

FLOW SLIDE ON THE TIDAL FLAT OF WALSOORDEN IN THE WESTERN SCHELDT

D.R. Mastbergen¹, S.J. van Schaick², J.J. van der Werf¹, R.A. Schrijvershof¹

¹ Deltares, Dick.Mastbergen@deltares.nl, Jebbe.vanderWerf@deltares.nl, Reinier.Schrijvershof@deltares.nl

² Delft University of Technology

Flow slides are a common phenomenon in tidal flat margins in estuaries and along river banks and coasts where fine sands and deep channels are present. Along the Eastern- and Western Scheldt, flow slides are reported since 1800. Before the Delta works were completed in 1987 and stone protection was applied on many vulnerable fore shores, dike collapse due to flow slides was a severe flood threat. On the 22nd of July 2014 a shipper reported that he saw a ‘slide’ with ‘cracks’ taking place on the southern bank of the tidal flat of Walsoorden. A week later multibeam bathymetry measurements were performed. A large gap had opened (Figure 1) and 850 000 m³ of sediment was deposited in the channel. The navigational depth turned out to be reduced by over 7 m and additional dredging was commissioned by the Port of Antwerp. In the framework of the Dutch-Belgium ‘Flexibel Storten’ policy, monthly measurements are being performed on several dumping locations and it was decided to extend the survey area to the location of the slide.

Meanwhile, the location was selected to perform the IJkdijk / Flood Protection validation test. A flow slide was initiated by dredging and continuously surveyed with three vessels. Vibrocore boreholes and bottom samples were analysed. Several steep 6 m high breaches developed and slowly retrogressed into the shoreline, but eventually stopped. The involved volumes remained only small compared to the 22 July flow slide.



Figure 1 Aerial view of the gap created by the 22 July 2014 flow slide on the tidal flat of Walsoorden, Zuidergat and in the distance Perkpolder (E. Paree, September 2014).

The detailed and frequent bathymetry surveying combined with the soil investigation gives us a unique database of the geomorphological recovery of the system on meso-scale after a large event. The transport and erosion of the sand deposited in the tidal channel was analysed and compared with numerical computations (Delft3D). The sedimentation patterns in the gap and the composition of the sediment structures were analysed in more detail. This results in some new insights in transport patterns of sand by migrating dunes in the channel and along the tidal flat margins and the development of mud and clay layers.