

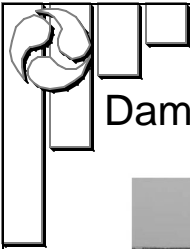
## **Best Practices for the I-10 Escambia Bay Bridge Replacement Project in Florida and the I-10 Lake Pontchartrain Bridge Replacement Project in Louisiana due to Hurricanes Ivan and Katrina**

Jeffrey Ger  
Division Bridge Engineer  
Florida Division, FHWA



### **Damaged I-10 Escambia Bay Bridge**

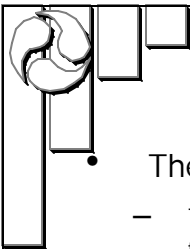




## Damaged I-10 Lake Pontchartrain Bridge



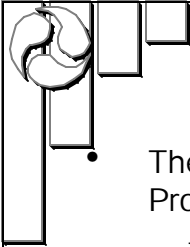
b



## Project Delivery Methods

### • The Escambia Bay Bridge Design-Build Project:

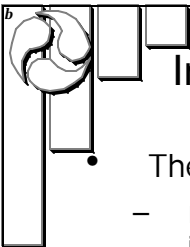
- To expedite and complete the project delivery, due to the fact that I-10 is the only east-west interstate in the southern region of the U.S. Decreasing the overall project completion time is critical.
- The existing emergency repaired EB bridge can only carry one lane of interstate traffic which creates significant delay and interstate traffic backups.
- D/B allows more flexibility for innovation in the design and construction efforts.



## Project Delivery Methods

### • The Lake Pontchartrain Bridge Design-Bid-Build Project:

- The damaged bridge does not jeopardize the major east-west interstate highway in the southern region.
- The existing emergency repaired bridge still carries two-lanes of traffic in each direction as before.
- Overall project completion time is not as critical as the I-10 Escambia Bay Bridge. There are two additional bridges over Lake Pontchartrain (US-11 and Pontchartrain Causeway bridges).



## Innovation in Contract Document

### • The Escambia Bay Bridge Design-Build Project:

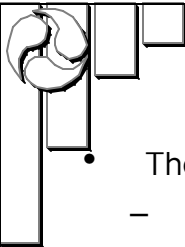
- Incentive/disincentive (I/D) for early/late completion: \$10M incentive; \$133K/day disincentive.
- I/D for lane rental days to minimize the inconvenience to the traveling public.
- Utilized a 5 year warranty for deck expansion joint, coatings, bearings, lighting/electrical systems; and drainage systems.
- Cost plus Time (A+B) with technical score bidding calculation:  
$$[BPP + (PCT * TVC)] / TS = \text{Adjusted Score.}$$
  - BPP = bid price;
  - PCT = proposed time;
  - TVC = time value cost (daily road user cost);
  - TS = technical score (design services, maintenance, MOT, innovative aspects, warranty, etc.).



## Innovation in Contract Document

### • The Lake Pontchartrain Bridge Design-Bid-Build Project:

- A+B bidding provisions to minimize contract time.
- I/D provisions with maximum incentive of \$4.5M.
- Formalized partnering meetings before and during construction.

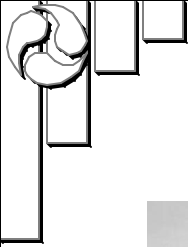


## Innovation in Construction

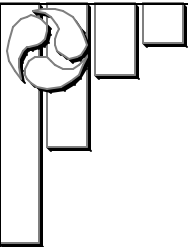
### • The Escambia Bay Bridge Design-Build Project:

- Deck form placer and stripper used to greatly increase the production of CIP decks.

