

Emigrant Dam Is Constructed on Scientific Principals

Material Is Not Loose Dirt, Rock, Engineers Report

By ERIC W. ALLEN JR.
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E. M. Tucker Sr., the respected inventor of the Tucker Sno-Cat, and president of the firm that manufactures it, believes that Emigrant dam, located southeast of Ashland is unsafe.

The Bureau of Reclamation's engineers declare that it is as safe as human experience, ingenuity, skill and modern construction methods can make it.

Who is right? Like Tucker, this writer is a layman in geological and engineering matters. And Tucker is a persuasive man, particularly when he waves his arms and talks about a "wall of water" sweeping down the valley.

Inspects Dam Closely

Last week end I visited the dam, and inspected it closely, with both Tucker and James A. Callan, Bureau of Reclamation engineer in charge of the Talent project, under whose direction the entire project, including Emigrant, has been built over the past five years at a cost approaching \$25 million.

As a result, I am personally convinced that the dam is just as safe as it can be made, and that Tucker's fears, no matter how sincere, are without foundation.

What are Tucker's specifics? He has alleged:

1. That the dam itself is in danger of washing away, due either to earthquake action, or because of waves blown up by tornado-like winds, and that the "loose dirt and rocks" of the dam are not adequate to hold back the reservoir water.

2. That "crevasses" in a nearby formation indicate that the formation might be unstable, and might stretch around the hill to the dam itself, thus endangering it.

The engineers reply, in effect:

1. The dam is built on scientific principles, with the old concrete dam as a core, the center portion of the dam is of highly compacted clay-type earth which is impervious to water, and that the next layer is of heavy rock, gravel and cobbles, with a final layer of rip-rap on heavy rocks, no less than five feet thick and in most areas far thicker than that. (See diagram.)

Earthquake-Resistant

They add that this type of construction, of natural materials, is far more earthquake-resistant than unyielding concrete, although the principal reasons concrete was not used included cost, convenience and use factors. The dam is for an entirely different purpose than the great power-generation dams on the Columbia or Colorado and is far, far less costly.

The materials used cannot be accurately called "loose dirt and rocks," they point out.

As to wind action causing waves to go over the top, they point out that an open spillway some distance from the dam will keep the water level 12 feet below the crest of the dam even at high water; that additional water releases are available if necessary; that the lake is too small to permit waves of any appreciable size forming, and that even if they did for a period of time, the solid construction of the dam would not be affected.

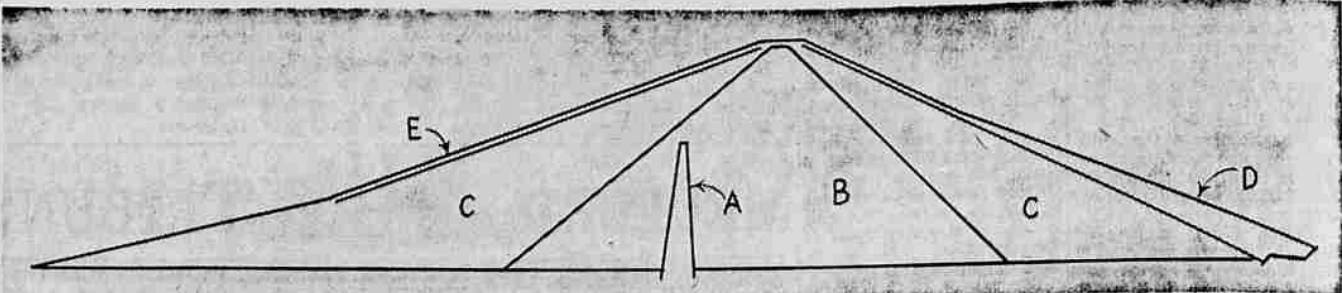
'Crevasses' Evident

2. The "crevasses" Tucker fears are, indeed, evident. But they are a local phenomenon, a good distance from the dam, and are not part of a fault formation running to the area of the dam.

The outcrop of concern to Tucker (see photos) is some 200 or more feet from the dam itself, and is one of a number noted in early geological surveys of the area.

