US Army
Corps of Engineers

Ministerie van Verkeer en Waterstaat

Rijkswaterstaat

US-Dutch Third Technical Exchange

14-16 March 2007

New Orleans, Louisiana

TABLE OF CONTENTS

SUMMARY 3
PROGRAM 4
ROLE AND RESPONSIBILITIES 6
DAMAGE MITIGATION PLANNING, RESPONSE AD RECOVERY. 8
The preparation of the Dutch contingency plan on large scale floods 8
Role of RWS in response and recovery 9
Michael Lowe: federal disaster response, role of USACE 11
Final conclusions 12
Attachment 1 Participants 13

SUMMARY

The US Army Corps of Engineers (USACE) and the Dutch Rijkswaterstaat (RWS) signed a Memorandum of Agreement (MOA) in May 2004 to collaborate on a range of technical and policy related areas that are proving to be mutually beneficial for the two organizations. A wide range of topic areas, focused on water resources planning and management, were identified in the agreement. In May 2005, a high-level contingent from RWS visited New Orleans and coastal Louisiana to gain insight on a delta region that in many ways is analogous to their own. The aftermath of Hurricanes Rita and Katrina have given particular credence to this partnership, as both parties seize the opportunity that disasters of this magnitude provide to learn from one another on matters related to coastal zone protection and management.

After two technical workshops held in The Netherlands[*], a third technical workshop was held in New Orleans, U.S.A. on 14-16 March 2007.

There were three focus areas covered during the workshop:

- Roles and Responsibilities.
- Technical Aspects of Levee and Floodwall Performance.
- Damage Mitigation Planning, Response and Recovery.

Besides these focus areas, the workshop was preceded by a presentation of the 'Dutch perspective on flood protection and restoration of coastal Louisiana' by Deltares, RWS and other involved parties. Also, as part of the workshop, a kick-off meeting was held for a possible cooperation between the State of Louisiana and the Dutch province of Zeeland.

This report highlights the results of the third workshop related to delta protection and management. It includes a summary of findings from two focus areas: roles and responsibilities and damage mitigation planning, response and recovery. Results from the other meetings ('the Dutch perspective' and the cooperation between Louisiana and Zeeland) have been reported through their respective channels.

Paul Bourget
USACE MOA Program Manager

Jean-Marie Stam
RWS MOA Program Manager

[*] The 1st and 2nd Technical Workshops were held in The Hague on 10-12 July and 10-11 October 2006, respectively, the results of which are available upon request.

PROGRAM

AGENDA
FLOOD AND COASTAL ZONE MANAGEMENT AND PROTECTION MEASURES;TECHNICAL WORKSHOP
14-16 March 2007; New Orleans

Wednesday, March 14

- Lunch 1200-1330 - Guest speaker John Barry, author 'Rising Tide'.
  Welcome Mr Paul J. Woodley ASCW
- Welcome and introductions
- 3rd Workshop goals and objectives
- Introduction to focus areas:
  - Roles and Responsibilities: Aspects of governance between the two countries; Levee Boards versus the Water Boards and their approach to flood protection (policy; design; operations, maintenance and inspection.
  - Technical Aspects of Levee and Floodwall Performance. A range of topics including robust and innovative design; how to address subsidence; effects of sea-level rise; guidelines for design and safety of levees; reliability analysis; performance of levee system during Katrina; design and construction changes as a result of Katrina; LACPR levee design; and reliability and risk analysis.
  - Damage Mitigation Planning (DMP): Primarily focused on roles and responsibilities (overlap with first focus area), contingency planning for floods and response and recovery measures.
  - Integrated Approach: Kick-off workshop for cooperation between Louisiana State, Province Zeeland and RWS.
- Break-Out Groups (1500-1645)
  - Group 1 – Emergency Evacuation of the New Orleans Area: Presentation by Stephen Glasscock, State of LA Department of Transportation and Development.
  - Group 2 – Katrina's Impact on Levee Systems: Work that has been completed, that is still underway and is planned through 2010. Presentation by John Meador, Taskforce Hope
- Levee/Floodwall/ Floodgate Failure Models: Fragility curves vs physics based models. Presentation by Dr. Reed Mosher, ERDC.
- First Day Wrap-Up (1645-1700)

