International US Scanning Tour
"Adaptation to Climate Change“

I-10 Twin Spans Bridges Project: Repairs, Rehabilitation and Challenges

March 29, 2012

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Project Manager

BRIDGE DESIGN

MEMBERS OF FEHRL

Welcome to our State

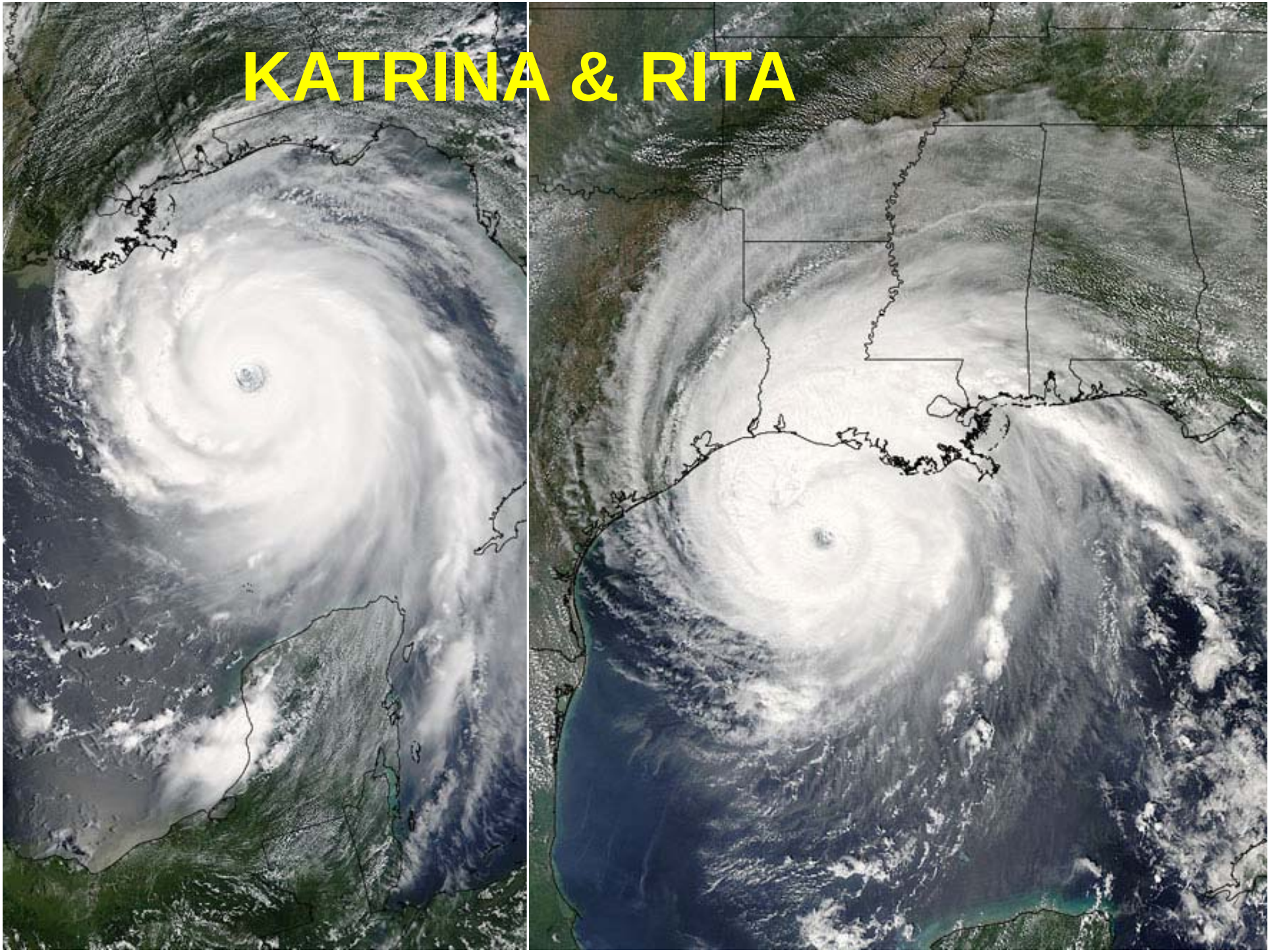
- The 2005 hurricanes, conditions and public needs after the storms
- Damage to the twin span bridges and other infrastructure
- Restoring traffic by repairing the old twin spans
- Planning and executing the replacement project
- Project goals, construction and financial commitments
- Conclusions, Questions and Answers