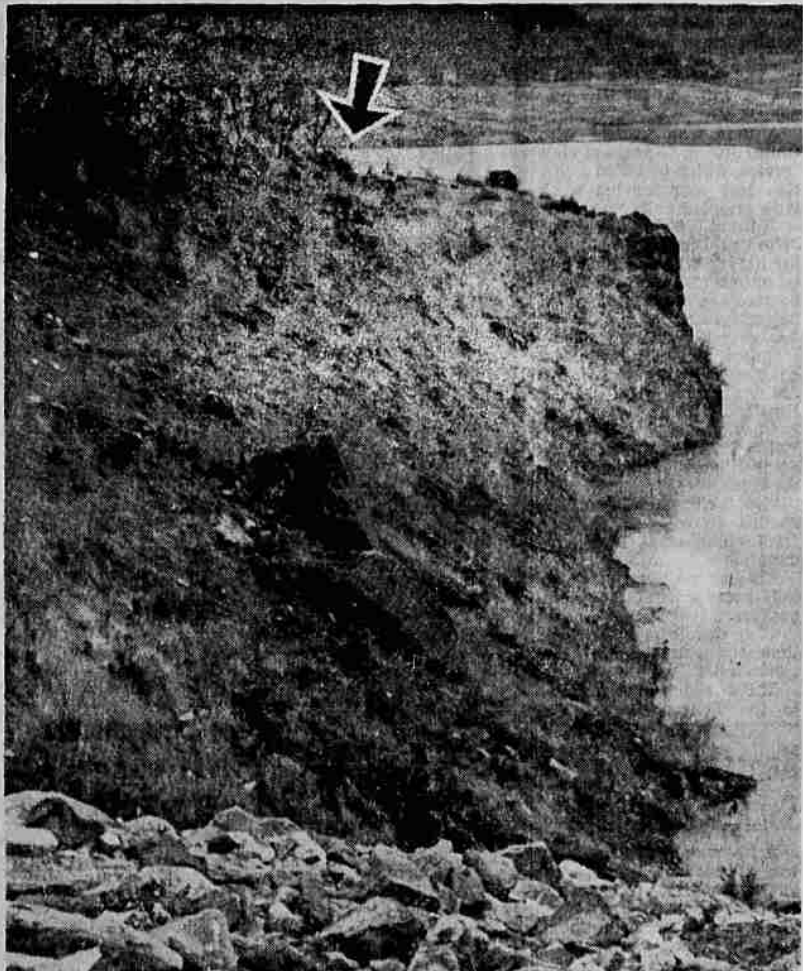
(The 1953 Bureau of Reclamation report on the geology of the reservoir area noted: "On the sides of the reservoir, overburden consists of as much as 10 feet of residual solid and slope-washed out crops. Outcrops are numerous at the lower end of the reservoir, but practically disappear at the upper end. The reservoir has been eroded in the upper part of the Umpqua formation (referring to the geologic reference to the type of formation). Bedrock throughout the basin consists of medium to coarse-grained sandstone, shale or siltstone, conglomerate, and intrusive igneous rock. Dips and strikes are erratic in the vicinity of the intrusive rock. Numerous faults throughout the area are filled with clay gouge and water tests indicate they are tight.")

The movement of this particular outcrop, with the crevasses widening, has been not-



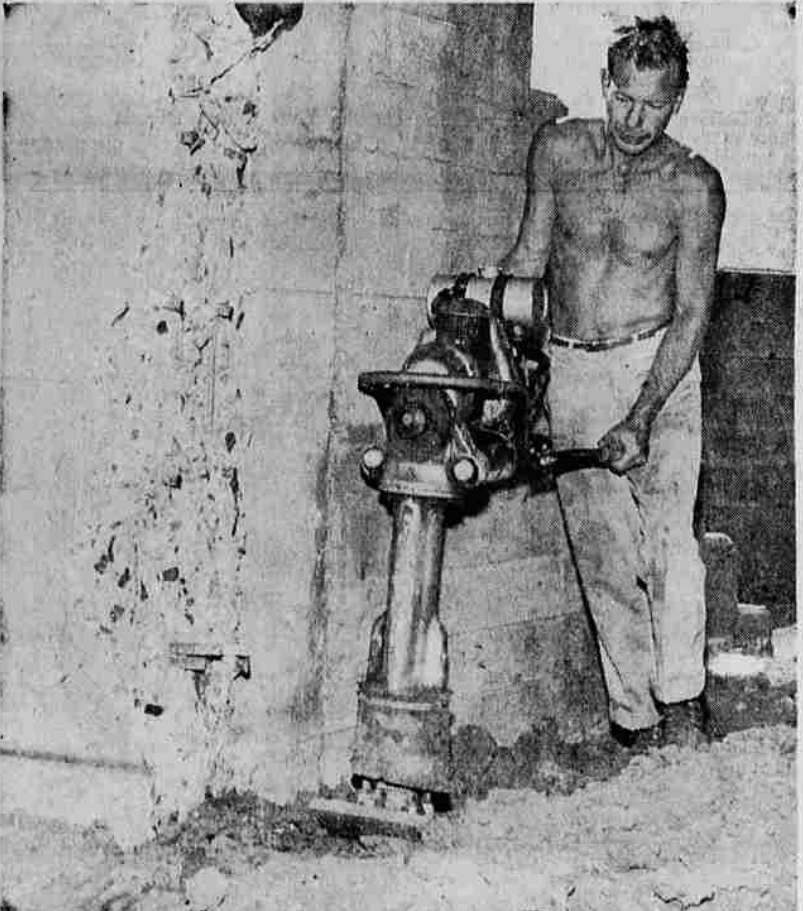
DIMENSIONS SHOWN — The schematic diagram of a cross-section of Emigrant dam, adapted from engineering plans for the structure, show its "profile" and dimensions. The width at the base is approximately 1,100 feet, and at the top, about 35 feet. Total height is 190 feet. The old concrete dam (A), which is an integral part of the new structure although buried by the earth, clay and rock of the new one, is 110 feet high. Sections marked B