Thursday, March 15 (Morning: 0830-1200)

- Tour 1 – Emergency cross-overs and rehabilitation work on I-10 Twin Span-bridges; 17th Street Canal construction. Steve Heraty, Volkert and Associates
- Tour 2 – Work that is ongoing at 17th Street Canal; Lakeview area; New Sector Gate construction at Harvey Canal. Al Naomi, Corps of Engineers, Jackie Purrington, Corps of Engineers
- Tour 3 – Mississippi River Delta area, MRGO, Coastal wetlands, Port Area, Metro NO HPS. Tim Axtman, Corps of Engineers

Thursday, March 15 (Afternoon: 1330-1700)

Group 1 –
1330-1500 - Roles and Responsibilities – Presentation by Richard Jorissen
1500-1515 - Break
1515-1645 – Zeeland-Louisiana cooperative agreement – integrated approaches

Group 2 –
1330-1500 - Robust Design and Failure Mechanisms – Bas Jonkman, Joop Weijers S
Presentations on Sea Level Impacts – Kevin Knuuti, ERDC
Localized land subsidence in Louisiana – Del Britsch, USACE
1500-1515- Break
1515- 1645 - Levee design criteria for specific surge and wave return periods – Dr. Don Resio ERDC and Dr. Jane Smith ERDC
- Levee overtopping, exposed earth performance and armor slopes, Dr. Steven Hughes, ERDC

Friday, March 16 (Morning: 0900-1200)

Group 1 – Damage Mitigation Planning
0900-1015 – Towards a Dutch National Contingency Plan for Floods, Wilfried ten Brinke
1015-1030 Break
1030-1200 – Role of Rijkswaterstaat as manager of flood defenses /early warning and evacuation during response and recovery phase: Jos van Alphin

- experiences with emergency repair of dikes, roads,
- experiences with cleaning operations, recommendations to avoid pollution caused by flooding
- Role of (and problems with) communication and information systems
- Federal response to disasters, Mike Lowe, Corps of Engineers

Group 2 –
0900-1015 – Jan Heemstra – Geodelft, failure mechanisms
1015-1030 Break
1030-1200 – Innovative levee designs, latest on hollow core levees, discussion by Geodelft representative. Wesley Jacobs, Arcadis.

Friday, March 16 (Afternoon: 1300-1500)

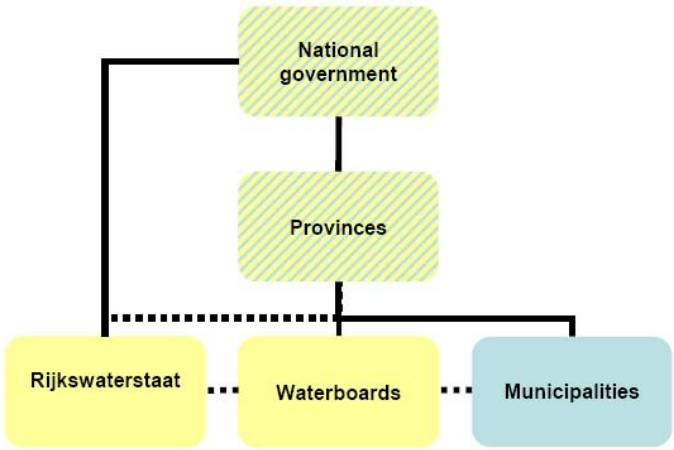
- Groups report progress
- Open discussion
- Recommended next steps
- Adjourn

ROLE AND RESPONSIBILITIES

This session started with a presentation on 'Delivering Flood Protection Policy in The Netherlands' by Richard Jorissen from Rijkswaterstaat. The goals of this presentation were:

- introduction on the sessions on emergency planning;
- sharing the Dutch situation with the US colleagues; and
- discussing the differences and/or similarities between the two countries.

