

## Session 20

### Jean Ducher

FDOT - CO - Office of Maintenance

### *Operational Implementation of LRFR*

#### **Topic Description**

The Department is implementing the LRFR (Load Resistance factor Rating) method to load rate its bridges. During this implementation the Permit Office, the office of Maintenance, the Department's Districts and The Structure Design office have an essential role to play in insuring safe, accurate, consistent and timely issuance of permits partially based on bridge ratings obtained using the LRFR method.

#### **Speaker Biography**

Jean Ducher served as the State Bridge Evaluation Engineer for the Florida Department of Transportation since March of 1998. Mr. Ducher is responsible for assisting the Road Permit Office with overweight permit decisions and to develop load rating policies to safely preserve the bridge inventory while minimizing bridge restrictions to truck mobility. Before becoming the State Bridge Evaluation Engineer, he held the position of Engineer of Structures Design in the Bridge Design Office in Tallahassee. Mr. Ducher started with FDOT in 1993.

His previous experience includes Research and Teaching Engineering at the University of Florida. He held various positions in Engineering-Architecture Consulting Firms. He served 2 years in the French Army in Africa.

Mr. Ducher is a licensed professional engineer. He holds Both a Masters Degree in Civil Engineering Structures and a Masters Degree in Architecture from the University of Florida.

Mr. Ducher other interests are Classical guitar and the study of ancient Greek and Latin.



# Operational Implementation of the LRFR method

Jean Ducher, P.E.  
State Bridge Evaluation Engineer

FDOT, Office of Maintenance



- How to best implement the LRFR method in the State of Florida to fulfill the Department's mission ?

**OUR  
MISSION**

The department will provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity and preserves the quality of our environment and communities.



The people of DOT ... dedicated to making travel in Florida safer and more efficient.

**OUR  
VISION**

- While implementing the LRFR method, the Department must keep the same level of mobility as the current one and possibly enhance it...

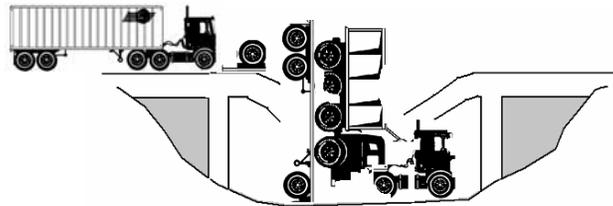


...while preserving the bridge inventory by:

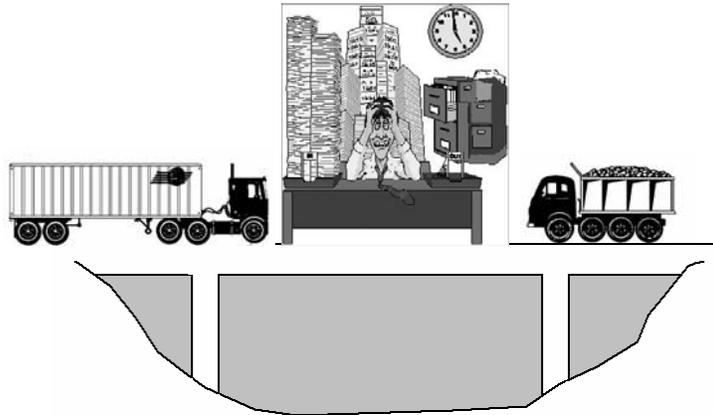
Preventing deterioration due to overloading ....



...or preventing bridge collapse due to overloading



The Implementation of the LRFR method must still allow the Department to issue overweight permits timely...



Implementation of the LRFR method should help us in issuing...

- Safe
- Accurate
- Consistent
- Timely

Permits for Overweight Vehicles



## To meet those challenges we needed to :

- Simplify/Modify some of the proposed AASHTO requirements
- Update our load rating, permitting and posting procedure
- Modify our permit bridge evaluation software
- Introduce new LRFR related data in the bridge database



## Our current permitting approach:



- Truck information
- Road segment information
- District bridge Database information

## We needed to Simplify table 6-6 of the Manual for Condition Evaluation of Bridges and LRFR

Load and Resistance Factor Rating 6-27

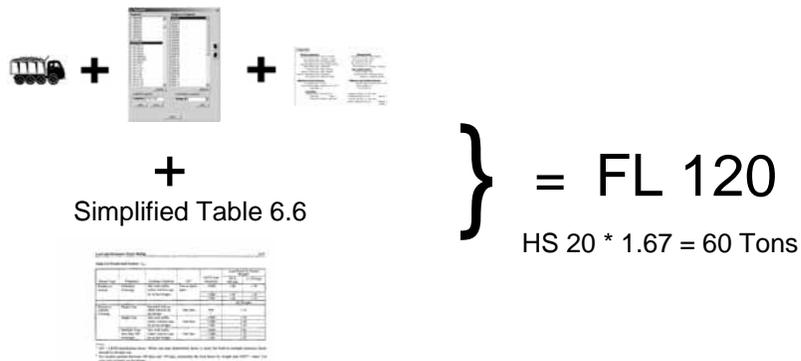
Table 6-6 Permit load Factors:  $\gamma_L$

Permit Type	Frequency	Loading Condition	DF <sup>a</sup>	ADTT (one direction)	Load Factor by Permit Weights <sup>b</sup>	
					Up to 100 kips	≥ 150 kips
Routine or Annual	Unlimited Crossings	Mix with traffic (other vehicles may be on the bridge)	Two or more lanes	>5000	1.80	1.30
				~1000	1.60	1.20
				<100	1.40	1.10
All Weights						
Special or Limited Crossing	Single-Trip	Escorted with no other vehicles on the bridge	One lane	N/A	1.15	
					1.50	1.40
	Multiple-Trip (less than 100 crossings)	Mix with traffic (other vehicles may be on the bridge)	One lane	>5000	1.35	1.25
				~1000	1.85	1.75
				<100	1.75	1.55

Notes:  
<sup>a</sup> DF = LRFD-distribution factor. When one-lane distribution factor is used, the built-in multiple presence factor should be divided out.  
<sup>b</sup> For routine permits between 100 kips and 150 kips, interpolate the load factor by weight and ADTT value. Use only axle weights on the bridge.

## Simplification for permitted Vehicles

Simplified Permitting Approach



## Simplification for posting vehicles



- HL 93
- SU4, C5, ST5
- SU2, SU3, C3, C4

## New LRFR related data in the bridge database

- FL120 Longitudinal rating for governing span
- FL120 Transverse rating for segmental bridges
- FL120 Floor beam rating
- FL120 Longitudinal rating for maximum span

The screenshot shows a software window titled 'FDOT Bridge Related Information' for a 'Parallel Structure (101) Unknown (NB)'. It features several tabs: 'Misc. Bridge', 'Load Rating 1', 'Load Rating 2', 'Scour & Storm', and 'Warranty'. The 'Load Rating 2' tab is active, displaying various rating fields. Arrows point to the following fields: 'Gov FB Spacing' (ft), 'Gov FB Spacing' (ft), 'FB HS20 Rating' (tons), 'FB SU4 Rating' (tons), 'FB Present' (No), 'FB INV Rating Factor', 'Rating Factor', 'FB FL 120' (tons), 'Long Gov Span' (tons), 'FL 120 Trans' (tons), 'Single Axle Trans' (tons), 'Tandem Axle Trans' (tons), 'Wing Span' (ft), 'Web to Web Span' (ft), 'HS20 OPR Rating Max Span' (tons), and 'FL 120 Long Max Span' (tons). The window also includes 'Save', 'Close', and unit selection ('Metric', 'English') buttons.



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