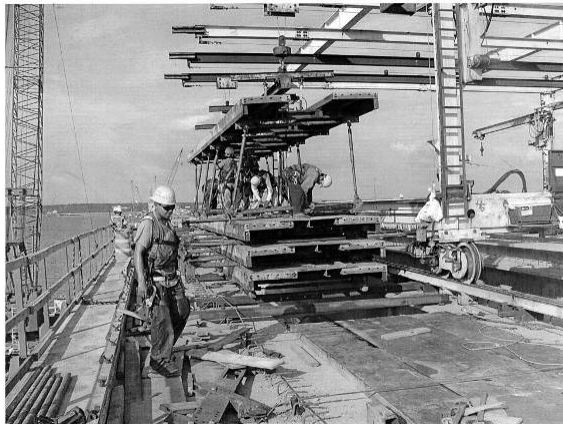


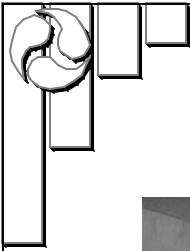


## Deck form placer and stripper

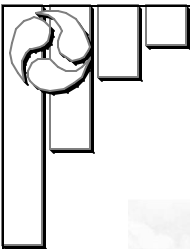


## Deck form placer and stripper



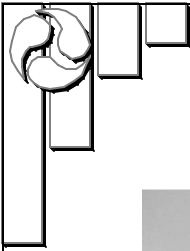


## Deck form placer and stripper

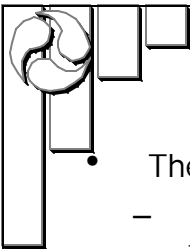


## Deck form placer and stripper



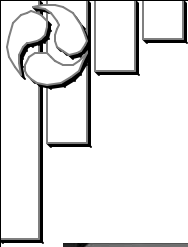


## Deck form placer and stripper

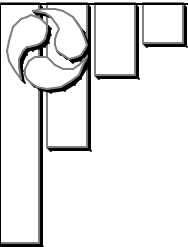
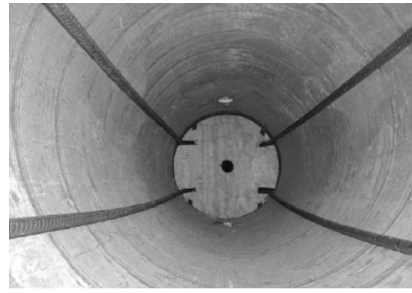


## Innovation in Construction

- The Escambia Bay Bridge Design-Build Project:
  - Deck form placer and stripper used to greatly increase the production of CIP decks.
  - Precast trestle pile caps for low level piers

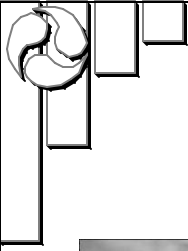


## Precast trestle pile caps

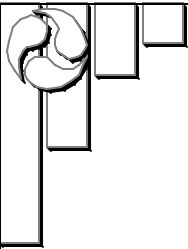


## Precast trestle pile caps



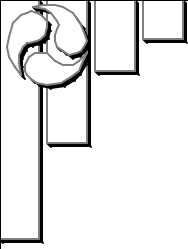


## Precast trestle pile caps

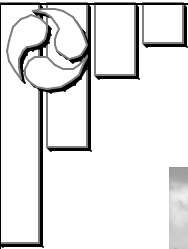


## Precast trestle pile caps



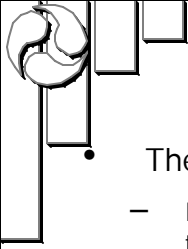


## Precast trestle pile caps



## Precast trestle pile caps

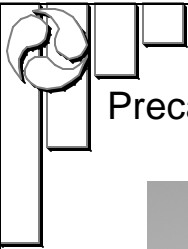




## Innovation in Construction

### The Escambia Bay Bridge Design-Build Project:

- Deck form placer and stripper used to greatly increase the production of CIP decks.
- Precast trestle pile caps for low level piers
- Precast waterline footings for high level piers



### Precast waterline footings for high level piers





## Precast waterline footings for high level piers



## Precast waterline footings for high level piers







## Precast waterline footings for high level piers



## Precast waterline footings for high level piers



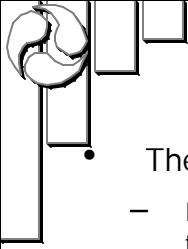


Precast waterline footings for high level piers



Precast waterline footings for high level piers





## Innovation in Construction

### The Escambia Bay Bridge Design-Build Project:

- Deck form placer and stripper used to greatly increase the production of CIP decks.
- Precast trestle pile caps for low level piers
- Precast waterline footings for high level piers
- CIP Waterline Footing Construction using special design forming system