Following the presentation, the main discussion topic was the cooperation between the national/federal level and the regional/state level.



Jon Porterhouse from the State of Louisiana recognized the classical presentation (see figure) of the hierarchy between the various Dutch authorities. However, he was interested how these authorities are cooperating in delivering more integral goals (such as the integration of hurricane protection and coastal restoration in the Louisiana situation).

Richard Jorissen indicated that all authorities involved in delivering flood protection were acting as integral as possible. For example, the coastal management policy (based on beach and foreshore nourishment) in The Netherlands is a good example of working with nature. And the new river management scheme also takes the natural processes as a starting point for measures. Jon Porterhouse was interested in an integrated approach between the various authorities involved in which each authority could deliver its own contribution via with a jointly defined integral result.

Richard Jorissen illustrated the recent approach in the (future) coastal weak links. A number of locations on the Dutch seashore will fail to meet the safety standards in the near future. As a proactive action the Ministry of Transport, Public Works and Water management asked the provinces to come up with solutions in which both the safety aspect and 'enhancing the spatial quality' were addressed. The Ministry estimated a budget of 740 million € for the reference designs for safety measures only. The provinces initiated a project organization with all authorities participating. So far, the provinces have come up with a number of integral plans. The main problem, however, has been to find the required additional funds. In urban areas, the larger local municipalities were able to chip in. But in the more rural areas, additional funds were harder to find. National budgets for recreation and/or environmental development are potential options, but the difficulty for the provinces is to coordinate or combine these budgets in the plans for the weak links. This process is still ongoing at the moment. Around the summer of 2007 the Ministry of Transport, Public Works and Water management will assess the provinces' plans based on the safety requirements and the additional (with respect to the 740 M€) funding.

In this respect, there is marked similarity between the two countries. Both the province and the State are generally the authority with the most integrated options available. But their funding options in most cases are singularly focused and aren't designed for integral plans. Regional or state taxation possibilities are limited and the coordination of national or federal budget is difficult.

During the workshop no further actions were agreed upon. However, Richard Jorissen is involved in the Dutch perspective project, and will contribute a related section on Management and Maintenance. In this section, he will build on the results of this discussion.

DAMAGE MITIGATION PLANNING, RESPONSE AD RECOVERY.

The Preparation of the Dutch Contingency Plan on Large-Scale Floods

The Dutch government has ordered authorities to be better prepared for floods caused by hydrodynamic conditions; therefore, exceeding the levels they were originally designed for. At present, the Rijkswaterstaat and the Water Boards are preparing a flood contingency plan at the national level, in addition to the regional plans dealing with the potential for localized floods. The plan will specify the parties involved, at which stage, their responsibilities and criteria for different levels of alert. It will be based on "worst credible flood scenarios" from rivers, the North Sea or Lake Ijssel, and must be completed in 2007. It will be tested in a large-scale exercise in November 2008.

Comments from the Discussion

The State of Louisiana had experiences with evacuations on two occasions before Katrina. Certain aspects of the Katrina evacuation of about 1 million people were rather successful. The largest traffic jam delay was three hours, requiring phased approaches and inter-state planning (e.g., counter-flow measures). People were forced to follow specific via specified lanes.

Scenarios in New Orleans

- Scenarios are very generalized: large-scale flooding of the city through failure of Canal embankments was not included.
- Scenarios, such as the worst credible flood, are primarily for emergency planners to exercise the lines of communication under disaster conditions; they make it explicit which actions are critical and require effective commanding structure/communication facilities. The importance of local-level decision-making is clear.
- In addition they can be used to make the public aware of the threat and make them trust the authorities when it is time to act.
- Scenarios should distinguish between the weekend and the work week (people on work or at home, time to evacuate the family of emergency workers) and consider the extreme storm conditions (and low temperatures)
- For the public, scenarios show the importance of communicating the aftermath of certain disasters to the public (e.g., dangerous conditions; lack of electricity, transportation, communication, sewage and fresh water supply). Visualization in a consistent, complete story is important, including which measures to take, e.g., travel to officially-designated "safe havens".