Two Major Hurricanes Hit The Louisiana Coast In the year of 2005

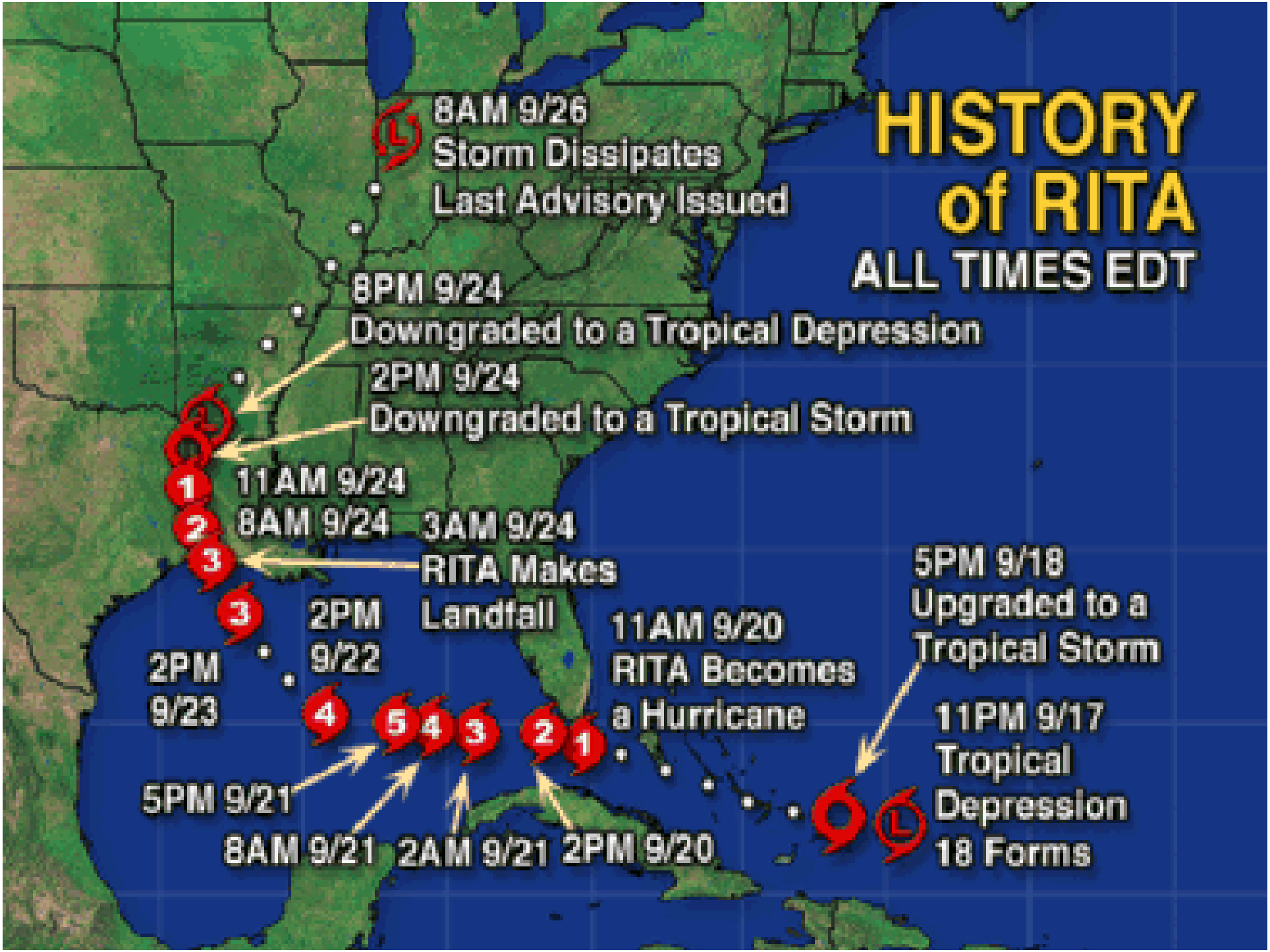
- **KATRINA**-Category 4 at landfall:
  Morning of August 29, 2005

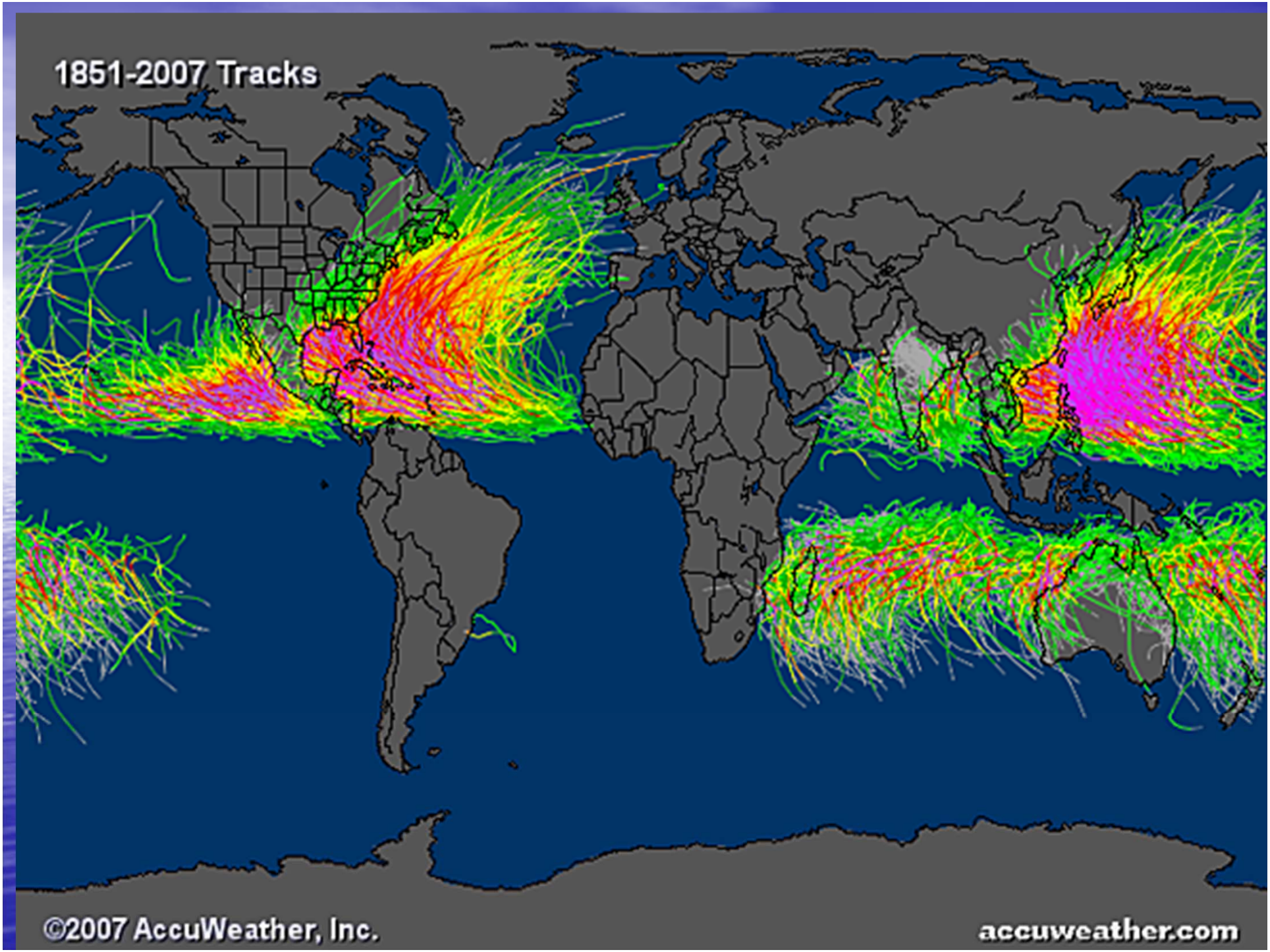
- **RITA** – Category 3 at landfall:
  Morning of September 24, 2005

