

OVERTOPPING UNDERMINING OF FLOODWALL

(58)

- WILL OVER TOP FIRST - LOWEST POINT
- NOT AS HIGH OF A STRUCTURE - BREACH
NOT AS SEVERE AS LEVEE BREACH
- ~~HIGH~~ CHANCE OF INTERVENTION
SUCCEEDING IS HIGH DUE TO LIMITED
LENGTH REQUIRING PROTECTION AND GOOD
ACCESS

(57)

• OVERTOPPING & EROSION OF EMB.

X WILL LIKELY OVERTOP AT MULTIPLE LOCATIONS

X WILL LIKELY OVERTOP FIRST IN CENTER SECTION, BOTH LEVEES

X BREACH NOT CERTAIN GIVEN
OVERTOPPING DUE TO ^{COMPACTED} CLAY

MATERIALS IN EMBANKMENT AND
LIMITED DURATION OF OVERTOPPING FLOWS
X IT WILL TAKE SOME TIME TO
BREACH IF A BREACH FORMS

X RISK STRONGLY DRIVEN BY
~~THRESHOLD~~ OVERTOPPING, FREQUENTLY
OF FLOOD AND AREAS

X INUNDATION DEPTHS WILL INCREASE
SIGNIFICANTLY FOLLOWING BREACH

DALLAS FLOODWAY

(56)

POTENTIAL FAILURE MODE RISKS -
HIGH TO LOW

- ① OVERTOPPING, EROSION OF LEVEES
- ② OVERTOPPING AND UNDERMINING OF THE FLOODWALL
- ③ BACKWARD EROSION OF ~~EXPOSED~~
SAND LAYER BENEATH EMBANKMENT
EXPOSED AT RIVER AND LANDSIDE DITCH
"BLOWOUT"
- ④ HEAVE (~~LE~~ OF CLAY CONFINING LAYER
AT LANDSIDE DITCH → BACKWARD
EROSION
- ⑤ GLOBAL ^V SLOPE INSTABILITY
EMBANKMENT
- ⑥ PROGRESSIVE EMBANKMENT SLOPE INSTABILITY

DALLAS FLOODWAY MFU

(55)

- OUTREACH EFFORT WILL MAKE FOR BETTER EVACUATION - NEIGHBORHOOD LEADERS - KNOW WHO TO CONTACT
- NICE TO APPLY PROBABILITY ESTIMATES TO "WHAT-IF" SCENARIOS
- NEED TO HAVE INFORMATION ON "FLOOD" DURATIONS
- TEAM WAS FOCUSED ON MOST REASONABLE SCENARIOS
- SURPRISED THAT LONG DURATION STORMS DIFFICULT GET INTO ~~FLOODWAY~~ BASIN,

DALLAS FLOOD WAY MFLU

(34)

- SEEPAGE ISSUES RELATED TO SAND LAYERS AND EXPOSED SUMPS ARE MITIGATED BY LONG SEEPAGE PATHS AND POTENTIAL FOR LIMITED CONTINUITY OF CLEAN SANDS
- STRENGTH PARAMETERS DID NOT DRIVE THE ANALYSIS RESULTS - SEEPAGE PROPERTIES FOR TRANSIENT ANALYSIS CONTROLLED
- SATURATION OF EMBANKMENT FROM RIVER UNLIKELY - RAINFALL MORE CRITICAL
- GREAT LEARNING EXPERIENCE - FOR EXAMPLE EFFECT OF VEGETATION ON EROSION
- SOME IDEAS PUT FORWARD FOR FLOOD FIGHTING
- NO SANDBOLDS OBSERVED IN LAST 26 YRS (OR EVEN DOCUMENTED FURTHER BACK)

DALLAS FLOODWAY MFU

(53)

• RISK ASSESSMENT PROCESS

FOLLOWED LOGICAL PROCESS AND INCLUDED INPUT OF A LOT OF KNOWLEDGE

- ~~LOW~~ WEST LEVEE WILL LIKELY OVERTOP FIRST NEAR MID POINT, EAST LEVEE WILL LIKELY OVERTOP FIRST AT FLOODWALL
- OVERTOPPING WILL LIKELY OCCUR ALONG SIGNIFICANT REACHES IF O.T. OCCURS
- OVERTOPPING WITHOUT BREACH WILL NOT FILL UP PROTECTED AREA - NOT ENOUGH VOLUME IN HYDROGRAPH - SIGNIFICANT INCREMENTAL DEPTH OF INUNDATION IF LEVEE BREAKS
- GOOD SURVEILLANCE PLAN AND EAP, GOOD COMMUNICATION W/ PUBLIC & EMERGENCY MGT. OFFICIALS → GOOD WARNING
- EAST LEVEE PAR MOSTLY COMMERCIAL AREA - GOOD POTENTIAL FOR EVA - W LEVEE SMALLER PAR BUT MORE SPECIAL NEEDS - MORE DIFFICULT EVAL

DALLAS FLOODWAY M.F.U.