Media in New Orleans

- The contingency plan should include a media management plan, but you cannot order them to communicate your government's messages, media have their own responsibilities.
- It is important that the government speaks with one voice and illustrates unity.
- Media are informed about plan preparation and invited to inform the public.
- For the actual evacuation, the emotional announcement of well-known journalists on TV was decisive for many people to start to evacuate. This type

of national communicators /trusted familiar faces should be included in the plan preparation and the exercise.
- Radio communications should be continued on dedicated wave bands

Miscellaneous:
- Take into account the effect of pets and cattle on human acceptance to evacuate
- Include evacuation of zoo animals.
- Guarantee protection of houses and belongings of people who have been evacuated.
- Do not conduct maintenance during hurricane season.

Role of RWS in Response and Recovery

In case of a large scale flooding, RWS has a role in response and recovery:
- Damage to highways:
  - Some roads that were overtopped were OK, others were not
  - Damage was caused by receding waters, not the waters coming in during storm
  - Helicopters are required for first transport of people and material. Roads are flooded or blocked by debris (people had to "chain saw" their way through to reach the damaged areas)
  - Eventually military assistance
  - Roads and bridges: have not been constructed for lateral forces (and impact of debris/barges)
  - Also, extensive damage afterwards due to heavy trucks with debris on saturated foundation of the highways.
  - Bridges were damaged due to rising water-levels which caused bridge sections float. Repair of I-10 Slidell twin bridges (5 miles) took 30 –100 days.

- Emergency repair of highways and flood defenses:
  - Use of available material (= experience), depends on the situation, contact contractors in advance
  - Storage of sheet piles and sand bags is important
  - Breaches in canals: closed off at low flow, rapidly. Material brought in by trucks and helicopters. Closed in 3-4 days, 2 days needed to get mobilized
  - It took about 1 mounth to pump the New Orleans metropolitan dry, and about 9 months to repair all damaged embankments (350 km's).
  - Scarcity of labor and material increases market prices with a factor of 2 to 3.

- Prevent and manage pollution and debris:
  - Should be addressed through the national contingency plan, with the importance of life-saving measures given the highest priority
  - People are asked to separate household wastes after flood, also the contractors and states separate the polluted debris
  - As best possible, recycling measures should be done in advance
  - Where to place the vast amount of New Orleans debris was a huge problem. It is best to designate storage areas in advance. USACE alone removed about 19 million m3 debris, the area total is probably 2 to 3 times higher.
  - USACE has models on the amount of debris to expect due to specific events

- Major companies: get their own robustness (storage facilities) no matter what happens (= advice)

Michael Lowe: Federal Disaster Response: Role of USACE

- Corps Emergency Authority
- National Response Plan
- Corps Role and Responsibilities

Accomplishments

- USACE: 8 divisions with 5-7 districts per divisions:
- Mississippi Valley Division: 6 districts from Canada to Louisiana
- Flood control lakes/reservoirs
- Shipping

Corps Emergency Authorities:

- All hazards planning
- Flood response
- Emergency Authorization
- Support to the National Response Plan

Parish/City: local resources; then State, then Federal

National Response:

- coordinated by Department of Homeland Security/FEMA
- Primary mission: lives, infrastructure, national security
- = new, replaces the Federal Response Plan
- builds on best practices
- addresses the complete spectrum of incident management activities
- uses the National Incident Management System (NIMS) – coordination among Federal, State, Local, tribal, nongovernmental, and private-sector organizations
- Emergency Support Functions: 15, primary agencies have a responsibility for these functions
- Planning and response teams (41, with specific expertise). Teams are put down throughout the area ahead of time (of disaster): in wide reach of area when not quite sure where hurricane will land. Also moving needed material in the areas ahead of the disaster.
- Response teams: it is not their full time job, they are operational only during disaster (within 6 hours)
- USACE has Quarterboats for remote areas. Advantage: not dependent on facilities in the area. Fully independent systems, also in landteams.

