

# Colossus (building Hoover Dam) by Michael Hiltzik (2010)

- 1869 John Wesley Powell explored the Grand Canyon
- 1901 Rockwood & Chaffey dug an irrigation ditch from the Colorado River [CR] to the Imperial Valley. The river brought water for crops, but also sediment. The silt clogged the ditch faster than they could dredge it. The power of the river brought floods that created the Salton Sea [largest lake in CA] & millions in damages.
- 1902 Edison Electric looked into installing a 40' rock dam, but it had an 80-mile transmission limit then [350-mile limit by 1920].
- 1906 The SPRR took control and spent \$3M & 18 months to stop the flooding. The amount of earth washed into the Salton Sink in 9 months exceeded that excavated from the Panama Canal by a factor of four.
- 1907 FDR proposed a plan to tame the CR [flood control, water supply & power plant]
- 1920s Water rights were discussed from 7 states & they based allocation off of the past 20 yrs [wettest in history]. CO snow provided 80% of the river's water.
- 1922 Greg Tierney [surveyor] was the 1<sup>st</sup> worker to die
- 1925 Stevens Creek Dam [arched concrete] was built on the San Joaquin River for the sole purpose to test the limits of concrete
- 1926 St. Francis [earth] Dam failed, sending a 140' wall of water downstream.
- 1930 power lines were brought 200 miles from Victorville for const [later used to take it back]
- 1931 govt spent \$500,000 on land acquisition
- 1931 15,000 men came to Vegas & Ragtown [riverfront] looking for work
- 1931 Britain & others abandoned the gold standard; in '33 US had to follow
- 1931 construction of Boulder City [\$2M] & the dam began
- 1931 scaffolding was built onto trucks to allow workers to drill the tunnels
- 1932 men died of carbon monoxide poisoning [ignoring safety laws]
- 1932 congress wanted to suspend funding, but Kaiser did a PR campaign
- 1932 the river flooded the tunnels before they were open [15' of water had to be pumped out]
- 1932 tunnel digging hit 256' [4 combined] in one day & the river diverted
- 1932 upper & lower coffer dams were built to create dry land for the dam to be built
- 1932 an inspector fell over a cliff only to be caught by a high scaler 20' below
- 1932 govt finally put an end of Six Companies paying employees in script.
- 1932 92,000 visitors to see construction [130,000 in '33 & 265,000 in '34]
- 1933 12 million people were unemployed
- 1933 a steel plant was built in NV just for the dam's intake penstocks
- 1933 Four 56' [3' thick concrete = 50' net] x 4000' diversion tunnels completed [later used for spillway & turbine penstock]
- 1933 while Six Companies was taking millions in profit, they fought paying the taxes that would build the schools needed.
- 1933 a grout curtain wall was created by drilling 400 holes [<150' deep] into bedrock & canyon walls & filling them with grout to prevent water from seeping around the dam. But inspectors failed to notice 15% of holes were not to specs.
- 1933 (230) 50'x50' columns were poured in 5' lifts at a time [16 tons per bucket = 1" deep]
- 1933 175 train cars of cement & gravel entered the concrete plant every day
- 1934 employment peaked at 5251 men [only 15 black]
- 1935 the last concrete was poured; diversion tunnels closed & lake began to rise
- 1935 Patrick Tierney was the last worker to die [13 yrs to the day after his dad died]

- 1936 construction of the dam finished [2 yrs ahead of schedule & \$10M profit]
- 1937 the reservoir was now 500' deep & 200 gpm of water was pouring from faults [failed grout curtain] into the interior of the dam
- 1938 govt realized the bedrock below the dam was riddled with faults & shears that water flowed freely. Over the next 9 yrs 12,000 tons of grout was poured into a new curtain wall drilled from inside the dam [\$2M].
- 1939 an earthquake happened near the dam [most likely caused by the pressure of the water]
- 1940 Lake Mead rose to maximum level & the spillways were tested; but when a gate failed 300,000 gpm chewing up the concrete leaving a 115'x 45' hole.
- 1983 Floods repeated the same spillway event & damage. Govt failed to lower the water level soon enough to absorb the above average snow runoff causing much property damage.
- 2003 water distribution had to be revised

Note:

- 1913 Los Angeles Aqueduct began delivering water to L.A. from Owens River
- 1923 Hetch Hetchy reservoir began delivering water to S.F.
- 1938 Kaiser broke the cement cartel & was awarded the cement contract for Shasta Dam
- 1941 Kaiser moved into shipbuilding & started 1409 liberty ships for WWII
- 1945 Kaiser went into aluminum mining [to help build the housing for veterans returning home]
- 1941 Colorado River Aqueduct began delivering water to L.A. from Colorado River
- 1974 CA Aqueduct began delivering water to L.A. from the Stockton Delta
- 1930 Fed budget was 3% of GNP [rose to 20% by 2000]

Average summer temperature in Black Canyon was 107 in the shade [140 in the sun] & did not cool off much at night. Men sleeping in the canyon did not allow their bodies to recover from the heat. Most did not take enough salt. 16 died in July 1931.

Las Vegas was virtually non-existent before the dam, but water & power made it one of the nation's fastest growing cities.

Boulder or Hoover Dam is 726' tall [then the tallest on earth]; 660' thick [at bottom]; hold 10 trillion gal [then the largest man-made lake on earth]; 9 cableways would span the canyon to carry men, equipment & concrete to the site; 3.4MCY of conc; 662 miles of pipes to cool conc; the govt contract had an exclusion for Chinese labor; 17 turbines; tunnels would need 174 drill holes for dynamite to blast open 9'; architect Gordon Kaufmann put the finishing touches on the dam; photographer Bernard Glaha captured still-shots & created a 45-minute film; There are 2 elevators & 2 staircases inside the dam [600' tall]; (4) 390' tall intake towers [37' penstocks] fed the powerhouse; three 12'x37'x2.75" thick steel plates were rolled to shape the curve & welded together to make the 37' diameter [two were welded together to set in place at 170 tons]; each spillway had 2x the capacity of Niagra Falls;

\$108M cost [\$49 for dam + + \$6M for change orders + \_\_\_ for power plant + \_\_\_ infrastructure]. The sale of hydro-electric power would pay for the dam in 50 yrs. By the 1970s Seven more dams were built downstream [most sending water to CA]. By now, 20% of the water is evaporated into the desert air.

Frank Crowe was the obvious choice to supervise const. Six companies was a joint venture to get it built. The depression kept wages low so the project bid came in under budget. Frank's hurry up schedule came at the price of safety. Six Companies was made up of Henry Kaiser & Warren Bechtel; Morrison-Knudsen, Utah Const, Charlie Shea, Pacific Bridge Co &

MacDonald & Kahn. 3 shifts worked around the clock 7 days a week; men earned \$4-6/day [pd in script], but were charged \$1.50/ day for meals [32% markup] & rent was \$30/mo for a 2 bedroom [at at cost of \$750 to build]. The company commissary was also expensive. Some families had to rent out a bed on their porch 3 shifts /day. They stated a hospital for its employees at a cost \$1.50/month [forerunner to the Kaiser-Permanente Health Plan]. Unions tried to organize, but it backfired in the depression. Ely Sims would banish men from public drunkenness. It seems Six companies would do anything to save money [bribing officials & judges, fixing juries, etc];

Hoover dam might have built the west, but it also confined it to a strait-jacket [limited water]. Kaiser & Pacific Bridge later helped build the Golden Gate Bridge. After the dam was built the environmentalist became more aggressive.

Quotes:

“Problems are only opportunities in work clothes.” (Bechtel)