are of highly compacted clay-type earth, packed down inch by inch, with sheep-foot rollers. Sections marked C are compacted sand, gravel and cobbles. Section D is rock and E is rip-rap over rock and gravel. Width of the compacted earth section is 470 feet at the base, and the rock sections are each some 300 feet thick. At maximum pool, surface of Emigrant lake will be 12 feet below the top of the dam.



SLIDING OUTCROP — One of the fears expressed concerning Emigrant dam last week by E. M. Tucker Sr., of the Tucker Sno-Cat Corp., concerned a sandstone outcrop several hundred feet from the dam on the east side. It is shown jutting into the water in picture above, and arrow points to the "crevasses" Tucker has mentioned. He fears that the weight of the dam and the

lake are responsible. However, bureau of reclamation engineers say the outcrop was undercut by action of rising and falling water on soft formation beneath it. They say it probably will drop into the lake eventually, but if it did, no harm would result. Picture was taken from crest of dam, which shows in foreground.



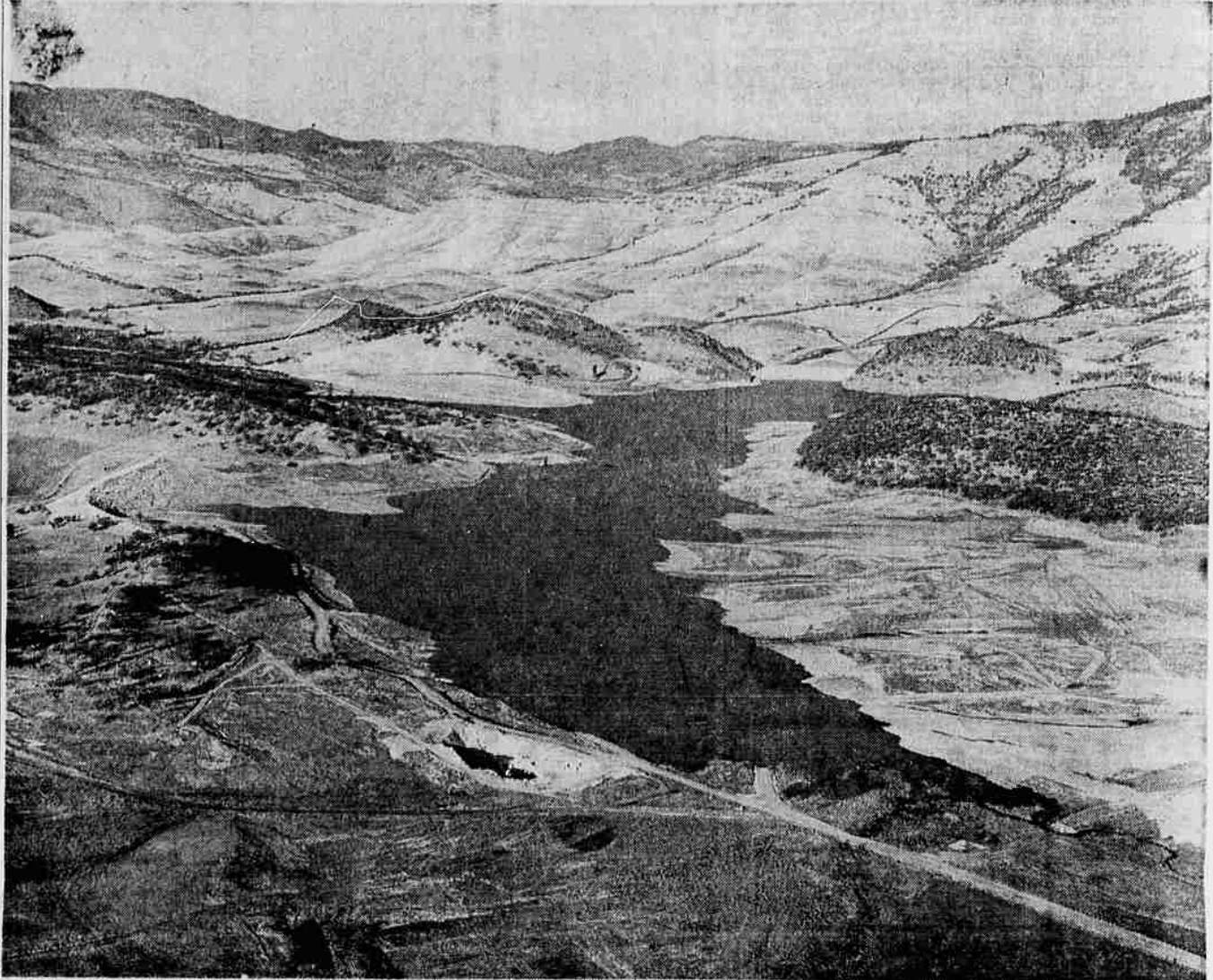
HAND PACKING — This construction work is packing dirt next to the old concrete dam at Emigrant lake. The machine was used along the rock abutments of the dam to pack the material where

