WAPUG SPRING MEETINGS 1989

TIDAL DESIGN LEVEL SOFTWARE

SUMMARY

A simple computer program has been developed to calculate the joint probabilities of tide level and storms. This allows the correct choice of tide level for a required return period of storm. The program is too simple to be suitable for systems with a lot of storage at or below tide level, but is suitable for many sewerage systems which are affected by tide levels.

Tide levels are assumed to follow a sine curve with a period of 13 hours. The tide is symmetrical about mean sea level. The amplitude of the tide varies from neap to spring also on a sine curve. There are in fact other sinusoidal tide components of different periods. The variations caused by these are ignored. Real tides also exhibit surge and wind set up effects. These are also ignored. The program will therefore slightly underestimate the tide levels to be used.

The program assumes that tides and storms are independent events. For any given risk of occurrence there is an almost infinite combination of possible tide and rainfall which has that risk. The program gives a selection of standard conditions. All of these should be analysed to find the worst result of that combination.

The data for the program is:

- Mean sea level
- Mean high water neap
- Mean high water spring
- Outfall level
- Required risk of occurrence

The result is a tide levels for each of a table of storm return periods. The tide levels should be used as a constant level.

M P Osborne 14 March 1989

Software Development for Tide-locked Outfalls : M Osborne, HR.

J.Bartlett : Binnie and Partners : I welcome the pragmatic approach ; are you guaranteeing adequate protection to those areas not affected by the tide ?

Answer : One of the options presented by the software will always be zero tide and storm return period = desired protection, which satisfies those areas not affected.

D. Beale : Howard Humphries : Have you compared your results with long Time Series ?

Answer : No. Research is being done at University College Cardiff, this is only an interim procedure.

J. Packman : IH : I have no qualms with pragmatic approaches providing they are underlain by research.

Answer : I totally agree that research is needed, but this is produced to address the current confusion, and at least provides something to use as an interim measure.

S. Walker : North West Water : I am unhappy that astronomic tides and not long-term tides are considered. Surge can be greater than 1m in some cases.

Answer : Again, the basic research is needed.

T Lloyd : Wirral Borough Council : I am worried about having to run models with long Time-Series, it is bad enough using the annual Series in terms of access to the computers. Also, I'm worried about simulating a sine curve with a straight line as proposed.

Answer : I take your point, but if you are looking at considerable storage volumes, then long Time Series is the only way to get reliable results.