KATRINA & RITA




HISTORY of
KATRINA
ALL TIMES EDT
11AM 8/30
Last Advisory
Issued
L
Downgraded to a
Tropical Depression
8PM 8/29
Downgraded to a
Tropical Storm
6AM 8/29
KATRINA
Makes
Landfall
4
8AM 8/28
5
2AM 8/28
4
5AM 8/27
3
11AM 8/26
2
1AM 8/26
Downgraded to a
Tropical Storm
1
7PM 8/25
KATRINA
Makes Landfall
5PM 8/25
KATRINA Becomes
a Hurricane
11AM 8/24
Upgraded to a
Tropical Storm
5PM 8/23
Tropical
Depression
12 Forms


HISTORY
of RITA
ALL TIMES EDT
8AM 9/26
Storm Dissipates
Last Advisory Issued
8PM 9/24
Downgraded to a Tropical Depression
2PM 9/24
Downgraded to a Tropical Storm
11AM 9/24
8AM 9/24
3AM 9/24
RITA Makes
Landfall
2PM
9/22
2PM
9/23
11AM 9/20
RITA Becomes
a Hurricane
5PM 9/18
Upgraded to a
Tropical Storm
11PM 9/17
Tropical
Depression
18 Forms
5PM 9/21
8AM 9/21
2AM 9/21
2PM 9/20


1851-2007 Tracks
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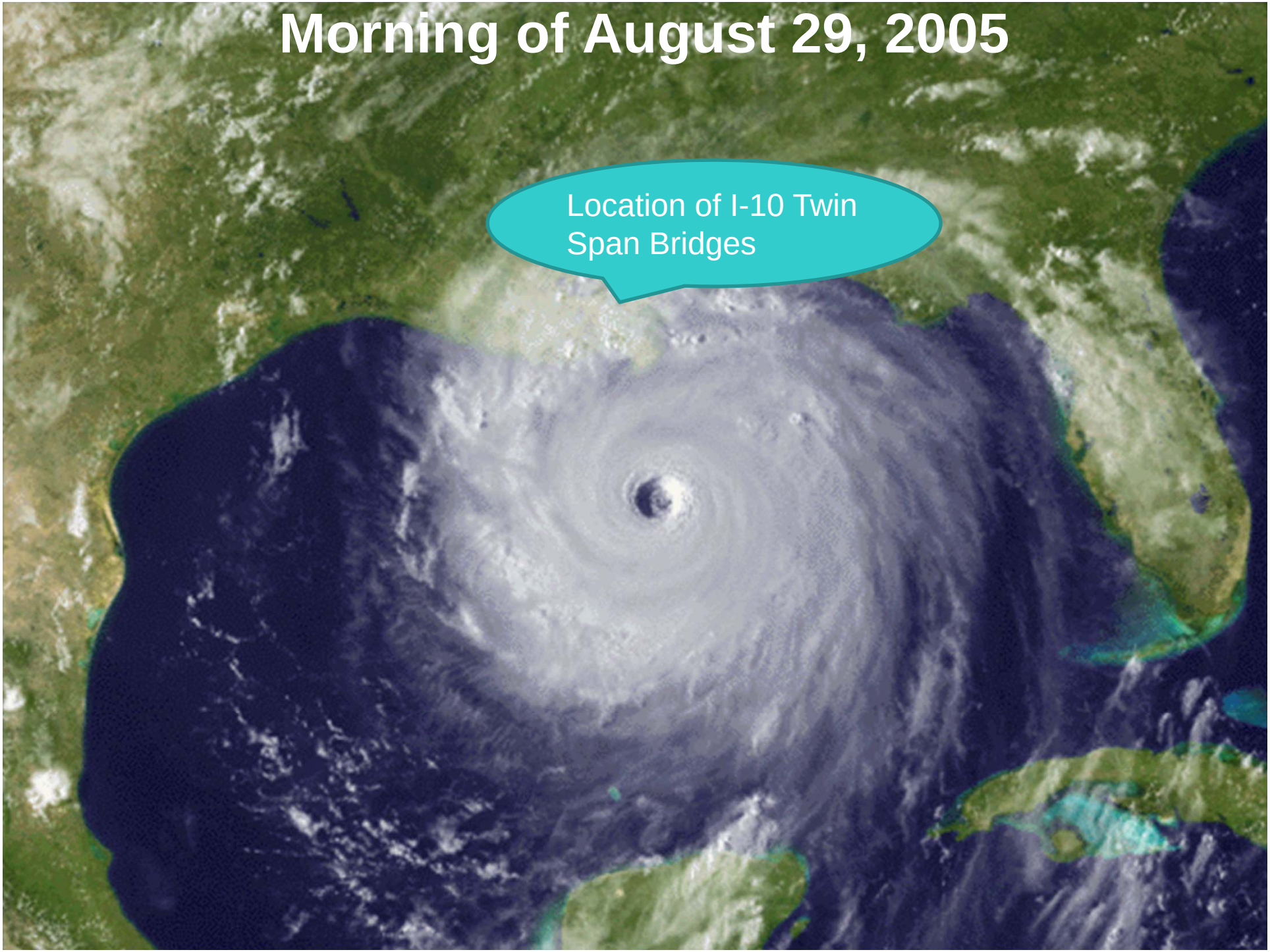
Hurricane effects are worsened by both the flat terrain and coastal erosion.


Morning of August 29, 2005
Location of I-10 Twin Span Bridges

Twin Span Bridges crossing Lake Pontchartrain were built in 1963. The bridges are each 8.7 kilometers long.

- Low level 20 meters monolithic simple prestress girder spans on 1372 mm ppc cylinder piles.
- High rise on north section of bridge.