machines could not travel. All the material used was constantly checked for the correct water content so there would be no void places in the packing where water could accumulate. (Whitland Locke Photo)



MACHINE PACKED — This machine was specially designed and made for earth-fill dam packing by Wagner of Portland for the R. A. Heintz Construction company, Portland, contractors for the Emigrant dam

project. It was the first time this machine had been used in dam construction. When this picture was taken, the earth-fill was about 10 feet above the top of the old concrete dam. (Whitland Locke Photo)



AERIAL OF LAKE — This is an overall aerial view of Emigrant lake south of Ashland. The earth-fill dam is at the upper end of the lake, and the highway saddle dike is at the left center of the picture. The spillway is on

the left side between the highway saddle dike and the dam itself where the water is visible extending to a point behind a tree-covered knoll. (Whitland Locke Photo)

ed and watched for years by irrigation district personnel, and by bureau engineers and geologists. It was marked, measured, and studied for movement for a long period. The conclusion was that the rising and falling action of the water from season to season, coupled with the wetting and drying action, had eroded and undercut soft formations below the outcrop, causing it to tip out.

It probably will fall into the lake some day, the bureau men believe, but this would cause no harm to the dam itself.

Comparing Tucker's fears with the engineers' fact-packed reassurances, having inspected the site myself, and having scanned the records of the long and detailed engineering and geologic work which preceded the construction, I was forced to conclude that the dam is safe, and that Tucker is unduly alarmed.

11 Phoenix Students At Speech Contest

Phoenix — Eleven Phoenix High school students and their coach, Bob Myrick, went to McMinnville last week to take part in the annual Tournament of Champions speech meet on the Linfield college campus.

The three-day tournament attracts hundreds of high school students throughout the state and features junior and senior divisions for first year and experienced speakers. All the members of this year's Phoenix speech squad are first year speakers and were entered in junior men and junior women divisions.

In addition to debate, each student was entered in at least two other individual events including oratory, extemp, impromptu, interview, after dinner, humorous reading and radio.

Those students making the trip for Phoenix were Karen Mocabee, Liz King, Pat Dienerich, Nancy Pettitt, Penny Simmonds, Shearon Poole, Barbara Gysin, Cheryl Bowman, Laura Griffith, Butch Tompkins and Gene Holt.

The Phoenix squad traveled by bus with Ashland and Eagle Point and returned late Saturday night following a banquet and presentation of awards.



'CREVASS' SHOWN — The slowly widening gap between a sandstone outcrop and the side of the hill, mentioned by Tucker, is shown above. Dam is several hundred feet away in background; lake water can be seen at left. One of the

cracks or crevasses can be seen at right of picture. It was measured at 20 feet deep, but may have been deeper before loose dirt fell into it.



SURFACE OF DAM — The lake-side surface of Emigrant dam is shown above. It is covered with rocks and boulders. The level of the lake (at left) was several feet higher when this was taken than the height of the old concrete dam

natural rock abutment is shown in background. Base of dam is several hundred feet to the left beneath the ing water.