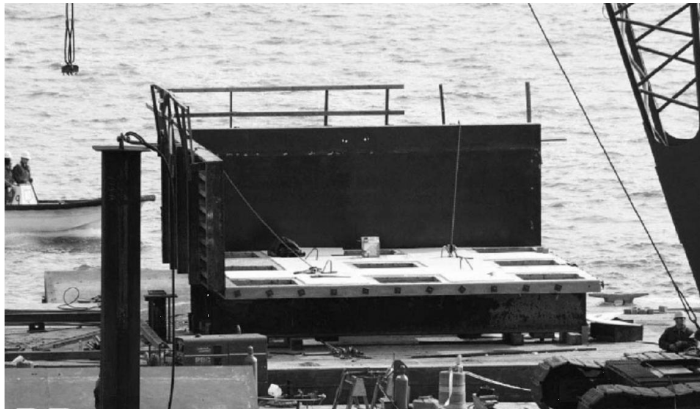


## CIP Waterline Footing Construction





## CIP Waterline Footing Construction



## CIP Waterline Footing Construction





## CIP Waterline Footing Construction



## CIP Waterline Footing Construction

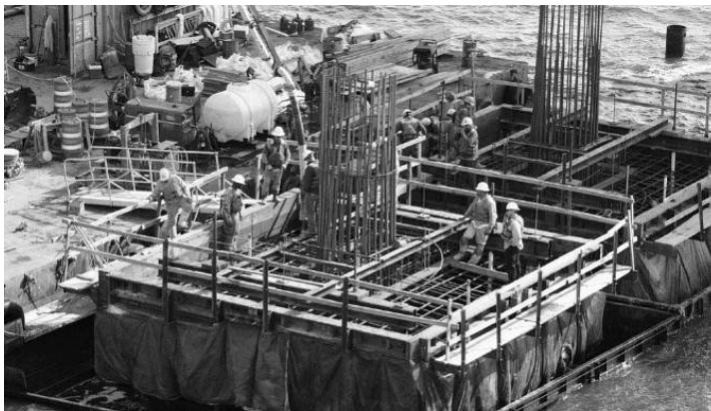




## CIP Waterline Footing Construction



## CIP Waterline Footing Construction





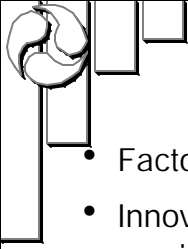
## CIP Waterline Footing Construction



## Innovation in Construction

• The Lake Pontchartrain Bridge Design-Bid-Build Project:

- Precast trestle pile caps (optional) for low level piers
- CIP Waterline Footing Construction using special design forming system