(52)

- SENSITIVITIES TO VARIATIONS IN GEOL / SUBSURFACE WERE NOT AS SIGNIFICANT AS ORIGINALLY EXPECTED
- POTENTIAL FAILURE MODES FELL INTO A FEW CATEGORIES IN COMPARISON TO OTHER LEVEE SYSTEMS
- RE-EVALUATION OF HYDROLOGY SUGGESTS LEVEL OF PROTECTION IS HIGHER THAN PREVIOUSLY THOUGHT
- NEED TO CONSIDER HOW TO USE RISK ASSESSMENT INTO IN PLANNING PROCESS
- LENGTH AFFECTS WERE NOT CONSIDERED IN TEAM ACTIVITIES
- SYSTEM HAS NOT BEEN TESTED FOR FLOODS GREATER THAN $\sim 1/40$
- PE DATA LIMITED TIME AND LOADING

MAJOR FINDINGS & UNDERSTANDING⁽⁵¹⁾ DALLAS FLOODWAY

- WORST CASE SCENARIOS NOT AS PROBABLE AS ORIGINALLY THOUGHT DUE TO REQUIRED MULTIPLE STEPS
- WILL LIKELY TAKE FAIRLY LONG TIME TO DEVELOP A BREACH IN THE SOIL MATERIALS HERE
- GOOD TO HAVE TEAM OF ENGINEERS AND SCIENTISTS RE-EXAMINE PROJECT FROM RISK PERSPECTIVE
- SURPRISED THAT SATURATION OF EMB FROM TRANSIENT ANALYSIS CONTROLLED BY HYDROGRAPH PEAK AND NOT DURATION OF RAIL
- ESTIMATES CLOSE BETWEEN ESTIMATORS WITH DIFFERENT VIEWPOINTS OF AN ISSUE

DALLAS FLOODWAY FORLEFUL INITIATION OF A WARNING RELATIVE TO FIRST BREACH

APPLIES WITH SEVERAL FT. OF FREEBOARD

	LOW	BEST	HIGH
INTERNAL EROSION	-3	0	0
BREACH FORMATION	12	26	40

ONLY AN ISSUE WHEN RIVER IS VERY HIGH

GLOBAL INSTABILITY	0	8	12
BREACH FORMATION	3	6	10

USE FOR ANY PFM WHEN RIVER APPROACHES TOP OF LEVEE

BREACH FORMATION	6	13	20
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FORECAST LARGE FLOOD - 1ST WARNING

TIME FOR COMMUNICATION LINE

0.5 0.75 1

USE 1 HOUR

DALLAS FLOODWAY PFM #3 BREACH

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ESTIMATES

LEVEL 1 0.5, 0.6, 0.6, 0.7, 0.8, 0.7, 0.6, 0.75,
0.95, 0.6, 0.7, 0.6

LEVEL 2 0.7, 0.8, 0.6, 0.8, 0.9, 0.9, 0.9, 0.9,
0.99, 0.7, 0.8, 0.7

	LOW	MED	HIGH
LEVEL 1	0.5	0.65	0.95
LEVEL 2	0.6	0.8	0.99

RATIONALE: SIGNIFICANT FLOW & DURATION.
NOT CONFIDENT WALL COULD SURVIVE.

DALLAS FLOODWAY PFM #3

(48)

FLOODWALL G.T. UNDERMINING

NODE 2 - BREACH

MORE LIKELY

- MOST FOOTING ON RIVER SIDE - DOES NOT PROVIDE EROSION PROTECTION
- KEY IS NOT IN A GOOD LOCATION TO PREVENT EROSION
- 20' SC, 2-10' SANDS & GRAVELS UNDER CLAY
- NOT LIKELY TO BUILD TAILWATER BEHIND WALL LOW FLOOD LEVEL

LESS LIKELY

- KEY ON RIVER SIDE PROVIDES SLIDING RESISTANCE
- 3-10' CLAYS NEAR SURFACE
- TAILWATER EVENTUALLY BUILDS UP AT HIGHER FLOOD LEVEL

DALLAS FLOODWAY PFM #3

(47)

FLOODWALL O.T. UNDERMINES TO PREVENT BREACH
NODE 2 - UNSUCCESSFUL INTERVENTION_A

ESTIMATES LEVEL 1 - 0.2, 0.1, 0.1, 0.1, 0.4, 0.6,
0.2, 0.1, 0.2, 0.1, 0.6, 0.1, 0.4, 0.3, 0.6

LEVEL 2 - 0.3, 0.4, 0.25, 0.2, 0.5, 0.8, 0.6, 0.1, 0.2
0.2, 0.8, 3, 0.6, 0.4, 0.8

	LOW	MED	HIGH
LEVEL 1	0.1	0.2	0.6
LEVEL 2	0.1	0.4	0.8

RATIONALE: IF DECISION IS MADE TO
INSTALL PROTECTION, IT WOULD BE FAIRLY
EASY TO ACCOMPLISH

DALLAS FLOODWAY - PFM #3 -

(46)

