

Relief well design to control seepage in reservoirs

In working reservoirs it is dangerous to neglect seepage even if its intensity is low. Seepage observations should be carried out carefully to identify its nature, whether it is through the dam body or through the foundation. Then remedial measures will be designed accordingly. In this paper "Relief wells", one of the remedial measures to control foundation seepage is discussed.

In seepage observations following steps should be taken;

1. Identify the locations,
2. Monitor the quantity, reservoir water level and ground water table,
3. Collect cross sectional data, material data, etc. and any other relevant information which could be useful with regard to the dam and the seepage,
4. Study the dam cross section, structures in the dam, construction methods adopted during construction and rehabilitation works, if any,
5. Study the geological conditions of the foundation and surrounding area,
6. Study the material properties of the dam body and the foundation.

According to the above observations it is possible to identify the probable seepage and the course. Hence appropriate remedial measures can be designed. As a result of the dam has been constructed on a pervious foundation without sufficient seepage cutoff measures, it always tends to seep through the foundation. To control foundation seepage of a dam, most common designs are loading berms, filters, providing drainage systems etc. For the construction of most of these designs, sufficient space is needed beyond the toe of the dam. If such space is not available an alternative is to design a series of relief wells.

A series of relief wells will be designed so as to release the undissipated hydrostatic head in the foundation. These wells are constructed at the down stream toe in parallel to the toe of the dam. The diameter of the wells and spacing of wells will be designed according to the data collected. The design procedure will be discussed in the model calculations.