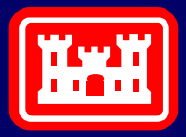
Flood Fighting Structures Demonstration and Evaluation Program (FFSD)

George Sills

Infrastructure Conference

August 2005



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Flood Fighting Structures Demonstration and Evaluation Program (FFSD)

1. Background
2. Product Selections
3. Laboratory Testing
4. Field Testing
5. Product Summaries

Not a New Problem
Lake Chicot Sand Boil (1973)

Background

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Background

Flood Fighting Structures Demonstration and Evaluation Program (FFSD)

Authorization

2004 Energy and Water Development Bill

"The conferees therefore direct the Corps of Engineers to act immediately to devise real world testing procedures for Rapid Deployment Flood Wall (RDFW) and other promising alternative flood fighting technologies."

FFSD Study Team Leaders

Laboratory Testing

Dr. Johannes Wibowo (GSL)

Perry A. (Pat) Taylor (GSL)

Dr. Donald Ward (CHL)

Field Testing

George Sills (GSL)

Fred Pinkard (CHL)

Product Selections

1. Congressional Directive – Rapid Deployment Flood Wall (RDFW)

2. Standard for Comparison - Sandbags

RDFW

Sandbag Structure

Product Selections

1. Develop Evaluation/Selection Criteria
2. Issue Solicitation for Technical Proposal
   - 9 Proposals Received
   - Categories – Product Type

   Impermeable Liner (with or without frame)

   Granular Filled Container

   Water Filled Bladder
3. Evaluate Proposals and Make Selections
   - Based on Technical Merit

Product Selections

- Competitive Technical Proposals

Portadam

Hesco Bastion

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Evaluation Parameters

1. Product Requirements

- Footprint and ROW requirements
- Durability
- Ease of Construction and Removal
  - Time / Manpower/ Equipment
- Adaptability to Varying Terrain
- Seepage
- Fill Requirements
- Cost
- Repair and Reusability
- Ability to Raise During Flood

2. Tests

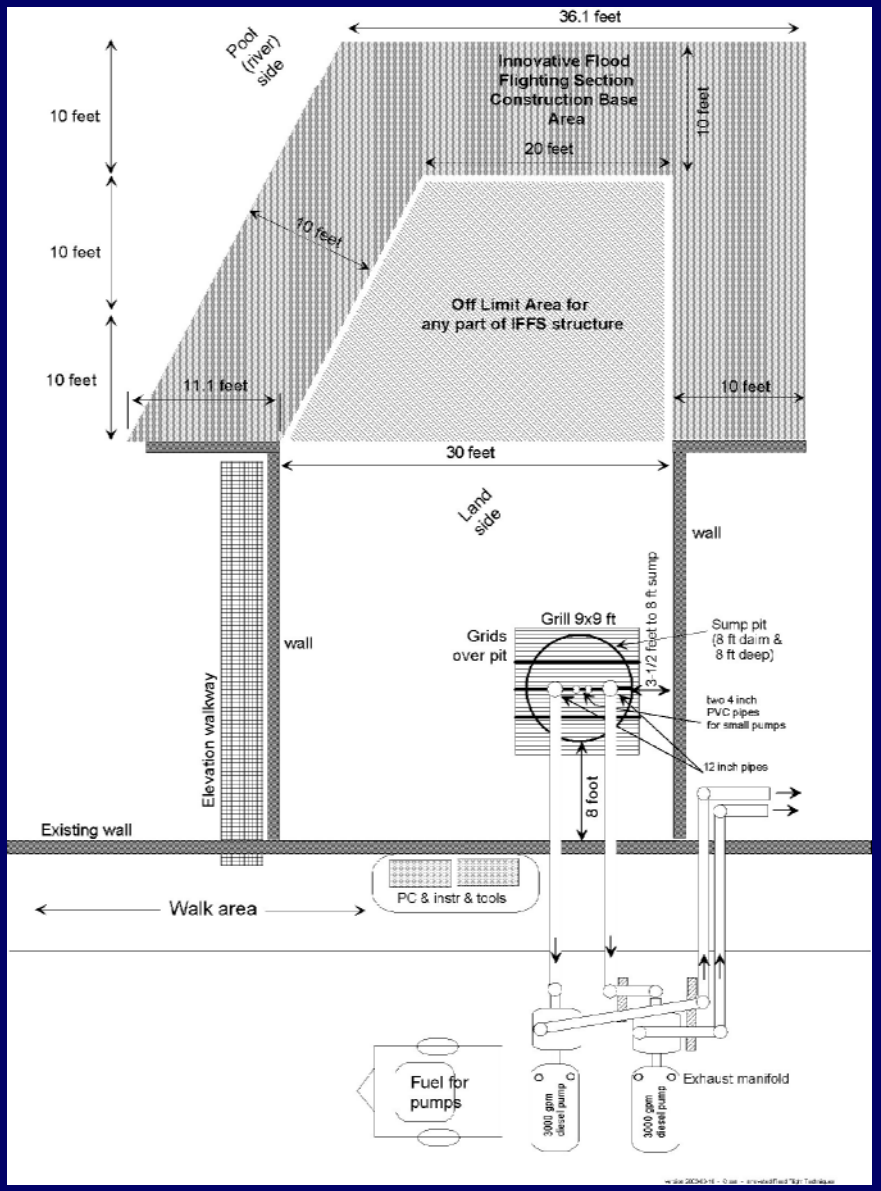
- Static Loading
- Overtopping
- Wave Impact
- Debris Impact

