

Flood Effect Evaluation on:

SH-24 - North of Washington, Oklahoma
in
McClain County

by:

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OBJECTIVE

- To determine whether significant subgrade softening occurred due to flooding
- To determine whether subgrade strength would be regained after drying
- To propose action to prevent pavement damage during the strength recovery

BACKGROUND

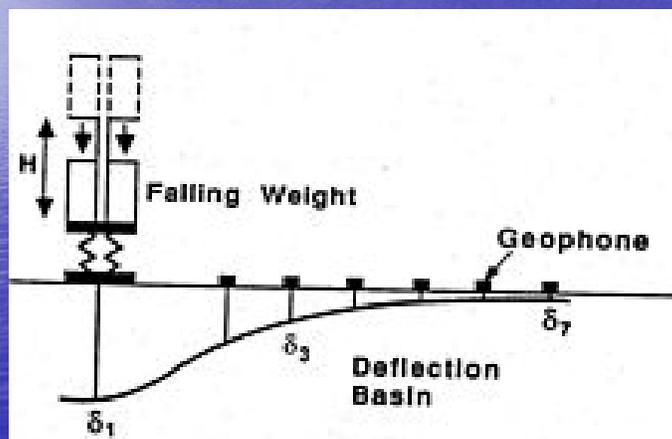
- Pavement damage is cumulative, and a function of traffic loading and climate
- Pavement is most vulnerable in wet seasons (so what happens when it's flooded?)
- Layer stiffness can be measured with the Falling Weight Deflectometer (FWD)

TEST METHOD & EXPECTATIONS

- No prior deflection data at this site
- Comparison was made between flooded and non-flooded sections, and within the flooded section at different times
- If significant softening was found, temporary load restrictions could be used to minimize damage

About the FWD

Basic FWD Concept:



About the FWD

FWD Load Plate and Geophones:



Test Site – Map Location



Test Site – Aerial Photograph



Test Site – Northbound View



About the Test Site

- The road was closed to traffic for 14 hours by the first flood event on July 9, and for about 8 hours in late August.
- This site was tested at 4 different times:
 - July 19, 2007
 - August 2, 2007
 - August 22, 2007
 - September 19, 2007

Geology of Test Site

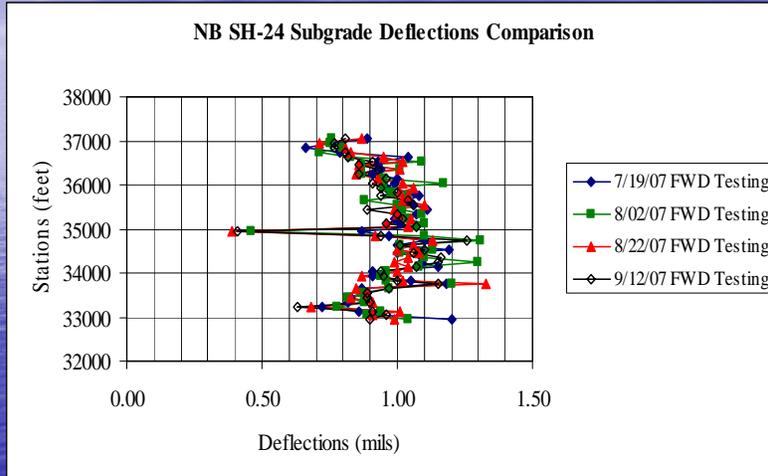
- The geologic unit for the test site consists of red platy to blocky shales.
- Materials visually observed in a severe scour area caused by the first flood event off the NB shoulder of SH-24 at the test site seems to confirm the geology of the test area.

Geology of Test Site

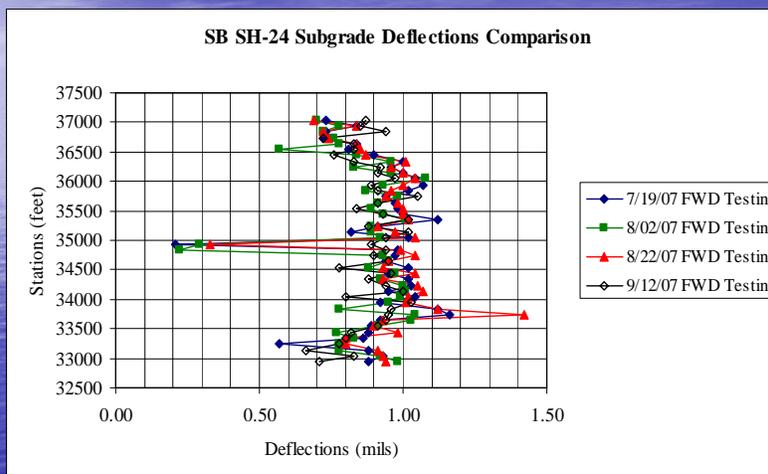
- The scour area was approximately 17 feet long, 10 feet wide, and 3 to 4 feet deep.



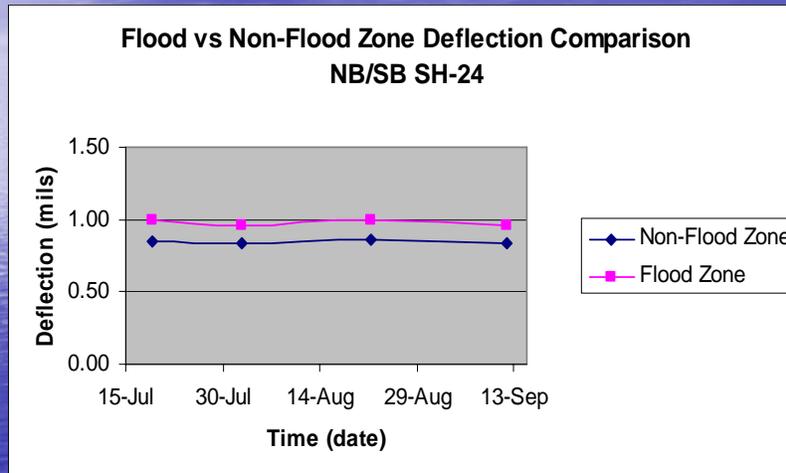
Deflection Comparison



Deflection Comparison (cont.)



Average Deflection Comparison



Conclusions

- The 14 hr and 8 hr flood durations probably were not long enough periods to cause significant subgrade damage.
- From the deflection plots, there was slight weakness in the SH-24 test site. The subgrade strength did eventually return to the test site.
- The geology of the test site played a part as well. If the test site had more sandy than clay soils present then subsequent voids and severe weakness may have occurred in the subgrade.