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Folsom Dam: Basic Facts

- Located in California near Sacramento
- Source: American River
- Concrete gravity dam, uses its weight to hold the water
- Crest Elev.: 480.5 ft
- Peak Inflow: 681k cfs
- Safe channel capacity: 115K cfs



<http://www.usbr.gov/dataweb/dams/ca10148.html>

<http://www.usbr.gov/dataweb/html/cadams.html>

Folsom Dam: Basic Facts

- Completed in 1956 for \$81.5 million by the U.S. Army Corps of Engineers
- Operated by the Bureau of Reclamation
- Provides Hydroelectric Power, Flood Control, Irrigation, and Recreation



Folsom Dam: Basic Facts

- Reservoir Capacity 43.9 billion cubic feet, Hoover dam is 1.24 trillion cubic feet
- Crest width of dam: 36.25 feet
- Base width of dam: 270 feet
- Volume of Concrete: 1.17 million cu yds.
- 198,207 kilowatts



Folsom Dam: History

- Folsom Dam has saved the Sacramento area from flooding in 1955 when the dam was under construction and again in 1964 and 1986 when rain and heavy snow fell in the area
- In Dec. 1964 the storm inflow broke records of 280,000 cfs. The safe release is roughly 115,000 cfs



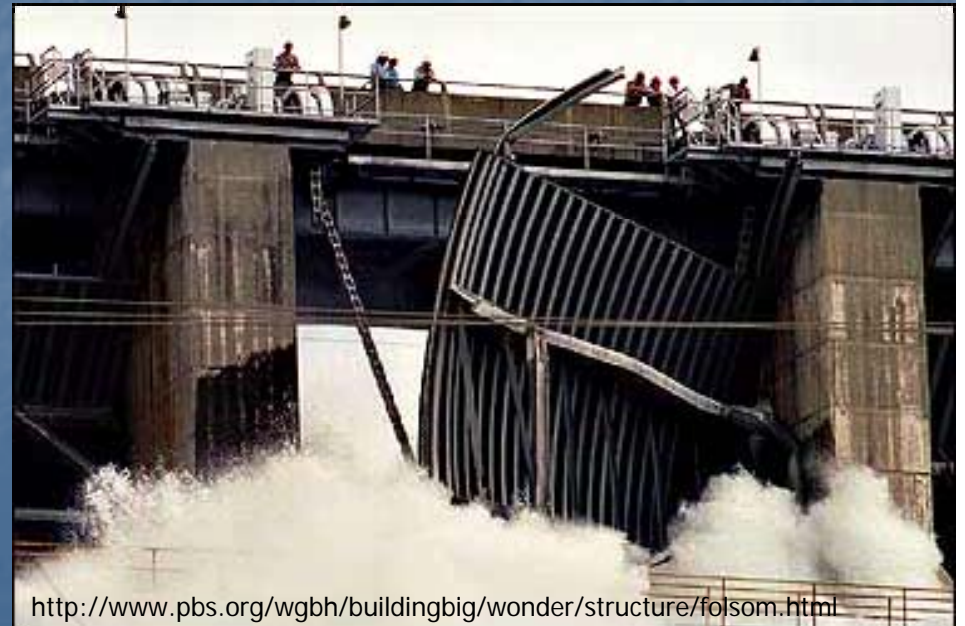
Folsom Dam: History

- Since Folsom Dam was built in 1955 to January 1986 the dam is estimated to have saved roughly \$438 million in flood damage. With a original construction cost of \$81.5 million it has paid for itself
- In the flood of February 1986 Folsom dam saved roughly \$4.7 billion in damages (are people moving closer to the river?)



