The nautical bottom concept introduced by PIANC is a practical criterion to define the safe limits of navigation in muddy areas. However, more thorough knowledge on the manoeuvring behaviour of the vessels in muddy areas was needed. A comprehensive research program consisting of captive model manoeuvring tests and simulation runs was therefore initiated. During simulation runs Zeebrugge harbour pilots could experience the behaviour of a deep drafted container vessel in muddy navigation areas and define therefore the criteria for the nautical bottom in the harbour of Zeebrugge (Belgium). Further mathematical modelling, with the introduction of a fluidization parameter, allows the prediction of the manoeuvring behaviour of deep drafted vessels in any realistic muddy navigation area, which leads to optimized maintenance dredging combined with an optimized admittance policy.