Webinar: Operational Structure Modelling using TUFLOW
Wednesday 13th April 2022

#	Question	Answer
1	What recommendations would you provide for using operational functions to model hydraulic blockage for different durations during a flood event? Specifically to apply a blockage varying over time as the build up of debris increases. Do you have any advice on how to action this task?	In TUFLOW there is a special function to allow the user to easily run various blockage scenarios based on the AR&R 2019 guidelines, so normally you wouldn't need to use operational functions to model blockage cases. One exception is if you want to vary the blockage over time during the simulation, in which case you could use operational structures to do this. The webinar shows some examples from case studies which might give some insight on how to set things up to vary a structure's opening, noting bridges and culverts are not in the operational structure group (which covers structures like pumps, gates, weirs, etc). If your structure is a bridge or culvert, given the debris is essentially a zero-length constriction, you could insert a gate or weir type operational structure on the upstream side to emulate the debris variation over time. Without getting into too much more detail now, can you please email support@tuflow.com with details of the structure you'd like to vary the blockage over time for, and we'll get back to you on the best approach.
2	What did they change in Maryborough to it didnt fail the second time?	I asked the same question! I believe in the first flood there was a failure of a gate which let the water through. Here's a news article: https://www.abc.net.au/news/2022-01-09/qld-weather-flooding-fraser-coast-maryborough/100746184
3	Hello this is my first time to join on this session , in need to undesrtand this meaning of TUFLOW??	TUFLOW is a 2D shallow water solver that we developped and we used it to build those example models. TUFLOW is also 1D with 1D/2D dynamic links, and in flexible mesh form is also 3D. For more info visit www.tuflow.com. For those interested, TUFLOW stands for Two-dimensional Unsteady FLOW and is pronounced 2-Flow. It started life as a 2D coastal model in 1989, but today it's grown to be much more than its original name.
4	Is it not necessary to use site-specific Elevation-Area-Capacity curves in modelling studies to evaluate water storage reservoir operation schedules, to meet various planned water demands?	Yes. Having the correct storage volume built into your model is essential, especially where the system is storage (volume) dominated (rather than strongly conveyance dominated). Note, to model the correct storage only requires good definition above the lowest water level that occurs during a simulation, as it's the change in storage that is used in the computations (unless investigating other metrics such as concentration of pollutants that are a function of the total storage/volume).
5	During drought years,we have to manage the conflict in demands between irrigation and water supply.Therefore,reservoir operation schedules to meet changing water demands becomes extremely important.How often should we do a re-survey of reservoirs to assess storage volumes ?	Regarding survey frequency of reservoirs where total volume needs to be known, resurveying would depend on the siltation rates for the reservoir which would vary substantially depending on the incoming sediment load.
6	Is the underground channel used as a storage until flood peak passes ?	Although the underground structures are massive, the main purpose of the channel is to transport the flood water from the small rivers to the pump station. Modelling results showed the flood extent was still quite extensive if the pumps didn't drain the water continuously from the system.
7	In example 1 in Tokyo, with underground flood passage, how come the whole discharge system is not fully gravitational and why does it include pumps	I believe the rivers are well above the surrounding land and certainly well above the underground flood storage system, therefore a gravitational outlet is not an option, with pumps the only option to extract the water after the flood event or, if full during a flood, slowly back into the rivers.
8	Considering the nature of the flow through these structures, did you face any model instability issues and how did you solve ?	Yes, like any 1D/2D model, the model can become unstable if the flow is excessively large compared to the 1D node storage volume (for example, imagine pouring a bucket of water into a thimble). The following methods are valid options to stabilise them: (1) check/reduce 1D timestep, (2) review the number of 2D cells linked to the 1D node if the 1D/2D link is a source type link (SX in TUFLOW world), so that the number of linked 2D cells is similar or greater than the 1D structure flow width, and (3) if the 1D/2D link is a momentum link (HX in TUFLOW world) make sure the 1D has sufficient nodal storage, and if a SX link increasing the 1D storage can help as this storage is built into the linked 2D cells.
9	Just wondering as many weir equations assume static upstream pool, but in reality it is likely to be some velocity effect for weirs in rivers, can tuflow model the velocity and be used to improve rating curves?	Yes, abolutely. You can turn on or off (globally or individual structures) the dynamic head for determining the upstream head to feed into the weir equation. The default in TUFLOW is to use total head (water level plus dynamic head).
10	What is the conceptual difference between a spillway control structure and a weir control structure in terms of structure operation for flood control ?	For operational weirs the weir invert height (and/or) weir width of the weir can be modified over time. For an operational spillway the invert and width of the spillway structure stays the same and the spillway gate opens / closes to control flow out. For example the Wivenhoe dam on the Brisbane River is a gated spillway.
11	What is the model time step used ? If you close the gate quickly it might generate transient wave - how you handle it in model ?	The models presented used an adaptive timestep. It is possible to generate a transient wave in the model by a sudden change, for example a dambreak or sudden release from a dam can cause a wave to propogate back into the dam.
12	Where is the outlet for the Melbourne case?	The outlet structure is to the south of the weir.
13	Are there integrated water quality modules available where hydraulic controls are assigned based on water quality triggers/regulatory conditions?	Yes, water quality triggers are also supported by TUFLOW FV.
14	Is it possible to model energy dissipators at drainage outlet in TUFLOW? if can model it in TUFLOW, which parameter should be used in .toc file? thx	There is no specific energy dissipator unit in TUFLOW as a number of structures and also open channels have options to dispel additional kinetic energy (fraction or multiple of $V^2/2g$). For example, for an outlet structure the full $V^2/2g$ can be dispelled through a form loss factor or if a culvert simply by fixing the exit loss as unadjustable (by default, TUFLOW adjusts the entrance and exit losses according to the approach/departure velocities - see this webinar: https://www.tuflow.com/library/webinars/#urban_pipes
15	I don't understand how the water can stay in that small lake over 4 days (south point), is there any pipe invert level issues there?	The outlet stucture is a pipe, with the invert above the base to allow the lake to retain water.