

For those of you unfamiliar with Westinghouse, I apologize in advance. Ian and family asked if I could talk today about Frank's time with Westinghouse. Since Frank's career spanned over 60 years this was not an easy assignment, however, with help from Leo Smitas, Kip Gray and others here is my attempt.

I started with Westinghouse Canada's Turbine and Generator division in 1975 as an engineering co-op student. During my 4 work terms with Westinghouse I had the privilege of meeting and then working with Frank Barnard. Frank had already been with the company for over 25 years. He was working in the Service Division at this time but was brought back to help the Turbine and Generator Service Department when there were unusually difficult issues to address. The first crisis I recall working in the field with Frank was at the Westinghouse synchronous condenser station in Wabush Labrador. I was sent to the station as part of my co-op training and Frank was there to make sure things were done correctly. After the repairs were completed on one of the large synchronous motors, we all retired to the station lunch room while this condenser ran for a time to thermally stabilize. Frank suggested to the affect that we should thermally stabilize also and in this regard pulled a bottle of single malt scotch from his briefcase. For this student engineer that was the first of many of Frank's valuable lessons.

Frank Barnard attended Saint Francis Xavier University for 3 years followed by 2 years at Nova Scotia Tech and upon graduation in the spring of 1948 received his Bachelors of Electrical Engineering. In those days Westinghouse was actively searching for talent to bolster its engineering ranks and Frank decided to write the Westinghouse exam for a possible position as an apprentice engineer somewhere in the large Canadian Westinghouse Company. Frank must have passed this test because he was accepted into the company at its big #1 plant at Sanford and Barton Streets in Hamilton for a 2 year engineering training program.

From my experience Westinghouse was a prestigious company to work for however in the 1970s when I joined they were not known as being terribly generous regarding employee pay cheques. This must have been the case in the late 1940s also as it took Kip, Frank and 3 other apprentice engineers pooling their meager Westinghouse pay to buy a used 1929 Oldsmobile to have a car to get around. This 20 year old car was registered in Frank's name and apparently could actually make it all the way up the hill to Clappison's corners with all of those in the Westinghouse class of 1948 onboard.

After his apprenticeship Frank joined the Hydro Generator Engineering Department. At that time he was mentored by Charlie Sargeant who I understand got his start designing synchronous machines back in the 1930's. Frank was becoming a member of a very small group of engineers that were classically trained in the art of synchronous machine design. This knowledge received can be traced back to Pittsburgh to the very start of our world's modern electrical infrastructure and to characters like George Westinghouse, Nicola Tesla, Benjamin Lamme and many others. Frank must have been a good student based on the large number of successful designs he later authored. And Frank didn't have computer programs or calculators to sort things, he just had a slide rule, a binder full of curves and a practical understanding of the physics of what makes electric machines work. It was estimated that from 1950 to 1960 Westinghouse T&G Plant 1 designed and manufactured over 170 large electric machines. That averages out to around one machine going out the door every 21 days. This must have been an exciting and perhaps exhausting time to be a Westinghouse electric machine design engineer with the majority of electric machines being a unique design.

Around 1961 Frank moved over to the motor division to head up the test department and provide bench strength to the various design functions there. Frank's experience lent itself well to the wide variety of products being designed including specialty synchronous, induction and DC motors. From discussion with some of Frank's colleagues I got the impression that Frank was like the skilled bench player on a ball team that was able to play any design related position well when called upon. This broad base of design expertise became a valuable asset for the service division's engineering group that Frank moved over to in or around 1968. Also around that time, Westinghouse had announced that it was getting out of the hydro generator business and their plant 1 high voltage Thermalastic coil operations were to be shifted over to the service division. This was a perfect technical match for Frank where he could now oversee the high voltage insulation at the new service division coil facility plus support the many service shops across Canada with their wide range of electric machinery challenges. Frank's familiarity with Synchronous machine design, induction motor design and DC machine design made him eminently suitable for a position in Westinghouse Service Engineering. These many service shops across Canada repaired all kinds of

equipment for Utilities, industrial plants, marine and defense applications. Frank guided the Service Division staff to take on more complex jobs which they would not have been able to handle without his expert know-how. The Company, his coworkers and his customers quickly began to appreciate his specialized knowledge, dedication and work which Frank carried on with to well after retirement.