## Summary

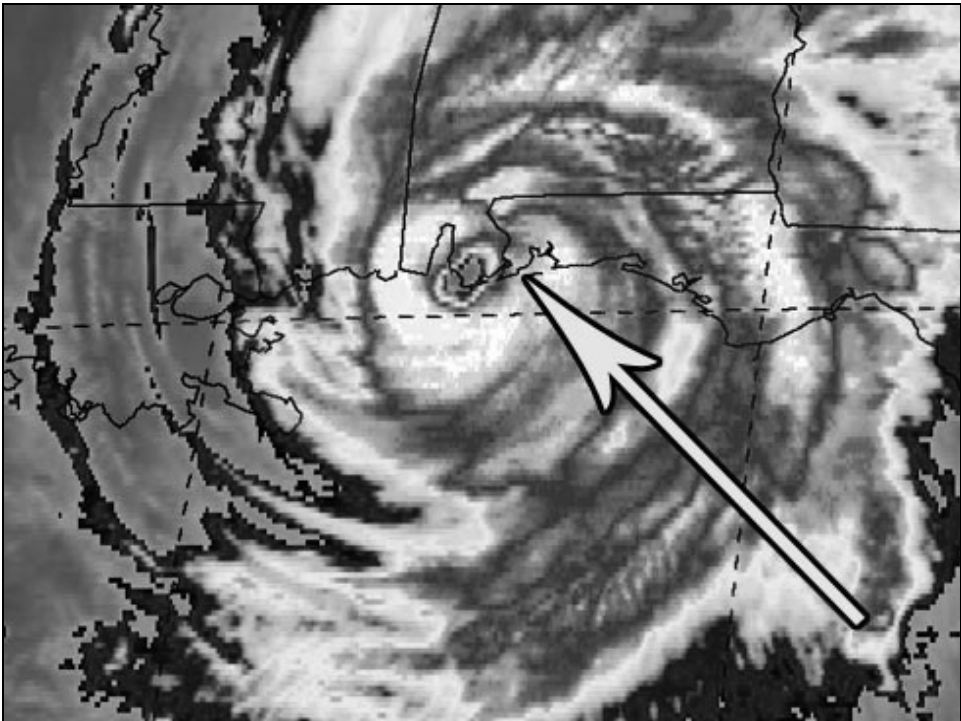
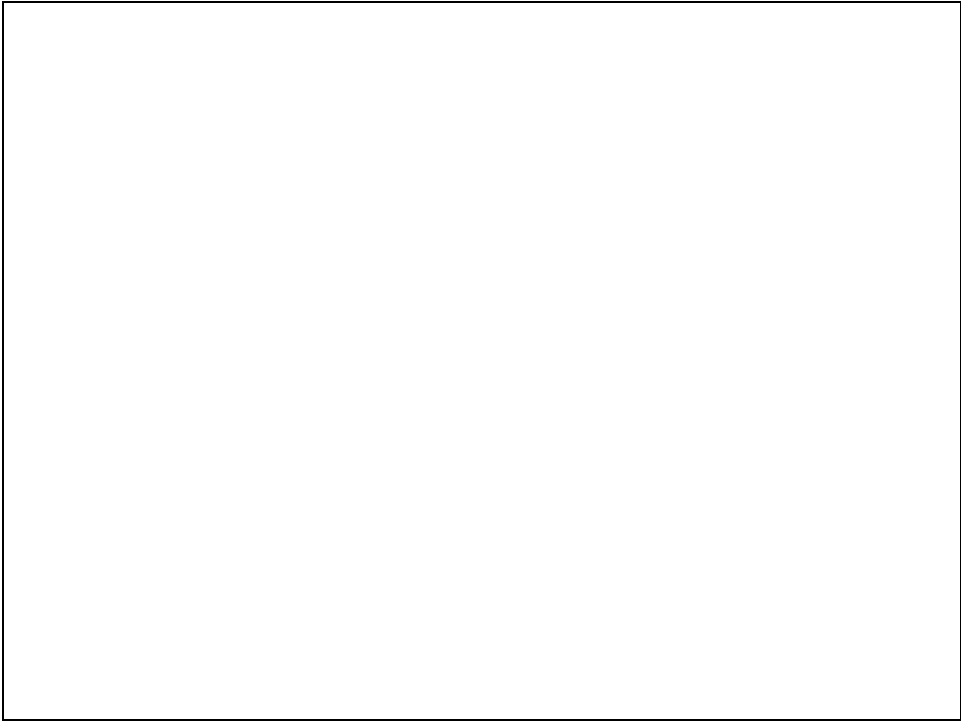
- Factors for selecting project delivery method (D/B).
- Innovation in contract document: A+B bidding; I/D provisions, warranty, and formalized partnering meetings.
- Using prefabricated bridge components to accelerate construction: precast piles & pile caps; precast footings, and deck form placer and stripper for deck placement.

