

HISTORICAL FLOODING OF THE FITZROY RIVER

Jerome Goh, Waterways Engineer of Main Roads (Western Australia), spoke to the June 1996 Kimberley Society meeting about historical and general flooding in the Fitzroy River. His job is to collect data about streams throughout Western Australia, to enable predictions to be made about the magnitude and frequency of floods, so that waterway requirements for bridges, i.e. their design width and height, can be formulated.

The design requirement varies with the importance of the road, but in the Kimberley, bridges and associated floodways are required to allow cars through during a flood which has a recurrence interval of 50 years, or put in another way, for a flood which has a probability of 0.02 of occurring in any one year.

It is particularly difficult to determine what is the 50 year flood in a river such as the Fitzroy. Above Fitzroy Crossing the catchment is steep and rocky, whereas below it passes through flat absorbent country. In smaller streams where storms affect the whole of the catchment, flood frequency can usually be related to the frequency of rainfall. In the Fitzroy, storms usually affect only part of the catchment at any one time, and even if the storm travels along the descending river it leads to a much greater run off than one travelling up river. Jerome showed the isohyets for a number of events that had led to major flooding and although similar rainfalls up to about 300 mm occurred in some of them, the size of the resulting floods were quite different. Reasonable design flood frequency predictions can be made if records of actual flows are available over a long period; e.g. 50 years, but this information is not available for the Fitzroy.

The magnitude of flood peaks is greater at Fitzroy Crossing than at the Willare crossing on the road between Broome and Derby. This is because the flood peak spreads out during the passage of the flood through the flat country below Fitzroy Crossing. The flood peak becomes attenuated, though the total amount of water remains much the same.

Jerome spoke about the upgrading of the Willare crossing on the road between Broome and Derby. In 1985/86, the road, including several flood crossings, was raised above flood plain level and two further bridges were added to the two that had been built about 1968. The cost of the upgrading was about \$18million. Within a few weeks, however, the road and flood crossings were badly damaged by a major flood. Repair works cost \$1.8million. Paucity of records were the problem. In 1983 the largest officially recorded flood occurred, amounting to 10,200 cubic metres per seconds at Willare. A large flood was known to have occurred in 1914, and a level (which later proved to be erroneous) existed for Liveringa. Analysis of the available

data indicated the 1983 flood was probably a 100 year event and the 1914 event, estimated to be 13,000 cubic metres per second, was quite rare. When the Fitzroy then came down in 1986, a flow of 17,500 cubic m/sec battered the upgrade that had been designed for 10,200 cubic metres per second.

Another major flow of 15,400 cubic m/sec occurred in 1991, and two amounting to 14,000 and 18,500 cubic m/sec occurred in 1993. The repaired Willare crossing withstood these floods, and further research, including reference to a diary kept by a boundary rider in a hut on the Erskine Sandhill, showed the January 1914 flood would have been 18,800 cubic m/sec.

Jerome also spoke about the flooding at Fitzroy crossing. The road crosses the flood plain mostly at ground level, and all the observed floods have been lower on the east side than the west side. The east side comes from the Margaret River whereas the west side carries the combined water from the Fitzroy and Margaret Rivers and Brooking Creek. Predicting flood frequency and flood levels here is obviously difficult.

Another topic in Jerome's coverage was the legendary flood when the Lennard and Fitzroy Rivers were reputed to have combined. This was clearly impossible as the divide between was 27 m high. The land is flat and takes time to drain, however, so it is more than possible that, in a major cyclone, the land would have been covered by slow moving sheet flooding that could have been continuous between the rivers.

Jerome had to spend a considerable amount of time researching the Fitzroy floods. He had to seek out people who may have had some knowledge of flooding, and then check and double check on any anecdotal evidence collected. In this regard, he recounted an amusing tale about when he thought he was on to some original information from an ancient Halls Creek resident. When asked how he knew, the old bloke told him he had heard it on the radio that morning!

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