Furthermore, the analysis of the use of space shows that the percentage of the river width used is comparable with other sections (see Figure 3).

These findings together with other aspects, such as morphology, nature, social aspects, maintenance, flood safety and freshwater supply will serve as a basis when considering the possible future realisation of other longitudinal dams in Dutch rivers.

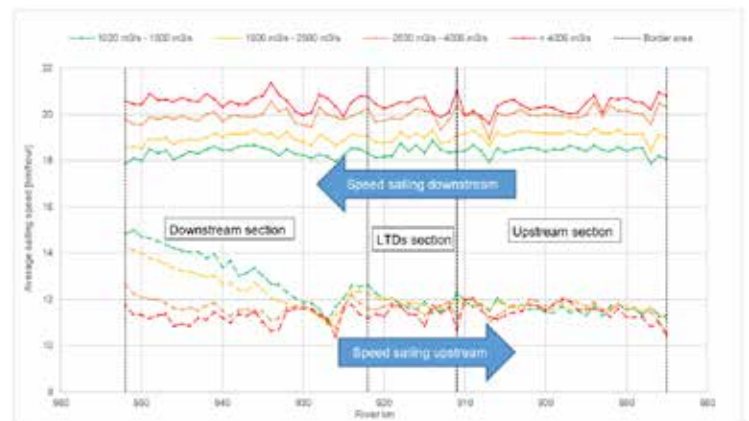


Figure 2 Average speed profile during different water discharge conditions



Figure 3 Normalised river width use during different water discharge conditions