BREACH GUI (BREACHJ)
Version 1-0-0 08-01-2010

Developer: Janice Sylvestre
Homepage: http://rivermechanics.net

Application Description

The National Weather Service (NWS) has developed a procedure for predicting the breach parameters and the outflow hydrograph of an earthen dam. The procedure known as the Breach Erosion Model (BREACH) produces the shape of the dam breach opening, the time of failure, the outflow hydrograph, and the tailwater elevation hydrograph. The original FORTRAN code was developed in 1984 and the last NWS revision was in 1999. The current JAVA GUI will create the input data file; run it through the breach application; display an animation of the dam breach formation; and display the hydrographs/rating curve graphically.

BREACH Release Version

The last official release of the NWS BREACH model was the 1999 version. Although the source code is the 1999 version of the model, the executable packaged in the NWS version is actually the 1997 version of the BREACH model. Refer to the READ.ME file in the bundle to see the changes between the two models. The results on some data sets may be slightly different when comparing the with the 1997 version results with the 1999 version results.

Changes to BREACH (brch.exe)

All of the algorithms in brch.exe are identical to the algorithm in the 1999 version of BREACH with the exception of those changes noted below. Some cosmetic changes were also made. When comparing the output files of 1999 version and the current version (2010) of the BREACH model, the results in the hydraulic table are the same. The user may see slight differences in formatting when compared to the NWS version of BREACH. The name of the executable files has been changed from breach.exe to brch.exe to distinguish it from the NWS application. The following changes were made to the FORTRAN code.

Breach Outflow

If the tailwater elevation exceeds the pool elevation the breach outflow is set to zero. Previously, the model would blow-up because of a negative head used in the breach outflow equation.

Format Change

The field for the area-elevation curve has been increased from 10 digits to 12 digits in the output file. This allows the user to have surface areas in excess of 100 million acres. Previously, the output would display "*" in the fields. Also, a deliberate space has been added between each parameter in the output table to ensure the values of the parameters do not run together.

Initial Tailwater Elevation

The initial tailwater elevation (TWD) has been set to the bottom elevation of the cross section. Previously, TWD was erroneously defined as a depth rather than an elevation.

Features in BREACHJ

The following enhancements have been added to BREACHJ.

Input GUI – The BREACH GUI allows the user to enter the data in a simple, easier way. A detailed description of the input parameters is in the BREACH documentation (breach.pdf). There is also a graphical display of some of the input data (i.e., inflow hydrograph, area-elevation curve, cross section, and spillway rating curve).

Output GUI – After reading in or creating the input file, the BREACH GUI will run the BREACH application (brch.exe) and generate the output file with a ".out" extension. It will then generate an animation of the dam breach showing the breach opening as well as display the outflow hydrograph,

the tailwater elevation hydrograph, and the rating curve. The user may pause the animation and replay any position of the breach. The Output GUI will also produce an Output Display Panel which shows the finalized graphs and table view in the Breach Animation.

Known Bugs

Any directory accessed by the program cannot have spaces in it.

System Information

***Operating System* – Windows 2000, XP, Vista**

***Language* – Java 1.6+**

***Directory* – C:\RiverMechanics\breachGUI**

Files

***brch.exe* – Fortran executable for BREACH application**

***breachj*.jar – Java classes for BREACHJ**

***breachj.ico* – BREACHJ icon**

breachj.bat – batch file to execute BREACHJ

***BREACH GUI Users Guide.pdf* – user's manual for BREACHJ**

***BREACH GUI Release Notes.pdf* – this file**

***breach.pdf* – the last NWS BREACH documentation**

***Example Input Files* –**

- ***Bsmbot2.dat***
- ***Clay.dat***
- ***Lawn.dat***
- ***Peru.dat***
- ***Redrock.dat***
- ***Teton.dat***

Acknowledgements

The initial development of the BREACH GUI was done by members of the River Mechanics Group in the National Weather Service Office of Hydrology in 2004. The key developers of the BREACH model were Dr. Danny Fread and Janice Sylvestre. The NWS ceased developing BREACH after 2005.

Warranty

There is no warranty (implied or otherwise) associated with BREACHJ or BRCH. It is made available as-is. The developer is not responsible for the results generated by the application.