Lessons Learned from the Katrina disaster for the WesternScheldt Estuary – part 1

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Study Objectives

The objective of the study is to investigate and to identify lessons to be learned from hurricane-induced flooding in New Orleans that might be applicable to the Dutch-Flemish situation. The study is based on currently-available information, reports and model studies, augmented by general knowledge of tide and surge propagation in the Scheldt Estuary and the Mississippi Delta.

Focus of the Study

Focus of the study is to find answers to the following questions:

- **Can useful lessons be learned for the Dutch situation from the Hurricane Katrina event 2005?**
- **How does the flood-risk in the Mississippi-Delta compare to that along the Scheldt Estuary?**

Project

After the catastrophic flooding of New Orleans following the passage of hurricane Katrina in 2005, Dutch private sector, technological institute and Dutch government specialists have supported United States (US) local and federal agencies' efforts to restore, rebuild and protect the disaster-stricken areas against future flooding. Some of the activities were carried out as a part of the Memorandum of Agreement between the Dutch Ministry of Verkeer en Waterstaat and the US Army Corps of Engineers. One of the objectives of the Dutch government in this context is to learn from the US experiences

The Dutch Rijkswaterstaat has therefore commissioned, as part of the long-term research program "Lange Termijn Verkenningen Westerschelde – Onderzoek en Monitoring" (LTV O&M), WL | Delft Hydraulics to conduct a preliminary study to identify lessons to be learned from hurricane-induced flooding of New Orleans, applicable to the Dutch-Flemish situation.

Brief comparative analysis of the important and major flooding events and the wind forcing that caused these events in the deltas, respectively Katrina hurricane event for the Mississippi delta and the 1953 storm event for the Western Scheldt, were carried out. Similarities and differences between the two deltaic systems and of the events are reviewed.

SIMILARITIES AND DIFFERENCES

Similarities are in essence related to their uses and their proneness to flooding. Both systems have been adapted by human intervention. Flooding is exacerbated by climatic and geologic changes including sea level rise and subsidence, and human alteration including channelization, erosion/aggradations, and/or channel widening, deepening or realignment.

Differences between the two systems

Significant differences exist between the two systems.

	Western Scheldt	*Mississippi Delta*
Dominant phenomenon	Mesotidal (tide)	Microtidal (wave)
Bathymetry	Large max. / average depth	Shallow (esp. eastern part)
River Depths	15 – 70 meters	2 – 20 meters
River Discharge	120 m^3/s	16000 m^3/s
Dredging for shipping	Less	Regular
Shipping volume	Large traffic & tonnage	Small traffic & tonnage
Meteorological threats	Small storms;	Hurricanes
High water	Small surge + high tide	Large surge magnitude
Surroundings	Polders	Wetlands
Protection	Dykes	Partially; by levees
Protection framework	Sound (legal & institutional)	Fragmented
Funding for protection	Sufficient	Lack of funding
Design criteria	Risk based	1/100 year event

Comparison 1953 Storm vs. Katrina

(Source: Kok M, Theunissen R, Jonkman S.N, Vrijling J.K., 2006)

	Dutch 1953 flood case	*New Orleans 2005*
Inhabitants in the flooded area	250.000	500.000
Number of fatalities	1835	1100
Flooded area	2000km^2	260km^2
Direct economic damage	Fl 1,5 billion *	US $ 30 billion
Number of dyke breaches	140	30

* = 1953 guilders

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