3. Performance on Various Surfaces

- Freshly Graded
- Grass / Weeds
- Finished Concrete

Laboratory Testing

Construction Footprint



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Laboratory Testing

Sandbag Structure

RDFW

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Laboratory Testing

Debris Impact

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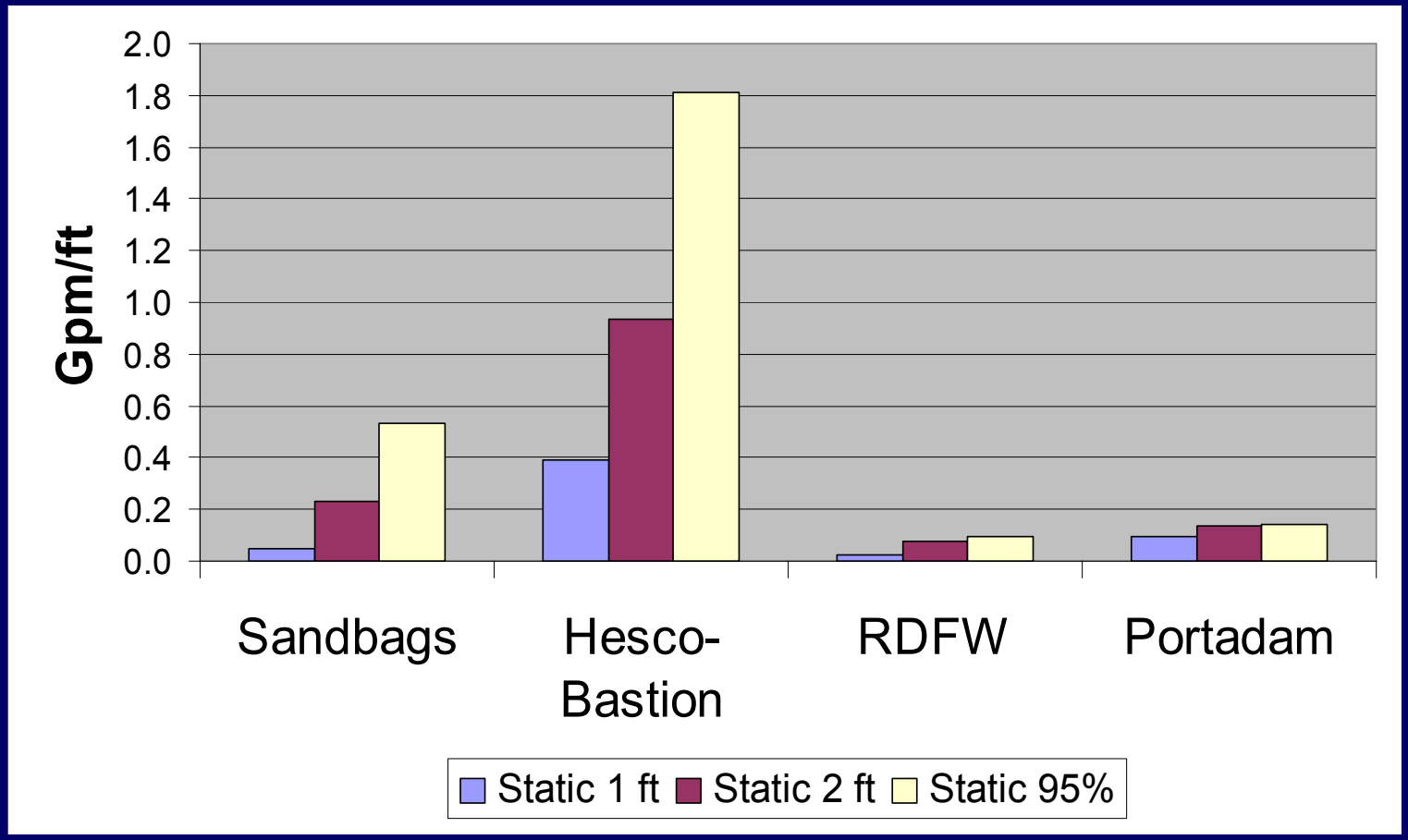
Laboratory Results