Folsom Dam: History

- A spillway gate on the Folsom dam broke open on July 17, 1995 while it was being raised. It broke beyond repair while the water was gushing through at a rate of 40,000 cfs
- 40,000 cfs?
34.2ft x 34.2ft x 34.2ft
- This was below the safe channel capacity of 115,000 cfs



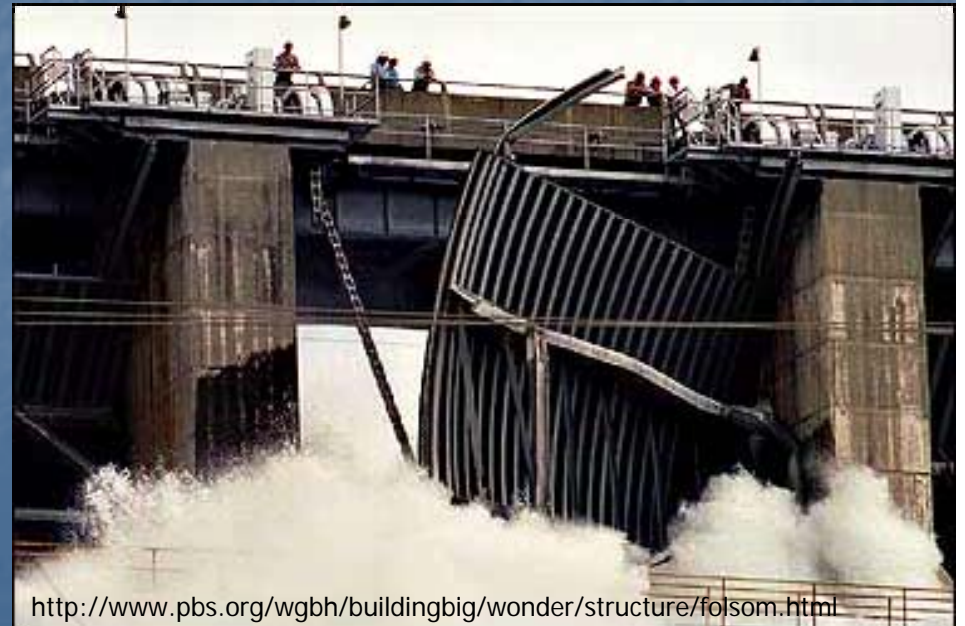
Folsom Dam: History

- 40% of the lake had to drain out before the spillway gate could be repaired