In 1987 when the design and manufacture of new Westinghouse hydro generators had been over for more than 10 years the Service Division gathered the various parts of Westinghouse Canada's hydro services together in one department which luckily Frank joined. Frank then became engineering mentor for a handful of young engineers. It seemed that over the past decades the business aspects of designing and manufacturing hydro generators had caused a generation wide gap in the ranks of experienced synchronous machine designers. It now fell mainly on Frank to pass the required knowledge on while still supporting the daily work needed to guide the service shops and keep the accountants happy. At a time with the value of each hydro order being relatively large, a major technical mistake could have ended it all for the fledgling department, Frank's technical leadership helped steer us clear of the many potential pit falls.

I was part of this new hydro generator service start up, coming over from the field service group at T&G. I had been mentored by many at Westinghouse, but found Frank to be by far the most important based on his unique experience. Frank was also my favorite due to his polite, patient and respectful manner that made you feel comfortable even when asking the dumbest of questions. When I stood on my own as an engineer and actually made decisions and signed drawings, luckily, Frank was working with me and others in the same Hydro Generator Service department to assist us all technically. Frank retired on paper from Westinghouse in 1989 after 41 years of service. The day after his retirement party, Frank arrived at the office as usual as if nothing had changed. About a month later he took an uncharacteristically long vacation for a trip around the world with his beloved Donna. When Frank returned he carried on in retirement with his normal workload of designing replacement windings, supporting service shops and checking our work to keep the Hydro Generation group and Service Division out of trouble. Frank was amazingly fast when he'd review a drawing; it seemed to me that a drawing error must have glowed like a neon sign to Frank as he

promptly picked out the defect and politely suggested a way to fix it. A drawing you had worked on for many days or even weeks Frank could pick apart in minutes and yet still make you feel good about the experience.

In my Westinghouse career I routinely saw all levels of employees and clients get angry at each other for good and not so good reasons, but, and I thought hard about this, I do not recall Frank ever getting visibly angry with anyone. I believe this was due mostly to him being a true gentleman, but also in part, to his strategic avoidance of any supervisory type assignments. He explained to me early on, over a shot of single malt, about the evils of a management career path. That path was a slippery slope destined to drag you irretrievably into endless personnel management issues, and further lead to the rusting of your engineering tools. Frank managed to stay almost 100% technical except for a brief slide while in the motor division as a supervisor, which he was reported to have successfully reversed. This was one of many life lessons I took to heart from Frank and feel I have benefitted from to this day.

As the Hydro Service group matured and successfully grew as a business the top management of Westinghouse in Pittsburgh felt confident enough in our group's technical stewardship of the large mostly Canadian fleet of hydro machines to move all of the US based Westinghouse Electric hydro fleet's records for care and custody up north. This was a great success story for this Canadian based group that proved it could profitably manage complex technical issues all over Canada and now the US and the world and still stay mostly out of trouble. Hugh Meyer was a big part of this success as he managed the expanding Hydro Generator Service department at the time, and Hugh realized that Frank was key to the ongoing technical stability of the business, and to his credit, kept Frank on well after retirement to continue his design work and mentoring of the engineering staff.

Some of us know the more recent story of the Westinghouse Hydro Service group being tossed about between Siemens and then Voith. And during this rather turbulent transition time the hydro service business continued to thrive and grow with the further acquisition of the entire fleet of Allis Chalmers and Siemens Allis hydro machine records from Milwaukie. Again, what a success story. Frank's positive technical influence over the years was recognized as so important that

Voith recently named their largest meeting area the Frank Barnard Conference Room.

Now that I am semi-retired from the equipment supply side of hydro generation servicing, I get to travel around and consult with utilities regarding the maintenance needs for their generation assets. Just recently in November I was inspecting and evaluation a generator that Frank had designed in 1959. This machine was completely original with over 55 years of trouble free operation. When the owner asked if it was appropriate to hi-pot the stator winding, I thought to myself that since the unit was designed by Frank Barnard it could pass, and I advised this client to go forward with the potentially destructive testing, and it surprised everyone except me that it did pass. I wrote an email to Frank congratulating him on the quality of his design. It is always a reassuring feeling when I see Frank's signature on the many winding diagrams, section elevations and other drawings for large hydro generators across Canada. Frank's numerous quality designs are a tangible legacy to his engineering talent.

And the success of so many engineers active today represents another legacy that can be attributed to Frank. Technical and life lessons were his mentoring specialty and we are all so fortunate to have been blessed with knowing and working with him.

Glenn Mottershead, P.Eng

1929 Oldsmobile