- **The prefabricated precast type of construction like the twin span bridges provides for speed with minimal site assembly. However the disadvantage is that it usually produces member connections less robust than conventional construction**

Additional Storm Damage Affecting Louisiana and Operations of the Louisiana Department of Transportation

Debris

Twin Span Area

Flooding – Shark 16 Km Inland


Wind Damage
Lake Charles – Calcasieu River Bridge

Electrical Substation

US 90-Rigolet's Pass Bridge under Construction

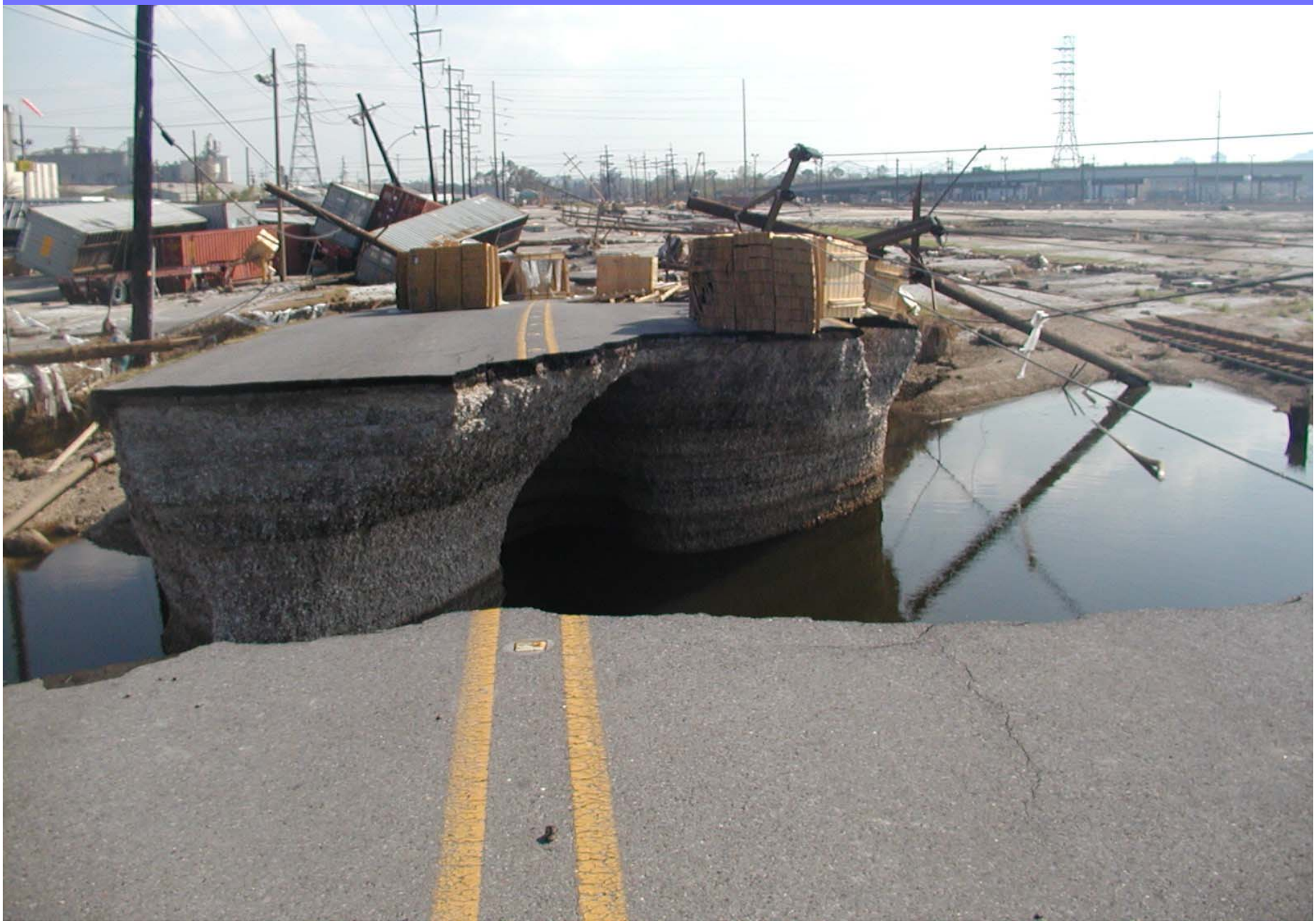
What do you do with it after you pick it up?

Holly Beach (before Rita)

By Arthur Belata / courtesy USACE


Holly Beach (after Rita)

Roadway Scour - New Orleans Area



Recovery and Restoration Constraints and Opportunities

- **September 2005 (DOTD's Situation)**
  - **116 DOTD Employees Missing**
  - **High Hurricane Recovery Expenses**
  - **Political Disagreements Over Recovery Priorities Among Federal, State, and Local Governments**
  - **Operation Difficulties – Shortages of Equipment, Lodging, and Personnel**
  - **Ongoing DOTD Project Obligations**

- Twin Span Bridges were heavily damaged by Hurricane Katrina. These bridges were unable to carry traffic on I-10 in either direction. The repairs and restoration of traffic on this national highway were essential. The events of Hurricane Katrina caused the public to question the State and Nation's ability to serve and manage the infrastructure.
- The plan was to first restore traffic to one bridge with the best parts from both and affect repairs on the second bridge by using 1.5 kilometers of temporary bridge.

Bridge Damage

- **Eastbound Bridge –**
  - **Lost 38 Spans**
  - **170 Spans Shifted Alignment**

- **Westbound Bridge –**
  - **Lost 26 Spans**
  - **303 Spans Shifted Alignment**
  - **Approximately 4300 meters of Damaged Bridge Railing**

Twin Span Repair Project

- Hurricane Katrina made landfall on Monday, August 29, 2005.
- Pre-bid, proposal developed, question / answer session held, and low bidder announced on Wednesday, September 7, 2005.
- Boh Brothers Construction, the winning bidder began work on Monday, September 12, 2005, fourteen days after Hurricane Katrina made landfall.

I-10 Repair Phases

Phase 1: Eastbound Roadway Repair

- Move Spans From One Bridge to Fill Gaps on Parallel Bridge
- Realign and Repair Missing Spans
- Completed in 34 Days (Opened October 14, 2005)
- Construct Crossovers and Open One Bridge to Two Way Traffic


Moving Spans - Mammoet

I-10 Repair Phases

Phase 2: Repair Westbound Roadway

- Replace WB spans with ACROW 700 Series bridging & realign spans
- Open WB lanes to one way traffic (Date opened January 6, 2006)
- Convert EB lanes to one way traffic


MASSMAN


Mammoet - Jack and Slide Method


Span Supports


01/11/2006


01/11/2006

By shifting, moving, relocating, and adding 1.5 kilometers of temporary bridging, both bridges were operational within a 4 and half month period.

