DAM CLASSIFICATION AND RISK ANALYSIS USING HEC-RAS PROGRAM

Dams are in our country a very common infrastructure due to the exceptional combination of orography and climatic rules. The orography allows us to built dams in mountainous areas and our limited water resorts make it advisable to meet a demand of water in the most dry seasons of the year.

The construction of a dam imply a risk too, because in break case of it the flooding downstream may become to have a grave effect on population, infrastructures, etc.

To establish those risks, nowadays we have mathematical models capables of simulate the breaking of a dam and to get the downstream flood levels as well the time from the break moment that would take to produce this flood.

The most usable model nowadays for dam break simulations has been the american DAMBRK.

From 2003 the model HEC-RAS, developed by the Hydrologic Engineering Center (HEC) of the United States Army Corp of Engineers, includes among its capacities a module that allows the dam break simulation. The appearance of this new appliance is particulary interesting for various reasons:

- The HEC-RAS application is very well-known in Spain and there are a lot of rivers simulated with it. The possibility of include a dam and simulate its break without making a new model exist.
- HEC-RAS is a Windows based program, while at present time DAMBRK is still working under the DOS operating system, making the fist one easier to use.
- HEC-RAS is a free program that can be found in the web page of the United States Army Corps of Engineers.
- To work with HEC-RAS exist a linking package, HEC-GeoRAS, wich works with GIS (ArcInfo, ArcView or ArcGIS). From a digital model of the terrain can be created an archive for importing to HEC-RAS the needed geometrical information to produce a simulation (stream, cross sections, etc). After making a simulation with HEC-RAS the results can be imported to GIS environment to attain flood and risk maps.

The created objectives in this work have been:

- To make firm the HEC-RAS capacity for dam breaking simulations, due to its new appearance exist slight experience in its use for this finality.
- Creation of a guide ot make easy the dam break simulation with HEC-RAS, ArcView and HEC-GeoRAS.

The study conclusions are the next:

- It has been checked that HEC-RAS has all the capacities for a dam break simulation in the planned circumstances in actual regulations.
- As for the calculation HEC-RAS is on the same level that DAMBRK, that has been the standard model for this kind of studies, as they use the same calculations sheme.
- The combination of HEC-RAS with ArcView with HEC-GeoRAS application has proportionated hight quality results (flood maps, velocity distributions maps, etc) with a minimum effort respect the traditional methods. The steps to follow to use this programs has been included in a guide that appears in the actual work.