Response: cost-sharing federal – states after the first days of assistance

NIMS: is set up by the various states. The states set the priorities, such as who to help and who not (= different from the Dutch LOCC).

District: 800 people. In case teams in the affected district have to be evacuated: plans are available to have other districts take over.

Difference US- NL: in US you need these teams on a more regular basis. In the NL: only every now and then. Suggestion: on EU-basis? Makes sense.

Final conclusions

- Netherlands is on the right track with National Contingency plan. It is important to define involved parties, responsibilities and criteria to scale up.
- USACE and Louisiana State have interesting experiences with preparation, response and recovery on large-scale floods, requires further contacts::
  - TMO visit to Louisiana to be informed about do's and don't's of preparation, response and recovery;
  - Include Louisiana and USACE officials in preparation of TMO November2008 exercise; and
  - Elaborate practical consequences of requirements for response and recovery within Rijkswaterstaat and the Contingency plan framework (→ prepare and "agenda") and intensify contacts about this with relevant employees of USACE and Louisiana State.

Attachment 1
Participants

US PARTICIPANTS (Invited)

Name	Organization
Edmond Russo	USACE EDRC
Carl Anderson	USACE New Orleans District
Tim Axtman	USACE New Orleans District
Robert Bass	USACE New Orleans District
Paul Bourget	USACE Institute for Water Resources
Del Britsch	USACE Mississippi Valley Division
Bill Curtis	USACE Coastal Hydraulics Lab
Mark Gonski	USACE New Orleans District
Steve Hughes	USACE Coastal Hydraulics Lab
Kevin Knuuti	USACE Coastal Hydraulics Lab
Zoltan Montvai	USACE Headquarters
Reed Mosher	USACE Geotechnical & Structures Lab
Al Naomi	USACE New Orleans District
Richard Pinner	USACE New Orleans District
Jon Porthouse	Louisiana Coastal Protection & Restoration Authority
Don Resio	USACE Coastal Hydraulics Lab
Edmond Russo	USACE Coastal Hydraulics Lab
Michael Sharp	USACE Coastal Hydraulics Lab
Jane Smith	USACE Geotechnical & Structures Lab
Stephen Glasscock	Louisiana Department of Transportation Development

Dutch PARTICIPANTS

Name	Organization	Focus Area
Ge de Beaufort	RWS BD	Dutch perspective
Erik Bijlsma	RWS BD	Dutch perspective
Wim Kortlever	RWS BD	Dutch perspective
Bas Jonkman	RWS DWW	Tech. aspects levees Dutch perspective
Jean-Marie Stam	RWS DWW	General
Joop Weijers	RWS DWW	Tech. aspects levees Dutch perspective
Richard Jorissen	RWS RIKZ	Dutch perspective Roles and Responsibilities
Jos van Alphen	RWS RIKZ	Damage Mitigation
Wilfried ten Brinke	RWS RIZA	Damage Mitigation
Annelie Kohl	RWS SDG	General
Leo Adriaanse	RWS Zeeland	Dutch perspective Zeeland-Louisiana
Hans de Jong	HMA Washington	General
Hans Balfoort	DGW	General
Myrte Berendse	Vrije Universiteit	General
Tjeerd Blauw	Provincie Zeeland	Zeeland-Louisiana
Durk-Jan Lagendijk	Provincie Zeeland	Zeeland-Louisiana
Pieter-Jan Mersie	Provincie Zeeland	Zeeland-Louisiana
Piet Dircke	Netherlands Water Part.	Dutch perspective
Marja Menke	Arcadis	Dutch perspective
Dick Kevelam	DHV	Dutch perspective
Jan Heemstra	Geodelft	Dutch perspective
Jos Dijkman	WL	Dutch perspective
Dirk Jan Walstra	WL	Dutch perspective
Mindert de Vries	WL	Dutch perspective
Peter Kerssens	WL	General