HW Assignment: Due January 30, 2019

This exercise is about reading of a case study where a catastrophic project failure occurred despite superb engineering.

This exercise is designed to give you a better understanding about the value of engineering geology and rock mechanics. At the completion of this exercise, you should realize the following:

a) The importance of geology to civil engineering
b) The importance of an interdisciplinary approach to design
c) Why you need to understand the terminology of earth materials
d) Why you need to know how to obtain geological information
e) Why importance of site characterization equals that of design
f) Why the concept of "change through time" must be understood

Read *ALL* of the following questions before proceeding. Then, read the article entitled "*Vaiont Reservoir Disaster*" by G. A. Kiersch, published in Civil Engineering (library call number: TA 1 C 49), Volume 34, pp. 32-39,1964. **This article is available electronically from the course web site**. Then, write the answers to the questions as you find them.

1) Was the dam itself of sound design and a product of quality construction?

2) Compose a list here of the geological terms that you encounter in this reading that you could not define and explain in a test situation.

3) How much time elapsed between completion of the dam and the occurrence of the devastating slide detailed in this paper?

4) Were the designers aware that this valley was landslide-prone before they built the dam? What feature of Fig. 1 suggests an answer?

5) Read the description of the Malm Formation under "The geologic setting". List all words here that you are certain are significant in conveying to the reader a problem with respect to slope stability.

6) Examine Fig. 4. Note the wide U-shaped profile of the upper (outer) portion of the valley as opposed to the steep V-shaped profile of the lower (inner) portion of the valley. Can you explain why this form exists? Is the form meaningful in terms of the dam?

7) Was the occurrence of the slide a complete surprise or was there some forewarning? If it was not a surprise, list the times and types of forewarning that were available.

8) A slide occurred in 1960 near the dam. Why didn't this slide cause a disaster? In what way might this slide have instilled a false sense of security into the minds of engineers who managed the reservoir?

9) Use graph (or engineering) paper or the computer, make a graph of rate of creep in cm/day (y-axis) vs. time (x-axis) given on page 36. Mathematically, what type of function is described by this graph? If you wish to modify your answer to "7" above, do so here.

10) If you ignore the labels and the caption of Fig. 5 and simply look at the geological formations, is there anything that tells you that this valley constitutes a hazardous landslide-prone site?

11) Does excellence in engineering design guarantee final success of a project? If not, what additional resource(s) are needed?

12) If a liability suit evolved from this failure, who would be liable?