Structure	Construction Effort (man hours)	Removal Effort (man hours)
Portadam	24.4	4.4
Hesco	20.8	13.4
Sandbags	205.1	9.0
RDFW	32.8	42.0

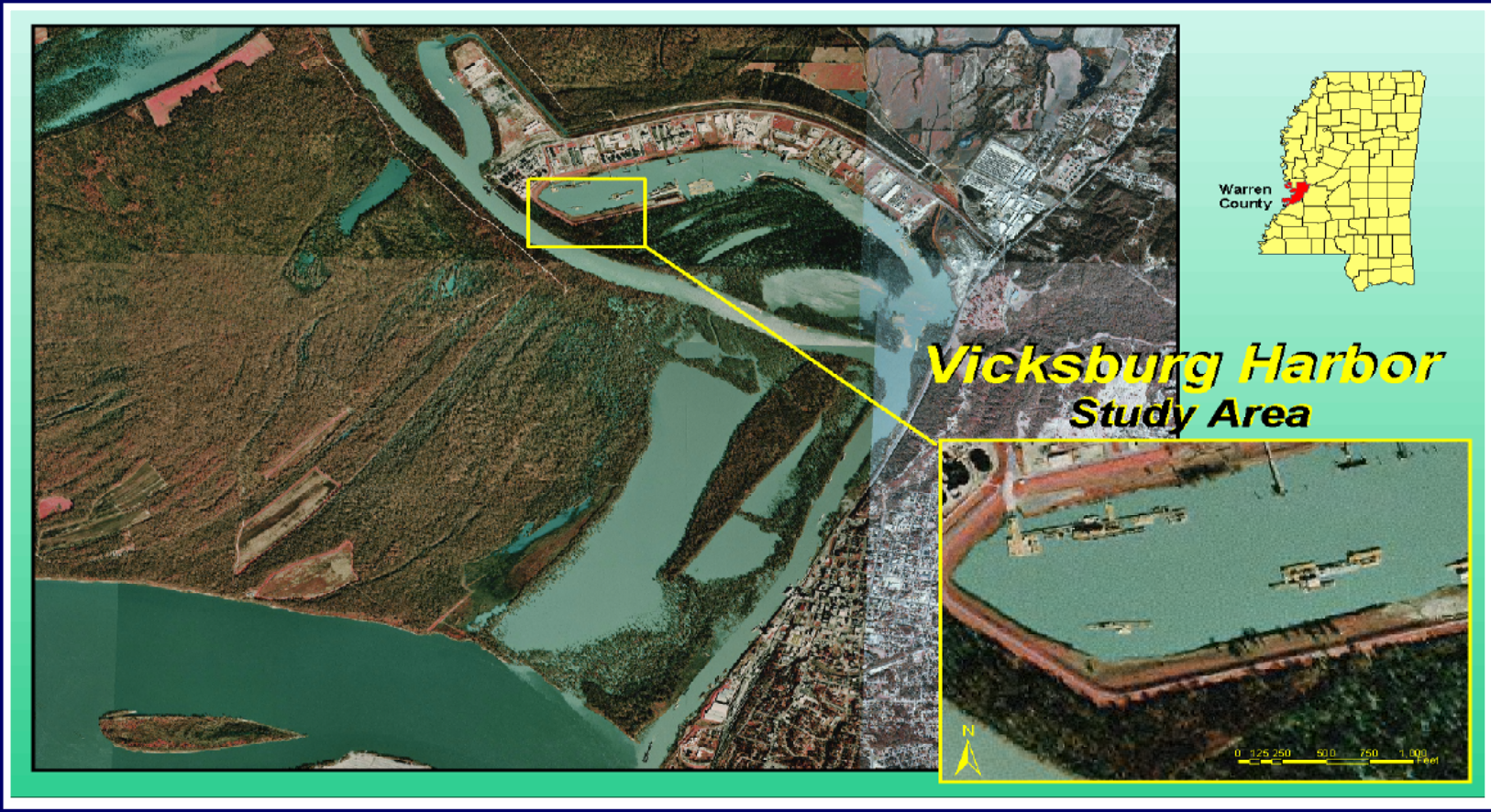
Laboratory Results

Seepage



Field Testing

Site Selection



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Portadam Structure

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Hesco Bastion Structure