O.T. UNDERMINING FLOODWALL

MODE 2 - INTERVENTION ^{IF FAILS} TO PREVENT BREACH
MORE LIKELY LESS LIKELY

- FLOODWALL WILL LIKELY OVERTOP FIRST

- ~1000 FT OF WALL WOULD NEED TO BE PROTECTED

- GAP BETWEEN WALL AND PARKING AREA

- MOST OF FOOTING ON FLOOD SIDE FDW. KEY

- TRAJECTORY PAST LAND-SIDE FOOTING AT NOMINAL O.T. DEPTH

- ~~SHORTER DURATION AT LOWER~~

- ~~WALL~~ NOT A LOT OF LEAD TIME FOR LOCAL STORM

- SIGNIFICANT LENGTH BUTTRESSED BY PARKING AREA

- ACCESS TO LAND SIDE OF WALL IS GOOD

- COULD PUT EROSION RESISTANT MATERIAL AT LAND SIDE TOE

- SHORTER DURATION AT LOWER FLOOD LEVEL MEANS BETTER CHANCE FOR SUCCESS

- WALL IS SHORT ~ 6'

- NO POOL ~~FOR~~ LAND SIDE TO LIMIT CONSTRUCTION

- WILL BE WORKING IN AREA TO SET HASCO BASKETS IN CLOSURE

- MORE EROSION RESISTANT
AT DEPTH

DALLAS FLOODWAY PFM #2

NODE 3 - BREACH

(45)

MORE LIKELY

LESS LIKELY

DEBRIS GOING OVER
LEVEE COULD INCREASE
EROSION

LEVEL 1 E: 0.5, 0.5, 0.6, 0.6, 0.6, 0.6, 0.6, 0.6, 0.5, 0.3, 0.5
0.4, 0.4, 0.75, 0.6

LEVEL 2 E: 0.9, 0.8, 0.9, 0.9, 0.8, 0.9, 0.9, 0.9, 0.8, 0.6, 0.85
0.6, 0.8, 0.9, 0.9

LEVEL 1 W: 0.1, 0.1, 0.2, 0.3, 0.2, 0.4, 0.45, 0.4, 0.3, 0.1, 0.4
0.2, 0.3, 0.5, 0.3

LEVEL 2 W: 0.5, 0.5, 0.4, 0.6, 0.4, 0.6, 0.55, 0.6, 0.6, 0.3, 0.75
0.4, 0.6, 0.7, 0.6

	LOW	MED	HIGH
LEVEL 1 E	0.3	0.6	0.75
LEVEL 2 E	0.6	0.9	0.9
LEVEL 1 W	0.1	0.3	0.5
LEVEL 2 W	0.3	0.6	0.75

RATIONALE: DEPTH AND DURATION O.T. HIGH ON
EAST AT LEVEL 2, LIMITED DEPTH/DURATION
LEVEL 2 W - UNCERTAIN MORE SO IN BETWEEN

DALLAS FLOODWAY PFM #2

(44)

NODE 3 - BREACH 150' WIDE DOWN TO BASE

MORE LIKELY

~~MORE~~ LESS LIKELY

- MULTIPLE LOCATIONS WILL BE LIKELY OVERLAP
- JOHNSON GRASS SLOPE COVER MORE "CLUMPY", * COULD BE "NICK" POINT
- DESICCATION CRACKING NEAR D/S CREST COULD BE "NICK" POINT
- COULD HAVE MORE ERODIBLE MATERIAL AT SURFACE
- DEBRIS BLOCKAGE AT BRIDGES COULD EXACERBATE
- WIND-INDUCED WAVES COULD EXACERBATE

- DURATION O.T. IN RANGE NEEDED TO INITIATE BREACH
- GENERALLY EMBANKMENTS CL OR CH MATERIAL WITH SOME PLASTICITY
- CL PI. 10 TO 65 AVG 45 CH PI. HIGHER

DURATION MAX DEPTH

LEVEL 1 E	~~24~~ 24	1.6
LEVEL 2 E	41	2.2
LEVEL 1 W	~~15~~ 15	0.6
LEVEL 2 W	34	1.3

WINDAM

20-30 ~~4~~ 4'

ALL INITIATED BREACH EXCEPT LOW K₁ & HIGHS

- MORE EROSION RESISTANT AT DEPTH

DALLAS FLOODWAY PFM #2

(45)