The next challenge was to plan and execute the replacement of both bridges.

Received Official Approval for Replacement

- **January, 2006**
  - **Received commitment for funding of permanent solution.**
  - **Design Plans proceeded as design-bid-build project with two distinctive alternate designs.**
  - **Neighbor State's design-build contract 50% to 100% over original budget.**

Project Development Team

- Environmental
- Traffic Engineering
- Road Design and Hydraulics
- Survey
- FHWA
- Steering Committee, Construction and Maintenance
- Project Control
- Management and Finance
- Contract Services
- Pavement and Geotechnical
- Bridge Design

Critical Project Features

- Provide Six Traffic Lanes as well as 3.65 meter wide shoulders
- Storm Protection
- Enhance Ship Collision Resistance
- Provide 100 Years Service Life

Other important safety features

- Dynamic Signs Structures
- Overhead Fixed Sign Trusses
- Emergency Cross Over with Electronic Gates
- Radar Vehicle Detector
- CC TV System and Structures
- Structural Health Monitoring System
- Navigational Lights
- Fiber Optics Lines
- Electrical Power and Service

Project Goals and Schedule

Planning for the replacement began September 2005. Two design alternates were prepared for spring 2006 public bidding. The selected alternate was engineered by the owner. The second alternate was engineered by FIGG. The aggressive schedule gave engineers 4 months to complete all design, acquire permits, geotechnical analysis, and assemble over 1000 plan sheets.

Project Plan

- Define Scope
- Define Agreements Among Key Players and State Officials
- Define Budget
- Define Schedule

Project Pace

- Compressed schedule required 11-14 hour days 7 days a week for a period of fourteen months
- Demand for activities to take place concurrently required revisions after all investigation reports were completed.

Critical Project Demands

- Replace the bridge containing the Acrow Spans first.
- Maintain 4 lanes of traffic.
- Provide 3 lanes outbound during hurricane.
- The bid model must reflect the need for speed yet stay within budget.
- Calendar days, Incentive and Disincentive are used judiciously.

General Facts

Winning bidders, contractors Boh and TKM, selected the alternate A designed by the owner containing AASHTO Type III, alternates Bulb-Tee and the Steel Plate Girder Span .