Testing

Construction

Removal

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Hesco Bastion
Installation Modification

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Sandbag Structure

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RDFW Structure

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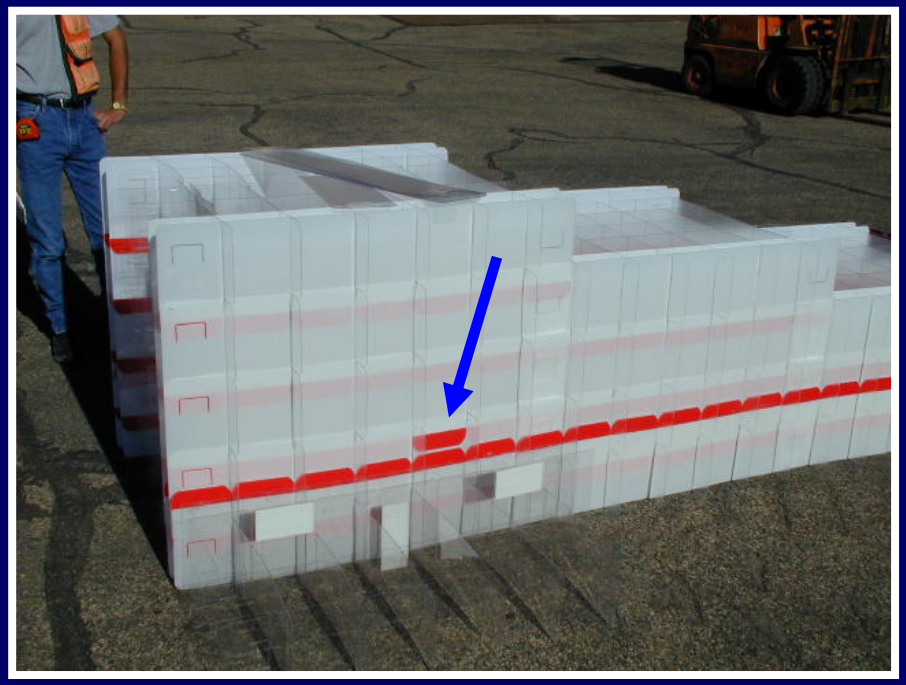
RDFW