- No major flooding occurred due to the failure because the safe outflow could handle a max load of 115,000 cfs



Folsom Dam: History

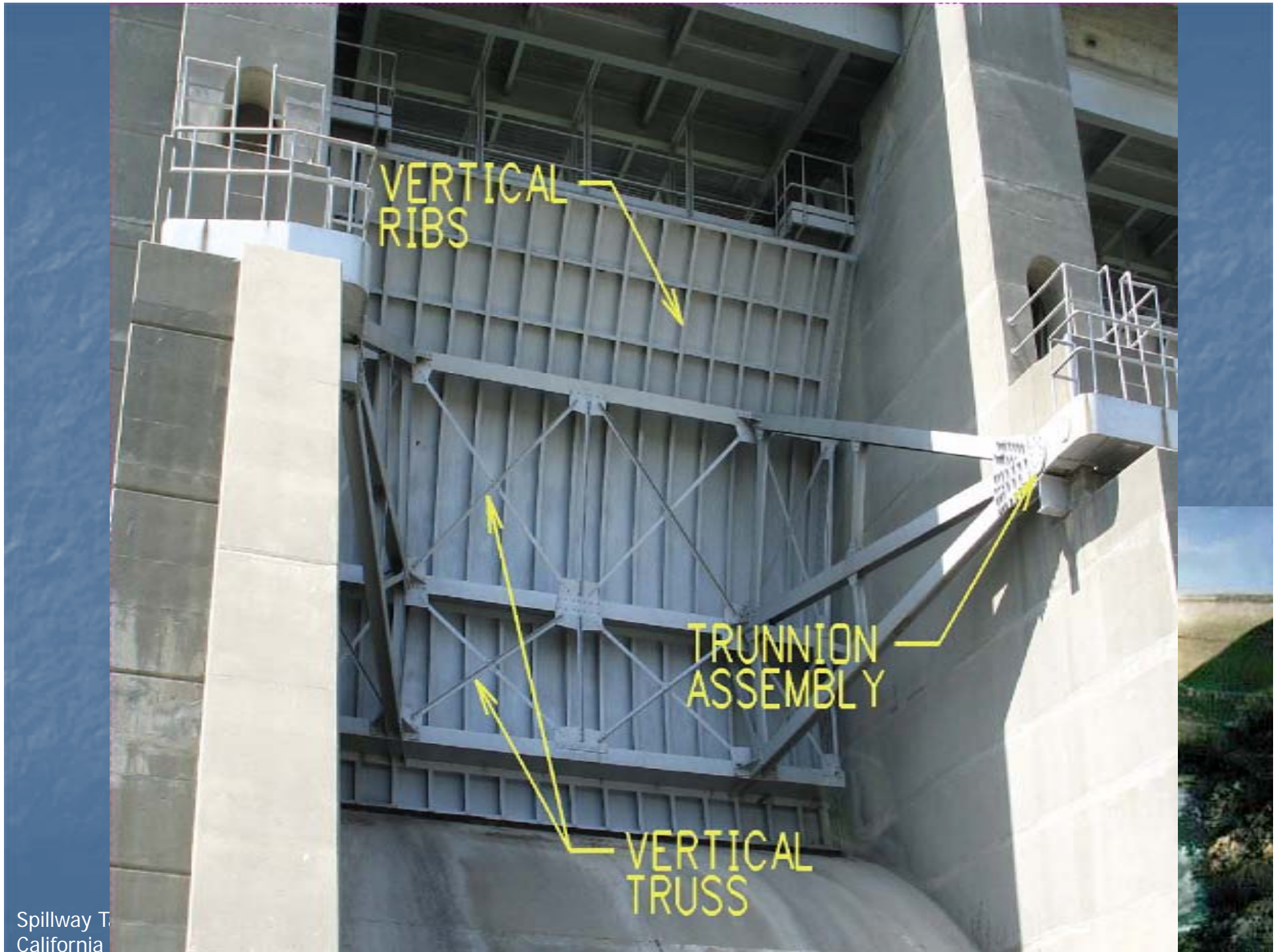
- As Professor Zagona pointed out in lecture: Spillways gates are expensive but they give the operator a greater control of the outflow rate
- Gates, however, are mechanical components with moving parts which wear and break and can be costly to repair and dangerous if not



