

## Session 9

### Amy Scales

FDOT D5

### *Graves Avenue Bridge over I-4: How-To Manual*

#### **Topic Description**

2006 Graves Avenue/I-4 bridge replacement project. This project is the first in the country to use SPMTs to quickly remove existing spans and install new spans that cross an Interstate highway, to significantly reduce traffic disruption and improve work-zone safety.

#### **Speaker Biography**

As Resident Engineer of Interstate Construction for the Florida Department of Transportation – District 5, Amy Scales oversees I-4 construction projects in Osceola, Orange, Seminole and Volusia counties. Mrs. Scales has worked for FDOT for more than 18 years and holds a Bachelors of Civil Engineering degree from Auburn University.

# SPMTs: RAISING THE SPEED OF BRIDGE CONSTRUCTION IN THE U.S.

Use of Self-Propelled Modular Transporters (SPMTs)

Amy D. Scales, P.E. – FDOT D5 Interstate Construction

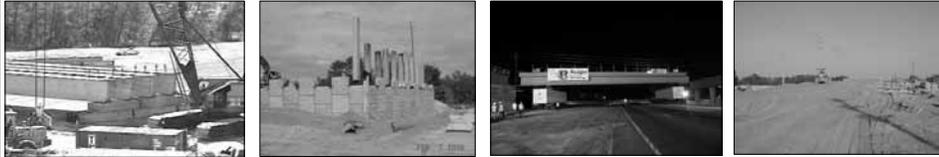
## THE TRADITIONAL METHOD

Close Bridge → Demo Bridge → Build Substructure → Build Roadway → Build Superstructure → Open to Traffic



Act ID	Activity Description	Orig Dur	2006												2007					
			MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR							
30010	Removal/ Demolition- Inclds. Beams	28																		
30034	CAST PRODUCTION PILING	21																		
40000	TEMPORARY RETAINING WALL 1, 2 & 3	45																		
90310	EMBANKMENT GRAVES AVENUE	31																		
40100	TEMPORARY RETAINING WALL 4, 5 & 6	45																		
30070	End Bent 1 Concrete SUBSTRUCTURE	14																		
30080	End Bent 3 Concrete SUBSTRUCTURE	14																		
30030	BRIDGE	67																		

# THE NEW METHOD



Activity ID	Description	Original Duration	2005												2006											
			NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG				
G005	Cast & Cure FBT 78	60	G005																							
G100	Demolition	26*	G100																							
G830	Install Temporary Roadway for SPMT's	20	G830																							
G200	Abutments	62*	G200																							
G220	MSE wall 1,2,3	30	G220																							
G260	MSE wall 4,5,6	30	G260																							
G700	Bridge	82*	G700																							
G300	Roadway	87*	G300																							

# MOTIVATION

- New Technology
- Reduced Construction Time
- Reduced Impacts to the Public
- Increases Safety



## **CHALLENGES**

- “This Is The Way We’ve Always Done It”
- Adding New Methods To An Existing Contract
  - Justification Of Added Costs
  - Finding The Funding
- Addressing the Contractors’ Concerns



## **GETTING READY FOR DEMO**

- Existing 4 Span Bridge
- Removed Tail Spans Using Traditional Method
- Spans Over I-4: 70’ 6” Long, 30’ Wide, 250 Tons



## **SPAN REMOVAL**

- 22 Minutes To Move Outside Of Travelway



## **AFTER THE MOVE**



## **48 HOURS LATER**



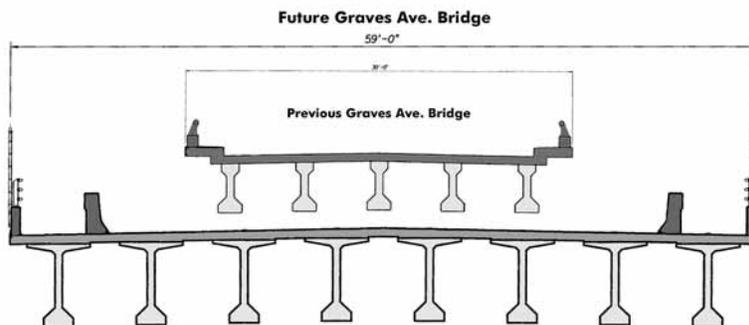
## **DEMOLITION SAVINGS**

- 12 Anticipated Nights Of Work For Demo
  - 2 Actual Nights Of Work
- 6 Anticipated Rolling Roadblocks For Beam Picks
  - 3 Actual Rolling Roadblocks
- Savings: ODLEO Hours, MOT Setups, Switching Manpower From Day To Night, Transporting Old Beams



## NEW CONSTRUCTION

- 143' Long, 59' Wide, 1300 Tons



## CRITICAL NEEDS

- False Bents



## CRITICAL NEEDS

- False Bents
- Correct Support



## CRITICAL NEEDS

- False Bents
- Correct Support
- Form Work Tolerance



## **CRITICAL NEEDS**

- False Bents
- Correct Support
- Form Work Tolerance
- High Degree of Quality Control



## **SAFETY ASPECTS**

- Supported Load vs. Suspended Load
  - Confidence Factor
- Fewer Workers Over/In Traffic
  - Fewer Lane Closures



# **SUPERSTRUCTURE CONSTRUCTION**



# **COMPLETED SUPERSTRUCTURE**



## THE LIFT

- Use of Four 12 Axle SPMTs
- 2 ½ Days To Lift To Setting Height



## THE LIFT



## THE LIFT



## THE LIFT



## **THE INSTALLATION**



## **THE INSTALLATION**

- 2 Nights
- 5 Hours First Night



## **THE INSTALLATION**

- 3 Hours Second Night



## **Selection Criteria**

- Is there a reason for minimal closure time?
- Is there room for offsite superstructure construction?

## **Lessons Learned**

- Set dates, time limits for bridge closure
- Provide incentives for earlier completion

**Amy D. Scales, P.E. – FDOT D5 Interstate Construction**