Reflections on the Early History of Process Control Teaching in Chemical Engineering in Australia (By Mike Brisk)

Control systems topics in undergraduate engineering education were first introduced in Australia about six years after the first US course in 1942, and only two years after the first UK undergraduate course. Some "automatic control" topics in undergraduate courses appeared simultaneously, but independently, in 1948 in The University of Adelaide (Electrical Engineering); The University of Queensland, (Electrical Engineering, but available to all final year engineering students); and The University of Sydney (Chemical Engineering and Electrical Engineering). In 1948 Sydney's Department of Engineering Technology was renamed the Department of Chemical Engineering following the appointment of the first Professor of Chemical Engineering in Australia, T. (Tom) G. Hunter in 1947. Hunter was interested in automatic control, and introduced the course Measurement and Instrumentation, covering the measurement and control of pressure, temperature, fluid flow, and liquid levels, together with automatic control theory, into the final year in 1948.

In 1950 half of the course Industrial Chemistry became Instruments and Process Control, with D P Eckman's 1945 book "Principles of Industrial Process Control" as a text. Apart from a shift in the balance towards PID control theory from instrumentation, there was little change until 1958, when Charles Sinclair, fresh from a master's degree in Chemical Engineering at Edmonton, Canada was appointed a lecturer. He introduced and taught a full final year subject Process Control, and, in his own words[1] "… in best university lecturer's style set out to master transforms and block diagrams by keeping one step ahead of the poor students who had to suffer my learning process". The initial text was "Automatic Process Control for Chemical Engineers" by N A Ceaglske. This proved too mathematical, and was replaced by Eckman's 1958 "Automatic Process Control".

This was the first full undergraduate course in Process Control in Chemical Engineering in Australia. Sinclair extended it in 1959 with the introduction of analogue computing for dynamic simulation of control loops (using two Systron-Donner ten amplifier valve computers), and introduced a separate course in digital computing using the University's SILLIAC computer. In 1959 final year student Michael Brisk wrote a SILLIAC assembler language program to simulate a feedback control system for his undergraduate thesis. This was the first use of a digital computer for an undergraduate Chemical Engineering thesis in Australia, and may have been the first Engineering undergraduate thesis to use a digital computer.

Sinclair left Sydney at the end of 1960 to establish Chemical Engineering at Monash University. Tom Hunter, in a typical "god professor" action of the time, appointed PhD student Brisk as a Temporary Lecturer to teach process control in 1961 two weeks before the start of first term! The subject developed progressively from then, with Brisk until 1965, then David Tolmie from 1966 to 1970, Brisk again from 1971 to 1982, followed by Geoff Barton from 1983. From 1986 John Perkins, and then Jose Romagnoli, successive holders of the ICIA Chair in Process Systems Engineering at Sydney, and both internationally known for research in Process Control, contributed. The modest start by Tom Hunter had grown indeed!

Reference

1. K P Dabke & M L Brisk, "A History of Control Engineering Education in Australia", Institution of Engineers Australia, 2000

About the Author: Emeritus Professor Mike Brisk professional career was equally divided between his work at ICI in the UK, Sydney and Melbourne and academic appointments at the University of Sydney and Monash University. Prior to retiring, Brisk was Dean to the Faculty of Engineering at Monash University, Melbourne from 1995 – 2002. Brisk designed and taught Monash University's final year process control undergraduate course and is a Fellow of IChemE and EA. He is also a member of several advisory committees and provided advice on course design to universities across Australia.