Folsom Dam: History

- 5 radial gates for flood control are 13m wide 15.2m high
- 3 radial emergency gates are 13m wide and 16.2m high
- Cause of Failure: Trunnion friction moment was the key factor, and was omitted in original design calculation

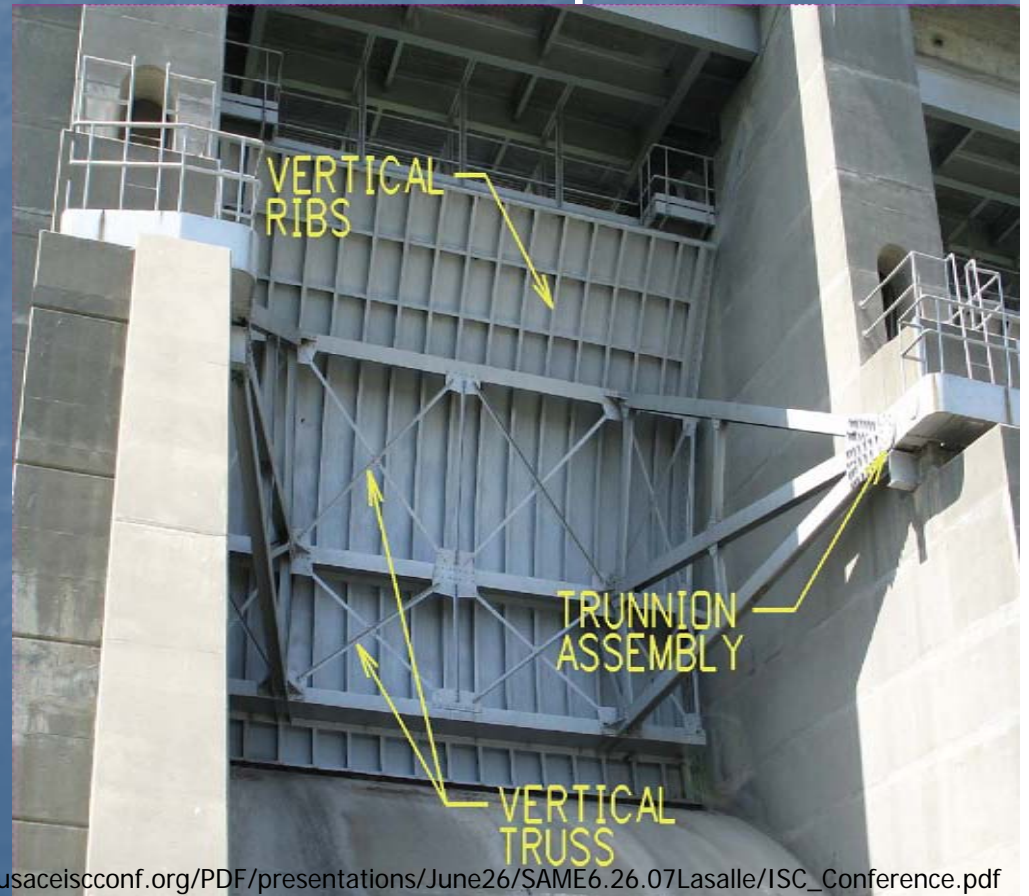




Spillway T
California

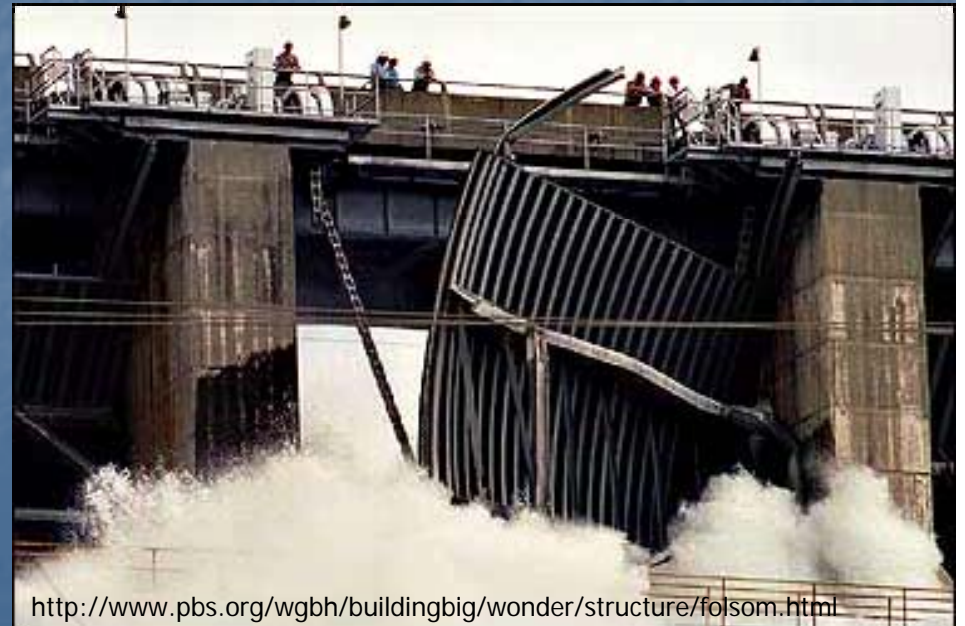
Folsom Dam: History

- So what is trunnion friction moment: the product of the friction force and the pin radius
- A considerable moment can be created depending on the coefficient of friction



Folsom Dam: History

- The total cost of repair to the gate destroyed and the modifications to the remaining gates cost roughly \$20 million
- At an original construction cost of \$81.5 million one can gauge the cost of gates (Is the cost and added danger worth the convenience of being able to control the outflow rate?)



Folsom Dam: Future

- The terrorist attacks of 9/11 raised the question of dam safety, and certainly Folsom dam safety so officials closed the access road which went over the dam.
- Big issue: it was a major road to the city, caused traffic and business problems



Folsom Dam: Future

- The dam road closure caused 18,000 vehicles per day to find alternative routes to cross the American River which added roughly a half hour commuting time.
- Bridge construction began in Feb. 2007 at \$117 million with an estimated completion date of winter 2008-09





Folsom Dam: Future

- The new spillway project is designed for the 200 year storm
- May include an increase of 3.5 ft to the dam to gain more flood protection
- Estimated cost \$800 million to \$1 billion



Folsom Dam: Resources

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