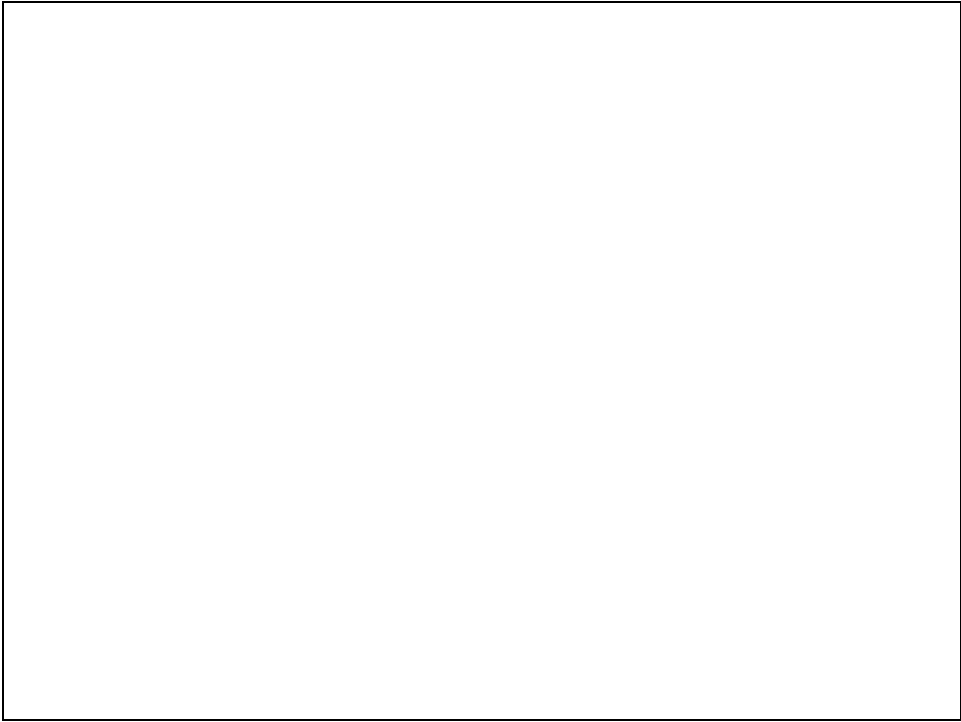


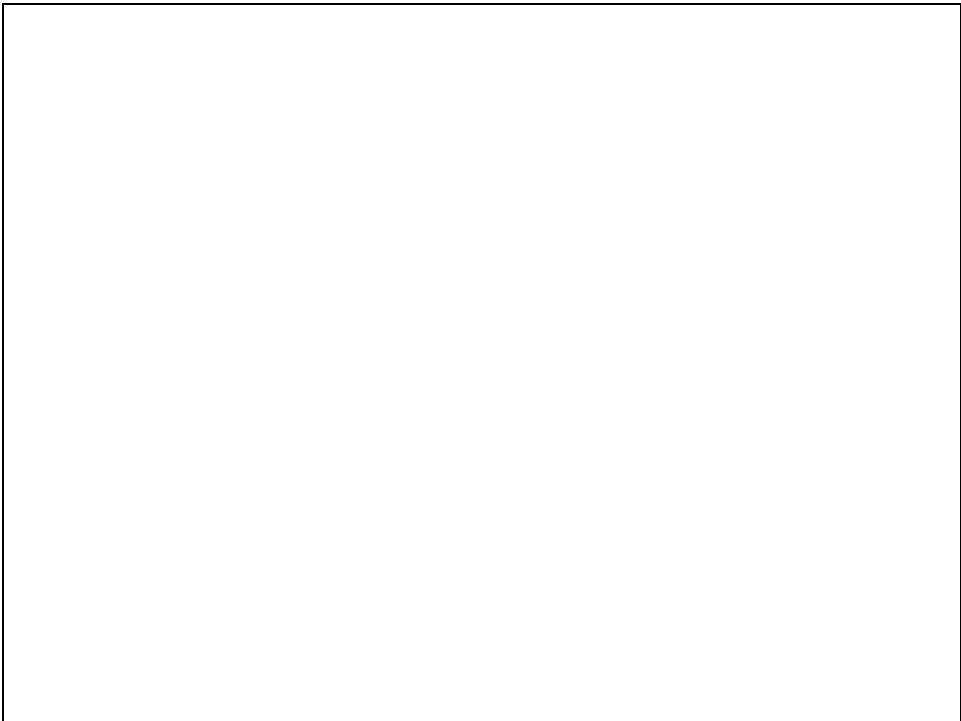
# Hurricane Recovery

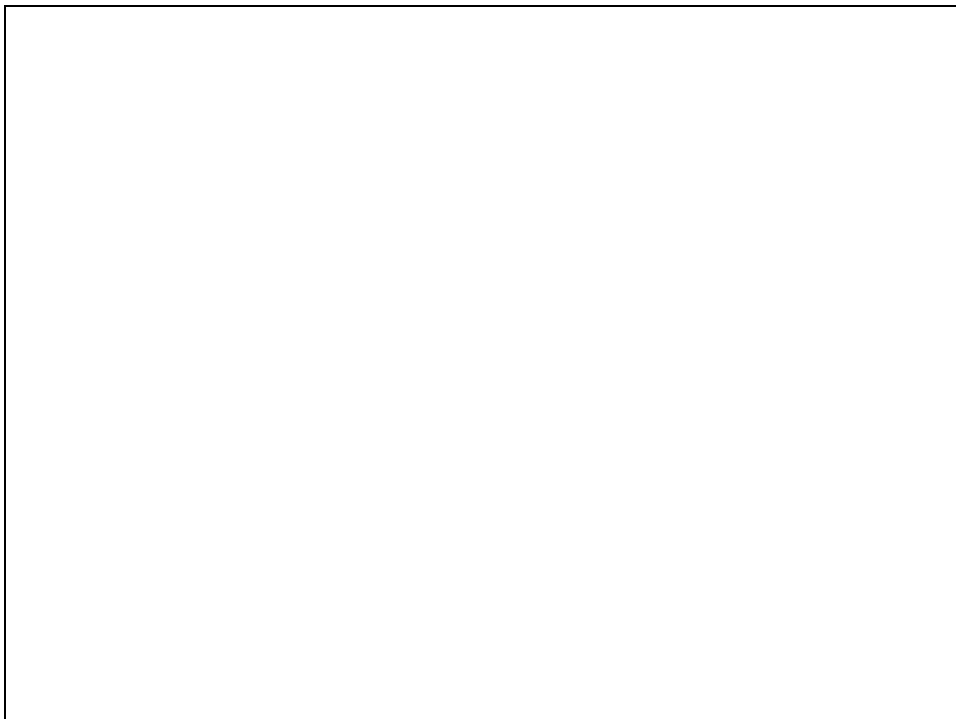
**Keith A. Hinson, P.E.**  
**FDOT D3 Asst. District Construction**  
**Engineer**