Post Testing Modifications



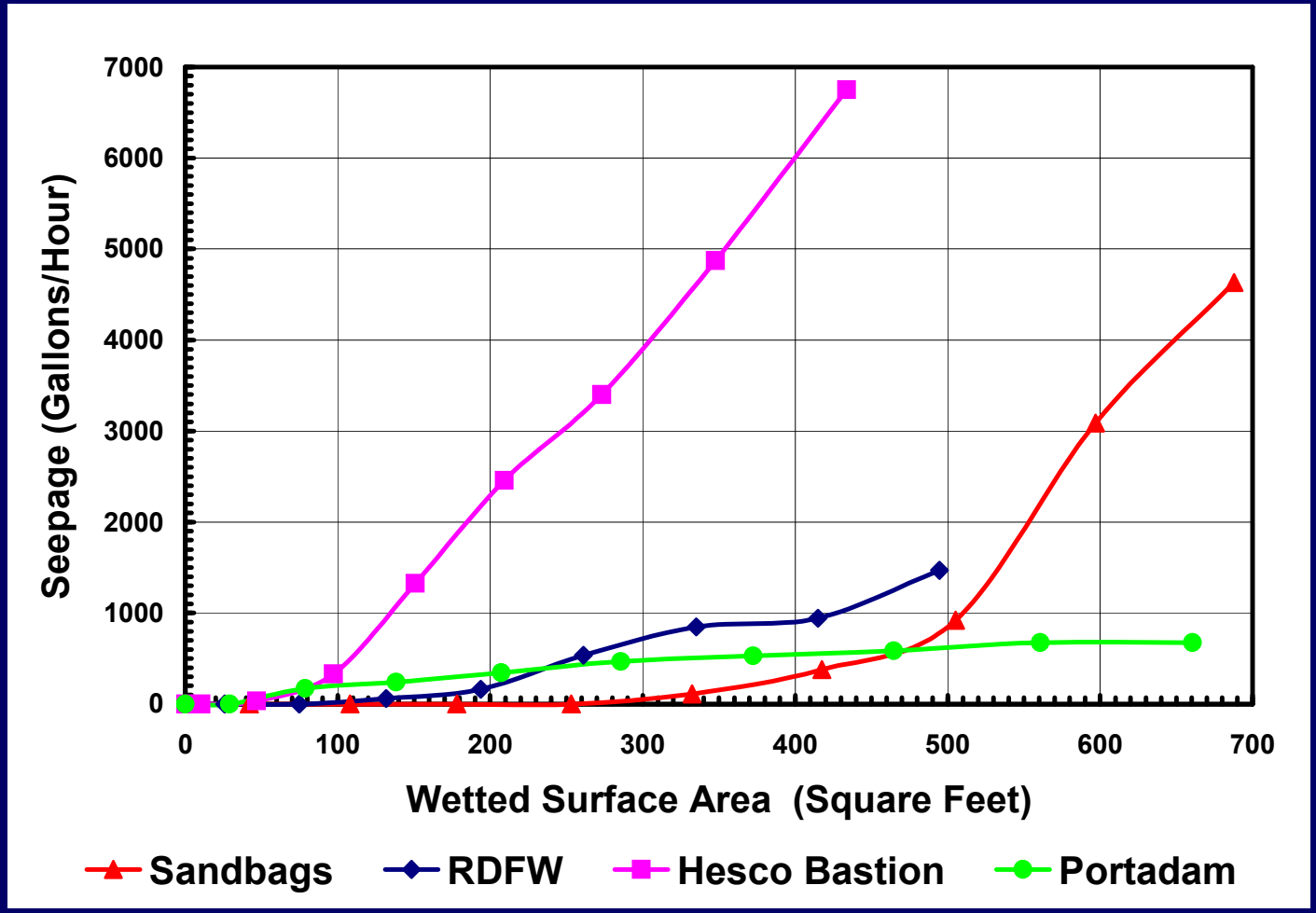
- Color Coded for Accurate Installation
- Rounded Corners
- Suction Trailer Available to Expedite Removal

Field Testing
Construction and Removal

Structure	Construction Time (hours)	Construction Effort (man hours)	Removal Time (hours)	Removal Effort (man hours)
Portadam	5.1	26.2	2.9	12.6
Hesco Bastion	8.9	57.5	8.7	36.3
Sandbags	30.5	453.1	2.6	3.5
RDFW	7.5	48.4	17.3	113.4

Field Testing

Seepage



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Field Testing - Damage

Portadam

None - 100% reusable

Hesco Bastion

Bent some panels and coils
Over 95% reusable

Sandbags

Bags began to deteriorate
All sandbags disposed

RDFW

Broke some unit pieces
95% of pieces reusable

Portadam Summary

Strengths

- Ease of Construction/Removal (Time, Manpower, Equipment)
- Low seepage rates
- No fill required
- High degree of reusability
- Least ROW Required

Weaknesses

- Punctured during debris impact test
- Can't be raised in typical application

Hesco Bastion Summary

Strengths

- Ease of Construction/Removal (Time, Manpower)
- Low cost
- High degree of reusability
- Can be raised

Weaknesses

- Significant ROW required due to granular fill
- Highest seepage rates

Sandbag Summary

Strengths

- Cost (volunteer / prison labor)
- Conforms well to varying terrain
- Low seepage rates
- Can be raised

Weaknesses

- Very labor intensive
- Not reusable

RDFW Summary

Strengths

- Ease of construction (Time, Manpower)
- Low seepage rates
- High degree of reusability
- Can be raised (8 inch units)

Weaknesses

- Significant ROW required due to granular fill
- High cost
- Most difficult to remove

Remaining Work

1. Place testing data and results on publicly accessible web page.

2. Conduct pilot tests at 3 locations around the country.
   - Philadelphia / Baltimore Districts
   - Omaha District
   - Sacramento District

3. Use purchased products in actual flood events.

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