Improving Illinois Dams: Alpine Dam Rehabilitation Project
"all obstructions, walls, embankments, or barriers, together with their abutments and appurtenant works, if any, constructed for the purpose of storing or diverting water or creating a pool. Not included are underground or elevated tanks to store water."*
ILLINOIS DAMS: CURRENT CONDITION

STATE REGULATED DAMS

Illinois - 1480

ILLINOIS
2007 – 10 Deaths

ASCE ’09 Report Card
Dams “D”

Dam Age
National Average 51 years

2007 Illinois Pop.
12.85 Million

1950 Illinois Pop.
8.17 Million
ILLINOIS DAMS: APPROPRIATE RISK

![Diagram showing risk assessment for Illinois dams compared to other studies and the New Orleans Pre-Katrina event. The diagram illustrates the annual probability of failure against the consequence of failure, with a focus on the risk profile of U.S. dams.]
ILLINOIS DEPARTMENT OF NATURAL RESOURCES: DAM REGULATION

ILLINOIS CODE 17 CHAPTER I SECTION 3702
Construction and Maintenance of Dams

CLASS I
Principal Capacity
Pre 1980 - 100-Yr New/Major Mod - PMF
Total Capacity
Pre 1980 – 0.6 PMF New/Major Mod - PMF

CLASS II

CLASS III

Reference Report
“Procedural Guidelines for the Preparation of Technical Data to be Included in the Application of Permits for the Construction and Maintenance of Dams”

http://dnr.state.il.us/owr/resman/3702RULE.htm
OVERVIEW: Alpine Dam Rehabilitation Project

1. Location
2. Background
3. Appropriate Risk
4. Assessment Process
5. Summary
ALPINE DAM: LOCATION

- Owned & Operated: City of Rockford
- Keith Creek
- Drainage Area: 6.6 sq miles
- Periodic Inspections: USACE
ALPINE DAM: BACKGROUND
ALPINE DAM: BACKGROUND

Built in 1942
Length - 600 ft
Width - 48 ft
Owned by City of Rockford
Storage Capacity 2100 acre-ft
I. Dam Safety Evaluation
- Prior Inspections
- Field Investigation
- Specific Evaluation

II. Design and Permitting and Bidding Assistance
- Phase I Spillway and Stilling Basin
- Phase II Embankment and Outlet Works

III. Services During Construction
I. Dam Safety Evaluation

Prior Inspections

Field Investigation

Specific Evaluation

1. Settlement
2. Movement
3. Erosion
4. Seepage
5. Leakage
6. Cracking
7. Deterioration
8. Seismicity
9. Internal Stress
10. Foundation Drainage
11. Stability of Adjacent Slopes
12. Site Geologic Conditions

1. Adequacy of Spillway
2. Effect of Overtopping and Non-Overflow
3. Structural Adequacy
4. Hydraulic Data
5. Analysis of Monitoring Data
6. Evaluation of Maintenance and Operation

II. Design and Permitting and Bidding Assistance

III. Services During Construction
ALPINE DAM: APPROPRIATE RISK

NRCS Requirements CLASS I Dam

Principal Capacity
-Pre 1980 - 100-Yr
-New/Major Modifications - PMF

Total Capacity
-Pre 1980 – 0.6 PMF
-New/Major Modification - PMF
ALPINE DAM: APPROPRIATE RISK

Rainfall Depth
100-Year 12-Hour 6.5 inches
0.6 PMP 72-Hours 21.48
PMP 72-Hour 35.8 inches
ALPINE DAM: PMF DETERMINATION

Method of Analysis

1. Probable Maximum Storm
   i. Hydrometerologic Report 51 (NOAA 1975)
   ii. HEC HMR 52

2. Probable Maximum Flood
   i. HEC HMS
CURRENT CAPACITY
0.8 PMF

SPILLWAY
Unacceptable

LOW FLOW INTAKE
Minimally Acceptable

MONITORING CAPABILITY
None
I. Dam Safety Evaluation

Prior Inspections

Field Investigation

Specific Evaluation

II. Design and Permitting and Bidding Assistance

Phase I Spillway and Stilling Basin

Phase II Embankment and Outlet Works

III. Services During Construction
ALPINE DAM: DESIGN

Phase I
Spillway and Stilling Basin
For Every 1 Repaired Dam
There are 2 Deficient Dams
I. Dam Safety Evaluation
   - Prior Inspections
   - Field Investigation
   - Specific Evaluation

II. Design and Permitting and Bidding Assistance

III. Services During Construction
Improving Illinois Dams: Alpine Dam Rehabilitation Project

QUESTIONS

Michael A. Hrzic
HNTB FSC
Chicago, IL