Part 6: The story of canal surge

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Interviewer: Dr MS Srinivasan

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"This relates back to my time when I was in the Ministry of Works and Development (MWD) Central Labs and Power Division Hydro Development. At that stage, they were designing the Upper Waitaki power development including the Tekapo/Maryburn canal. Now that was the first true power canal in the country, and carrying a lot of water and so they became concerned about what's called a "canal surge". If you've got a lot of water flowing down a canal steadily and there's an emergency so and they have to shut the gate at the bottom end then you've got all the is water running down towards the gate has and it's got nowhere to go so it piles up against the gate and creates a wave which travels back up the canal. The question from the engineering point of view was how high will that wave be and how far will it go? So, how high do we have to build the banks on the canal?"

"That problem was put through to me. Now there were, at that stage, some analytical techniques but they were nowhere near as sophisticated as they are now and so the question was, could we do anything to check out the analytical techniques? And so I had the idea, well the only other large canal we had in the country at the time was the Rangitata Diversion Race (RDR), which of course has got the 25MW Highbank Power Station at its lower end on the Rakaia River. I got in touch with the NZ Electricity Department at that time, as I say, those were the days when you could do this kind of thing and I said, "Will you be prepared to do an emergency shutdown of the Highbank Power Station so we can see what happens in the RDR angitata diversion race?" and they said, "Yes, we'll do that for you.""

I was in Wellington at the time, of course, and so I arranged with the Christchurch technical staff to give me a hand. We went out and put in gauge poles at intervals up the canal, and I was going to position a technician at each gauge pole with a synchronised stopwatch so

that at time zero, NZED would close the gate, and the wave would be generated and somebody sitting by a gauge pole would see the wave coming by and they'd go click, as the water rose So they recorded the time and the height of the water. That was the theory.

So we were setting ourselves up and putting out these gauging holes. Alongside the RDR there is a maintenance track up on the bank and just wide enough to take a single vehicle. We were driving up there, it was coming on midday and I was in a truck at the front – I was not driving it – and it had a canopy on the back and, fortunately, there was a guy sitting on the back of the truck under the canopy while we were trundling along and all of a sudden there was a pounding on the cab of the truck and a voice said – 'cos there was a Land Rover containing a couple of technicians coming up behind us – and the voice said, "The Land Rover's gone into the canal, woah."

So, we stopped and looked and sure enough it had, some way behind us. We had to drive on up till we found a place that we could turn around, did that and raced back down to where it had happened and fortunately for us, there were two very saturated technicians on the bank, one of them wearing thigh waders, would you believe? And we looked down into the Rangitata diversion race which is that sort of milky alpine water here you could see this orange and white MWD Land Rover roof sitting and a wave going over the top of it. We arranged for a crane to come up from Ashburton and dragged the Land Rover out of the Rangitata diversion race."

"The next day we completed the putting out of the gauging poles and did our experiment. I was expecting a foaming wave coming up the canal but it was really disappointing actually because it was just a smooth swell that died out within a kilometre or a kilometre and a half."