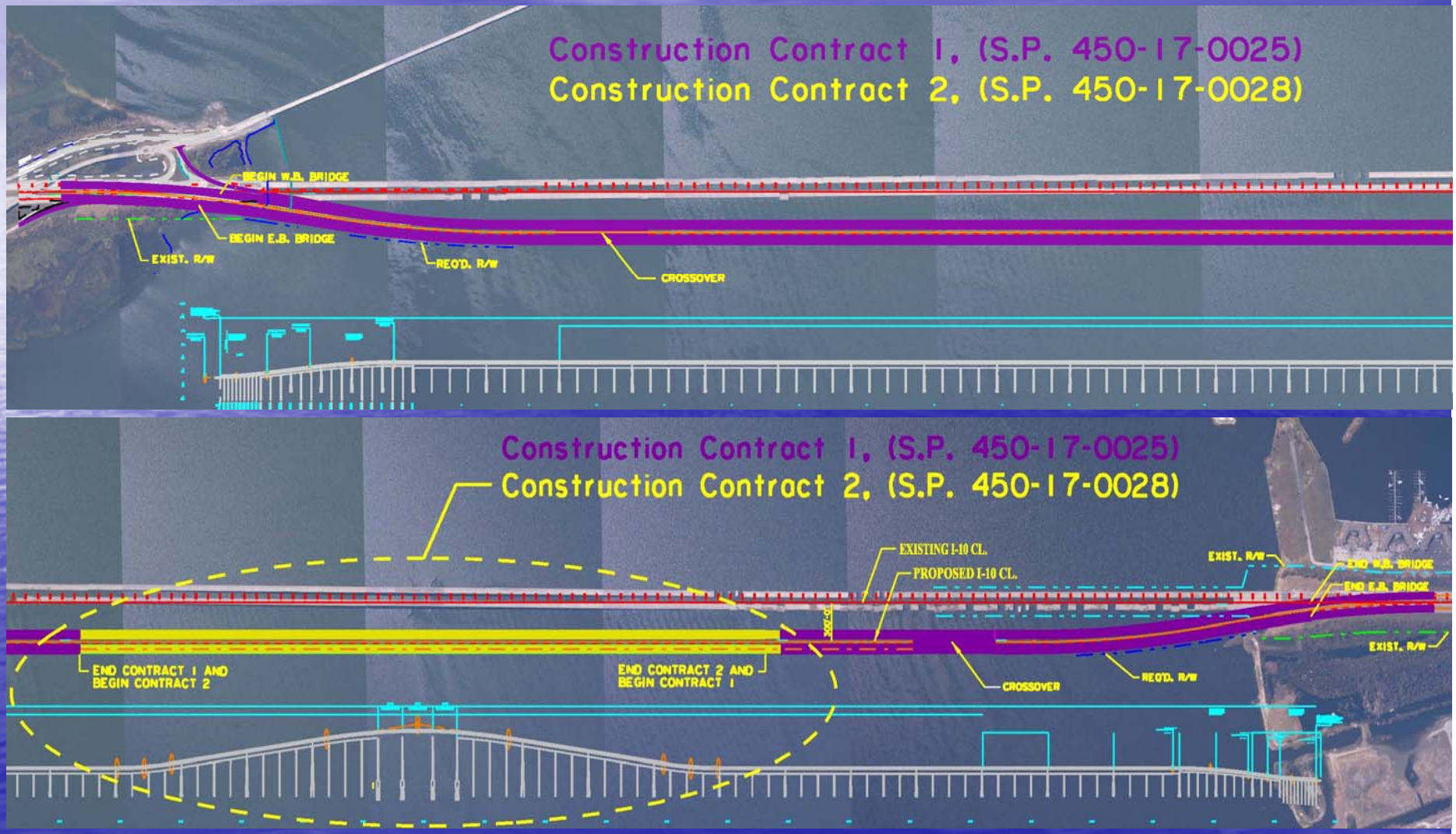
CONTRACT #1 - Letting Date: April, 2006

- **13578 meters of bridge, 314 million Euros**

CONTRACT #2 Main Channel Spans

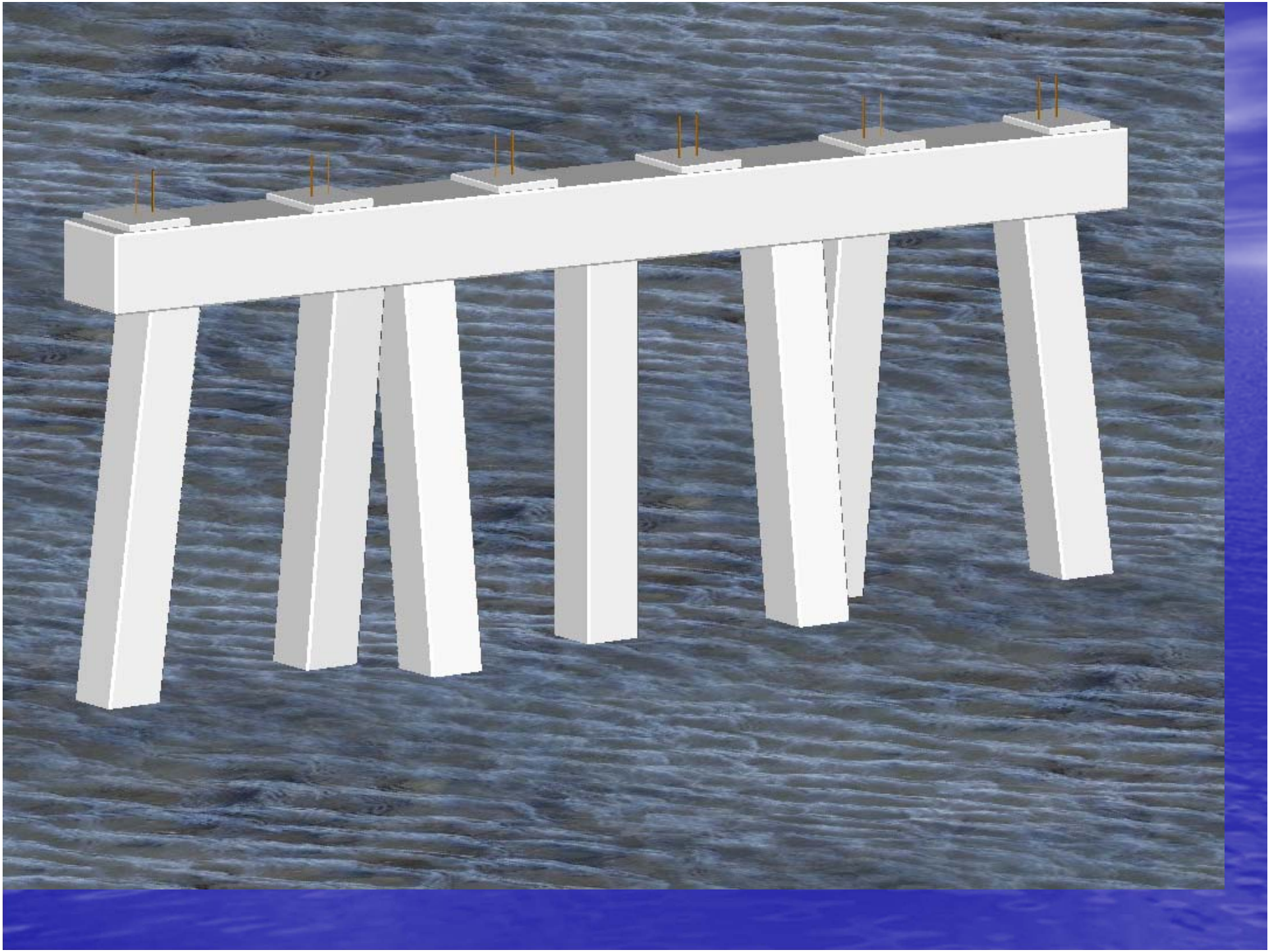
- **Letting Date - November 15, 2006**
- **3523 meters of bridge, 123 million Euros**

