

South Island Power Systems Field Trip - 2018

BY SHAREE MCNAB

The annual power systems field trip for 2018, subsidised by PEET (Power Engineering Excellence Trust) members, took place from Tuesday the 17th April to Friday the 20th April, visiting power related sites around the South Island. Twenty-two enthusiastic students ranging from Engineering Intermediate to Third Pro were exposed to the full range of power systems plant from generation, distribution, through to NZ's largest single electricity NZ's Aluminium Smelter at Tiwai Point. The first day was a long drive from Christchurch to Invercargill, broken by a welcome visit to **Alpine Energy**, the Electricity Distribution Business based in Timaru that serves the area between the Rangitata and Waitaki rivers. We heard about the distributed generation projects that Infratec, a subsidiary of Alpine Energy is involved both in NZ and internationally and the work that their Network Planners do in providing for growth and technology changes in the network. We then got up close and personal with some of the distribution equipment. The following day we were off to the Aluminium Smelter which uses the equivalent of 700 thousand households' worth of energy. We watched the carbon anodes being replaced in the reduction cells where the aluminium is smelted and visited the casting section where the ingots and billets are formed. Finally we visited the power supply section where the 220kV AC is transformed down in voltage and rectified to provide the 200kA of current required to run each potline. That afternoon we visited our first generation plant – **Meridian's** White Hills Wind Farm near Mossburn, which has twenty-nine 2MW Vesta wind turbines. We got to experience first-hand the windiness of the location, and got a look inside a turbine tower.

The third and fourth days of the trip had a strong hydro-electricity focus. We drove up from the bottom of the Waitaki hydro system, passing the Waitaki and Aviemore dams which looked spectacular with the autumn colours on full display. **Transpower** provided a delicious picnic lunch of burgers before our visit to the Benmore HVDC Switchyard. This is the southern end of the HVDC link, commissioned in the 1960s to carry hydro-power from the South to the North Island. We learned about the upgrades in capacity and technology that have been made since it was first commissioned in 1965 and marvelled at the art deco styled high voltage equipment. Benmore Power Station (**Meridian**) just a short walk up the road is the second to largest hydro-power station in the NZ with 540 MW of generation. Its earth dam is the largest water retaining structure in NZ. Meridian's Brent Wilson guided us up and down the bowels of the power station which is designed like a ship's hold, compartmentalised to contain a breach.

The final day we drove along the canals with Brent (Meridian) between Lake Ohau and Lake Tekapo, visiting "Gate 18" the gate that releases water from Lake Pukaki (NZ's largest capacity hydro storage lake) to the canals. We heard about the civil works to raise Pukaki's lake level to provide the 14.5m operating range available today. Our final visit was to the Tekapo A, a hydro power station with 27 MW generation from its single Kaplan generator suited to the high volume and low head available.

Everywhere we went it was great to meet up with past students ECE students of the University of Canterbury and hear about their career paths since graduation. We'd especially like to thank all our hosts for their enthusiasm for their industry and taking time out from their jobs to show us around. Each visit was very informative and certainly a unique opportunity to gain access to some very interesting places!

Thank you to our PEET Industry members.



T R A N S P O W E R



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