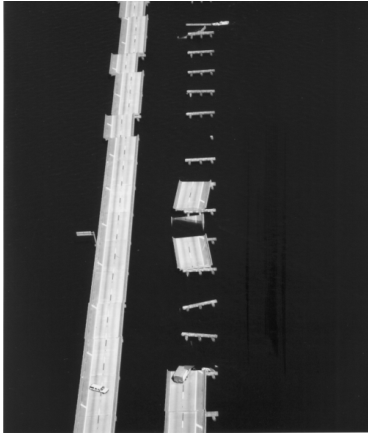




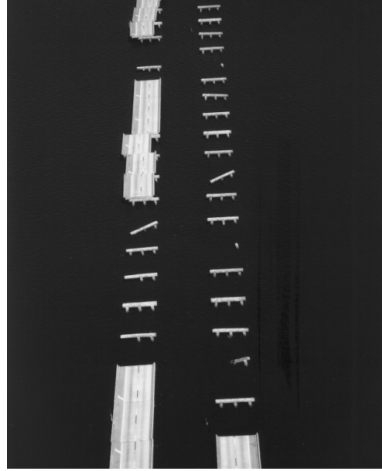




## Hurricane Ivan & I-10 (Sept 16)



Low level on west side of channel



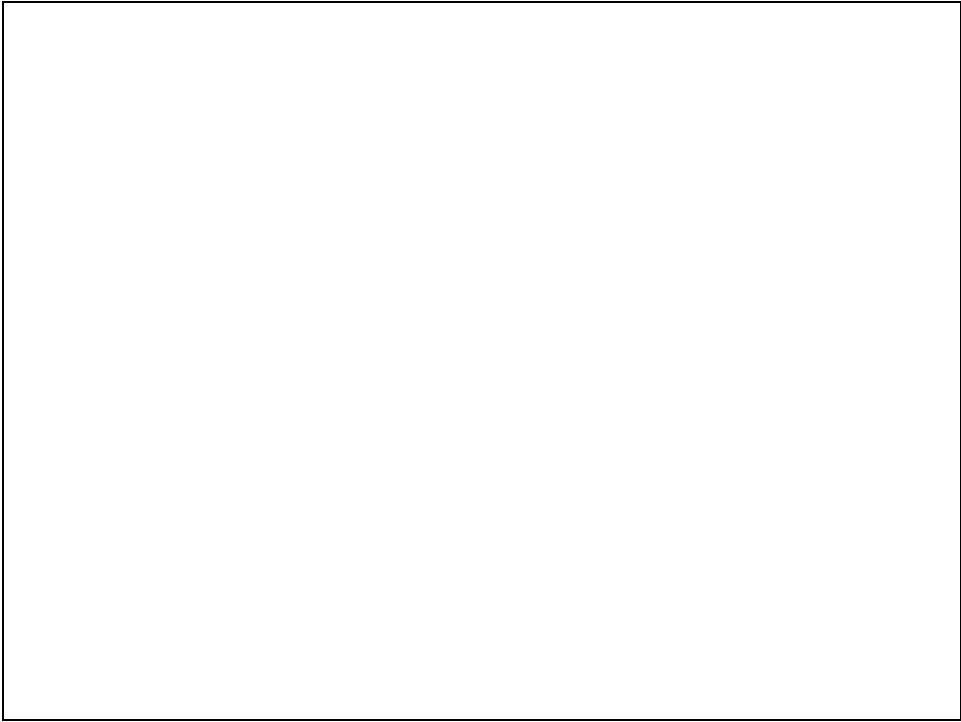
Low level on east side of channel











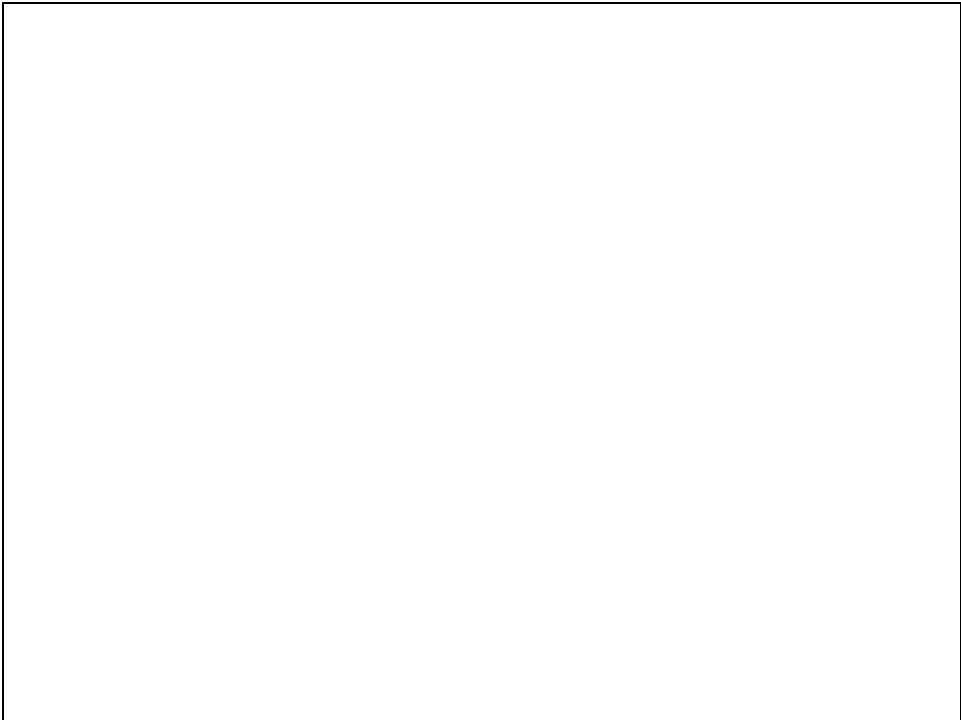




# Bridge Impacts

<b>Uplift force</b>	<b>900,000 lbs</b>
<b>Lateral force</b>	<b>700,000 lbs</b>
<b>Span weight</b>	<b>220,000 lbs</b>
<b>Surge</b>	<b>16 feet</b>
<b>100 year surge</b>	<b>12 feet</b>
<b>Wave height</b>	<b>12 feet</b>
<b>Spans shifted</b>	<b>66</b>
<b>Spans missing</b>	<b>58</b>
<b>Total Spans</b>	<b>104</b>

# I-10 Bridge Damaged





# Acrow Installed 3,400ft

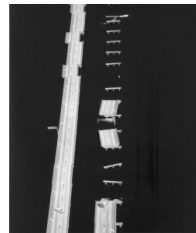


# Bridge History

- September 16, 2004, “Hurricane Ivan” makes landfall (Bridge Closed)
- September 17, 2004 Contract Executed
- October 5, 2004, I-10 opened “One lane EB. & WB.”
- November 20, 2004, I-10 opens two lanes WB., one lane EB.

## Emergency Design Build Contract

**Seventeen Days...**



**From This**



**To This**

# **Contract**

**Contract Executed Day After Storm**

**24 Days to Restore Traffic**

**\$250,000/day Incentive/Disincentive**

**\$50,000/day Incentive/Disincentive Completion**

**Decision Makers Present**

**Willingness to Take Risks**

**Mobilize Immediately**

**Shift Crews on Site**

**24 hours/day, 7 days/week**