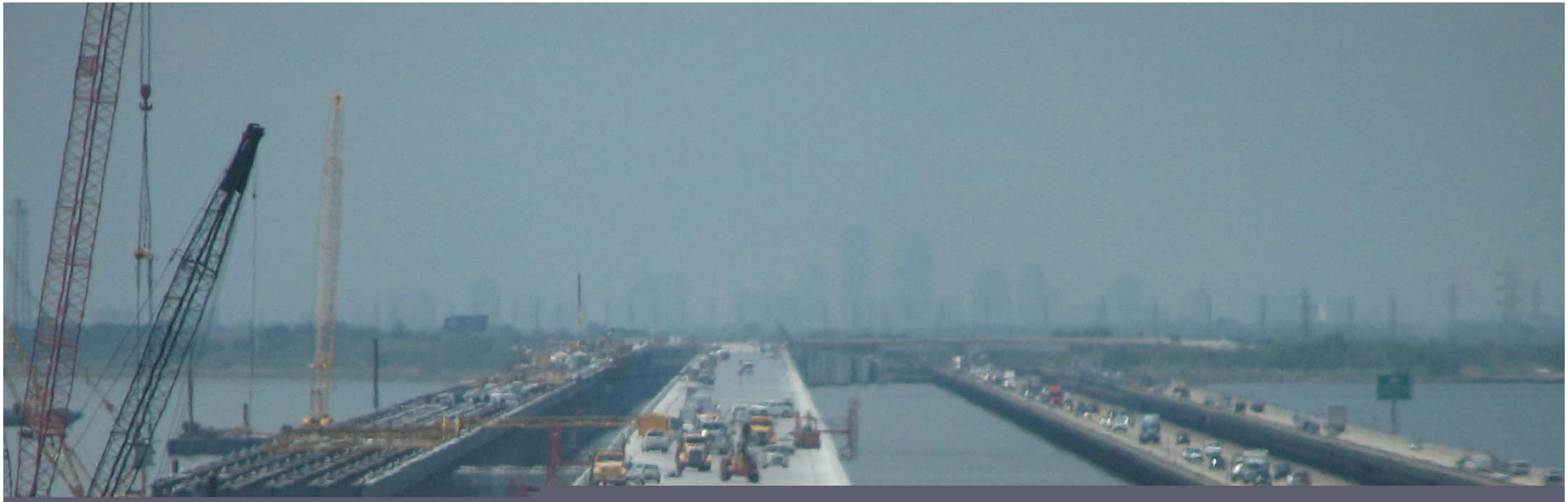
Scope of Contract No. 2

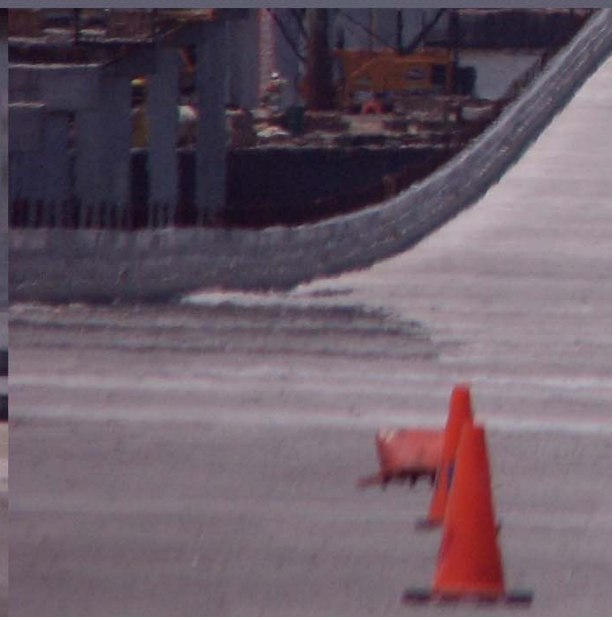


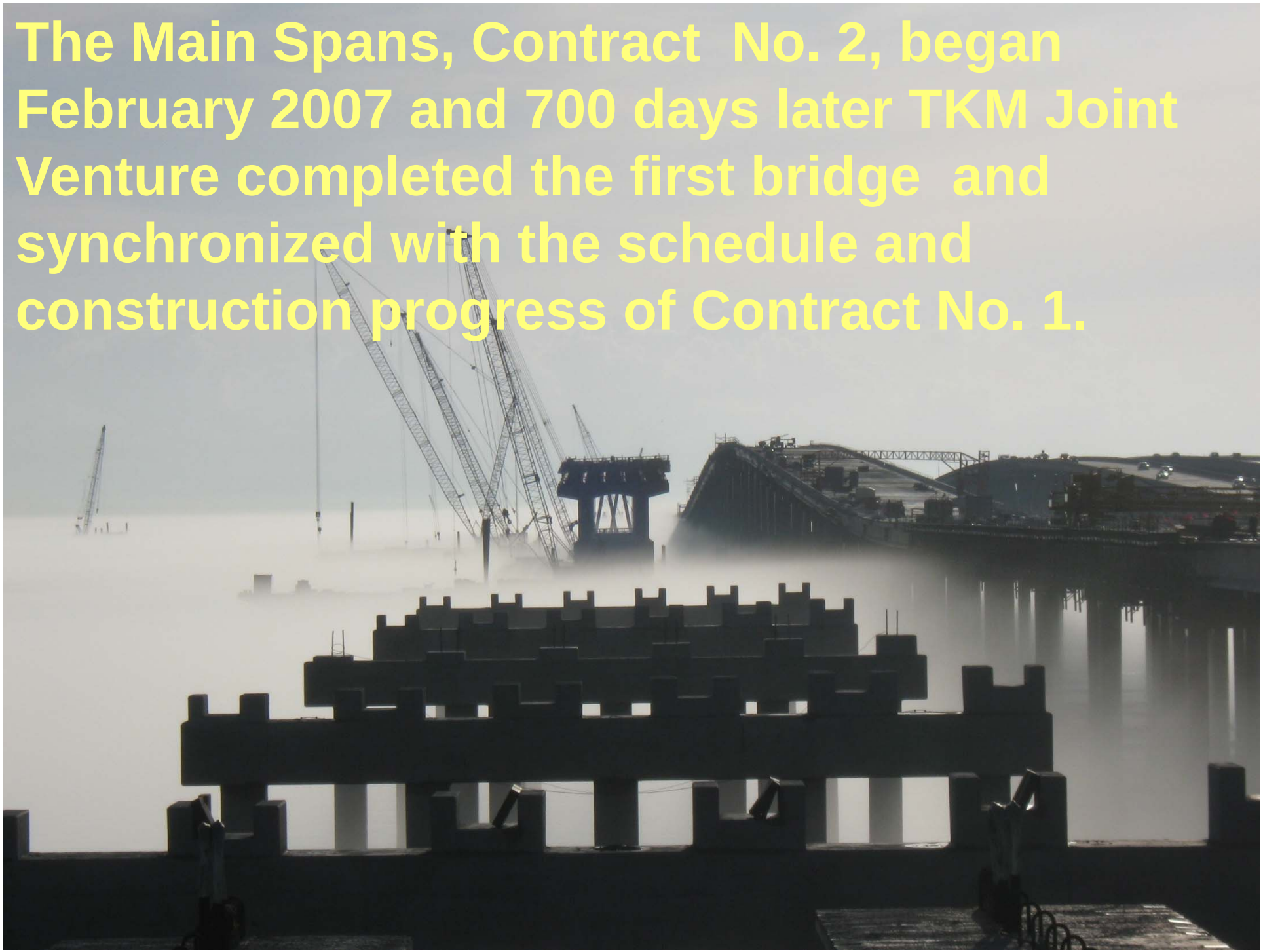
Construction of new bridges began in August 2006, 1000 days later one 8850 kilometer long bridge was complete and carrying traffic.


Use of precasting was maximize.
Construction in the lake proved to be very challenging.
JUL 24 2007








The Main Spans, Contract No. 2, began February 2007 and 700 days later TKM Joint Venture completed the first bridge and synchronized with the schedule and construction progress of Contract No. 1.


IOWELL
IOWELL

Existing Twin Span Bridges retired from operation and being removed.

