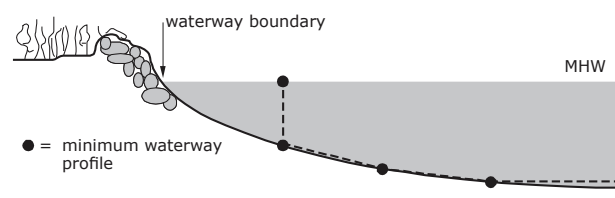


## New guidelines for inland waterways in the Netherlands

Waterway guidelines are key to safe, reliable, and efficient navigation in the Dutch waterways network. The present waterway guidelines are restricted to canals. In recent years, Deltares, MARIN and Rijkswaterstaat have been developing a set of rules that will allow the guidelines to be applied to the complete waterway network, including the river systems. These rules are based on the in-depth analysis of the hydrodynamic and morphological conditions, and the manoeuvrability of inland vessels. A unique combination of numerical simulations and statistical data analysis models that uses heterogeneous sources of information (about factors such as ship manoeuvring, experience from the field or physical models) ensures the best possible assessment of waterway guidelines (which include factors such as the cross-sectional profile of navigation channels, bend radius and port entrances).

The present waterway guidelines were published in 2011 and they are used for the design of waterways for inland commercial and recreational navigation (CEMT classes I to VIb). In particular, they are applicable to canals and channels without natural flow or with a low flow velocity of less than 0.5 m/s. The large majority of Dutch rivers exceed this flow velocity and Rijkswaterstaat therefore initiated a research programme to develop a comprehensive set of guidelines that can be used for waterways with a natural flow velocity greater than 0.5 m/s.



Fluctuating discharge levels in rivers lead to fluctuations over time in the navigation depth. In tidal rivers, the combination of alternating flow directions and varying water levels makes clear guidelines for the available navigable profile particularly necessary.

The continuous adaptation of river bends to flowing waters is another critical aspect of river navigation. In canals, the bends are designed for standard vessels and they have a stable, flat bottom. River beds are not flat and they are also not stable due to fluctuating discharge levels. River bends are therefore much more complex. In order to ensure safe and quick navigation, the new guidelines need to take into account the existing bend widths of the rivers and bend radius. In addition, locks and inland ports in flowing waters should also meet the requirements for navigation.

New waterway guidelines for rivers are key to safe, reliable, and efficient navigation on the Dutch waterway corridors to Germany and Belgium. These guidelines will apply not only to shipping channels but also to the structures in the waterways such as locks, bridges and ports. The new river guidelines will be published after the successful completion of the research conducted by Deltares and Marin in collaboration with Rijkswaterstaat and other field experts.

### Further reading:

Deltares & Marin (2015)  
Richtlijnen Vaarwegen – Rivieren  
Onderzoeksagenda. Available on  
[www.deltares.nl/en/](http://www.deltares.nl/en/)  
Rijkswaterstaat (2011) Richtlijnen  
Vaarwegen.