

# Dam Safety 2001



## **ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?**

### REFERENCES

#### GROUTING

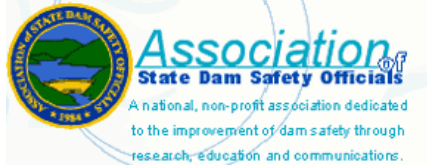
- I Applications
- II Materials and Formulations
- III QA/QC and Verification
- IV Case Histories

#### ANCHORS

- I Capacities
- II Specifications
- III Construction
- IV Corrosion Protection

#### CONCLUSIONS

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## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### REFERENCES

#### ASCE/GEO-INSTITUTE PAPERS

- New Orleans 1982, 1992
- Logan 1997
- Boston 1998
- Urbana 1999
- Denver 2000
- Blacksburg 2001

#### ASDSO PAPERS

- Each year

#### TEXTBOOKS

#### INSTITUTION OF CIVIL ENGINEERS CONFERENCE PROCEEDINGS

- London 1992 – Grouting
- London 1997 – Anchors

#### JOURNALS

- *Ground Engineering*
- *Geotechnical Engineering*
- Societies and Associations

#### SHORT COURSES

#### SPECIALISTS (as opposed to “experts”)

#### STANDARDS AND CODES

**GEOSYSTEMS, L.P.**  
(724) 942-0570

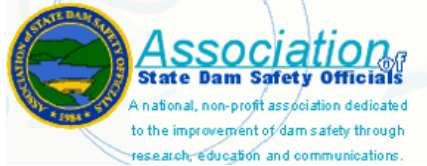


## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### GROUTING

#### I APPLICATIONS

- ◆ Very high flows?
- ◆ Very high heads?
- ◆ Long term performance?
- ◆ Liquefaction mitigation?
- ◆ Potentially erodible rock masses?
- ◆ Miracles?



## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### GROUTING

#### II MATERIALS AND FORMULATIONS

- ◆ One size fits all?
- ◆ Knowledge about “advanced formulations”?
- ◆ Unbiased opinions from
  - Suppliers?
  - Contractors?
  - Consultants?
  - “Experts”?
- ◆ Potential for solving any problem?



## **ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?**

### GROUTING

#### III QA/QC AND VERIFICATION

- ◆ Sufficient site investigation?
- ◆ Cooperation from Contractor?
- ◆ Attainment of absolute goals?
- ◆ Real time control of processes and performance?
- ◆ S & M?
- ◆ One opinion?



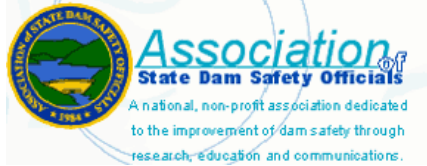
## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### ANCHORS

#### I CAPACITIES

- ◆ In rock?
- ◆ In soils?
- ◆ SBMA potential
- ◆ Limits?

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## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### ANCHORS

#### II SPECIFICATIONS

- ◆ PTI, 1996?
- ◆ USACOE?
- ◆ FHWA?
- ◆ Do it yourself?



## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### ANCHORS

#### III CONSTRUCTION

- ◆ How big?
- ◆ How deep?
- ◆ How straight?
- ◆ Does percussion kill?
- ◆ Do we need additives in grout?
- ◆ Are contractors our friends?
- ◆ Is FERC our friend?
- ◆ Are we good enough?
- ◆ Who cares anyway?



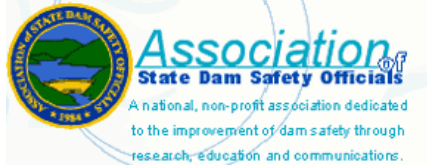


## ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?

### ANCHORS

#### IV CORROSION PROTECTION

- ◆ Is it necessary?
- ◆ Why water test and pregrout?
- ◆ Long term evidence and monitoring?
- ◆ Is epoxy coated strand the answer?



## **ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?**

### CONCLUSIONS

- ◆ Long term solutions to virtually every problem in the field.
- ◆ Occasionally – hopelessly bad specifications
- ◆ Variable contractor performance
- ◆ S & M from “experts”
- ◆ Claims and disputes
- ◆ Growing market for **KNOWLEDGEABLE AND COMPETENT** practitioners

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## **ANCHORS AND GROUTING: WHAT CAN WE REASONABLY EXPECT?**

I'd rather be tied down and injected  
than be rolled and compacted