ADAPTIVE HYDRAULICS

A TWO-DIMENSIONAL MODELING SYSTEM
DEVELOPED BY THE COASTAL AND HYDRAULICS LABORATORY

ENGINEER RESEARCH AND DEVELOPMENT CENTER

A PRODUCT OF THE SYSTEM-WIDE WATER RESOURCES PROGRAM

FREQUENTLY ASKED QUESTIONS

How do I set the adaption parameters?

Run a short simulation with ML = 0 and SRT = 1, view the *err.dat output file to determine the magnitude of the residual error values, use the SMS contour options to determine which elements may be refined for a given tolerance value. The values in the *err.dat file are ratios of residual error to tolerance value. When this ratio is greater than 1, an element can be refined. Once an appropriate SRT value is determined for each material from the initial run, set the SRT values and run again. This time the *err.dat file should contain much lower values. Locations where the values remain greater than 1 usually require more refinement levels. A standard rule of thumb is to not refine more than about 20% of your mesh at a given time, so select the appropriate SRT with this in mind. Watch the run and check the amount of resolution that is being added to make sure that you are getting the expected results.

How much mesh resolution is enough?

This is a difficult question to answer. Mesh resolution depends on your problem - bathymetry gradients and hydraulic gradients. ADH can add resolution for hydrualic effects but the bathymetry is defined with the inital mesh. You need enough resolution to accurate describe the bathymetry and visualization needs. Then you can use the adaption parameters to add more resolution to improve the model results. Navigation channels or inflow locations should be 4-5 elements wide. Element area changes should be no greater than 50%. Avoid thin triangles - triangles with angles less than 20 degrees.

How should the operation parameters be set?

We recommend that you set OP PRE = 1, OP BLK = 1, and OP INC = 40.

What is the difference between IP NTL and IP ITL?

The NTL value sets the convergence tolerance for the Residual Maximum Norm. This is the maximum residual norm throughout the entire model domain. The ITL value sets the convergence tolerance for the Increment Maximum Norm. This norm is the maximum amount of change desired for

the depth or velocity solution thoughout the domain. Convergence is met when one of these tolerances is met. The ITL value defaults to 0 if not included in the boundary conditions.

Is spacing and order important in the boundary conditions file?

The order of the card in the BC file is not important. You can order the file in any way you choose. Spacing is only inportant when giving the cards. The cards are all read as 3 character strings such that there must be three spaces before any values are given. This is automatic for most cards. However the gravity specification can cause trouble since 'MP G #' only gives a total of 5 spaces before the value. This means that the gravity card will actually be read as 'G #' and not be recognized correctly by ADH. You must include an additional space between the 'G' and the value.