In 2009, first bridge is completed and in 2010 both damaged bridges are permanently retired.

New Twin Span Bridges under construction with traffic flow in both directions.

Schedule

- Scheduling Promises
  - Deliver ON TIME each step of your GAANT chart and earn respect and support.
  - Missed deadlines cause key players to lose faith and trust in the Plan and Team.

Project Manager Strategy Notes

- Take advantage of all communication options.
- Assemble an experienced staff. Do not hesitate to assign roles and address problem situations.
- Establish scope, funding options and key stakeholders.

Project Manager Strategy Notes

- Meetings need to produce planned decisions.
- Stay on schedule by using the 7 day calendar and 12 to 14 hour days.
- Communicate and document decisions.

Late 2010 – Separate Contract Awarded to Demolish Both Old Bridges - Contractor NASDI, LLC

Working with other entities and the public much of the old bridge material is being recycled for beneficial use.

Distribution and Allocation of Concrete Material

CPRA- Orleans Landbridge Shoreline Protection Project - 164,838 Tons of Material

Louisiana Department of Wildlife and Fisheries – Reef Number 1 - 15300 Tons of Material

Louisiana Department of Wildlife and Fisheries – Reef Number 2 - 10,515 Tons of Material

Property of the Contractor - 8296 Tons of Material

St Tammany Parish – Fishing Pier - 71 Spans and 73 Bents

Construction Project Status

Both bridges were completed in September 2011 with six lanes of traffic servicing this national highway. Electrical and ITS work is still on-going

Demolition Project

Contractor –NASDI, LLC.
NTP- January 26, 2011
Estimated Completion Date –January 30, 2013,
Completed 10 months ahead of schedule on March 1, 2012

Conclusion

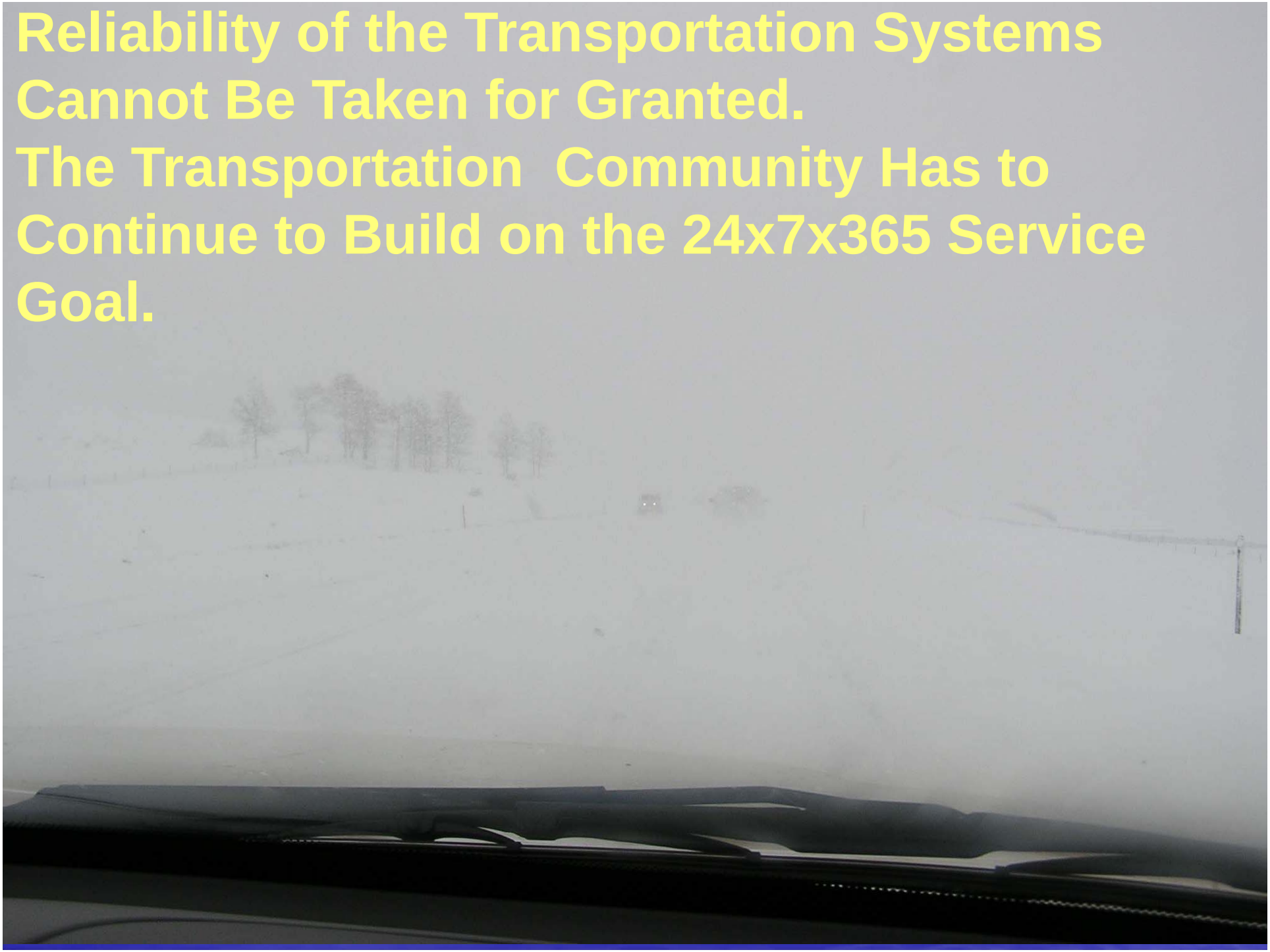
Twin Span bridges were temporarily repaired and then replaced as promised.

The project remained ahead of schedule and within the budget and funding allocated by the United States Congress.

A total of twelve contracts were awarded and most of them are now completed. The project met its obligation and in 2010, this project returned 35 million Euros of unspent monies to the hurricane recovery fund. In 2011, the amount returned will be about 16 million Euros. The total unspent funds equal to 12% of the original project allocation.

Reliability of the Transportation Systems Cannot Be Taken for Granted.

The Transportation Community Has to Continue to Build on the 24x7x365 Service Goal.



Thank you for your attention