Computerizing Distribution System Fault Analysis

In the ‘60s, there was no computer-aided drafting software. Updating drawings was a major task. Design corporations had large rooms full of drafting tables with hundreds of draftsmen busily drawing and making changes.

With computerization came major changes in the culture of our company, from the traditional manpower-intensive design process that was practiced for decades to a new modern computerized system. Once we wrote programs for automating calculations, word got around through the media and resulted in more companies showing an interest in getting involved with and using computers. Soon, volumes of new programs increased in the market and more designers and engineers started to use them. This process started a healthy and useful competition within the industry and helped the creation of better, faster and easier-to-use programs for architects, designers, and planners

Computer manufacturers were working hard to meet market demand by introducing better hardware, more powerful computers and software tools. Building material and equipment manufacturers were helping the process by providing the data related to their products for inclusion in computer program databases and libraries.

To help those not familiar with 1960’s computers, I’d like to share some of the features of the computer I worked on to write a few programs before moving onto the IBM 1130. The computer was called the basic “IBM 1620 Model 1” Data Processing System (1959-1970).

IBM 1620 Model 1

The Model 1 used a card punch reader and paper tape for I/O (input/output) plus a typewriter console for interactive control and printed output. One of IBM's last decimal machines (the internal format for numbers was binary coded decimal [BCD] with sign and parity bits), the 1620's nickname was CADET (*Can't Add Doesn't Even Try*)

because addition was accomplished using lookup tables rather than adders (similarly for subtraction and multiplication; and there was no divide instruction at all; division was performed in software). Programming was in SPS (Symbolic Programming System, the 1620 assembler) and FORTRAN (designed by Watson Lab alumnus John Backus), which were both available from day one.

It's apparent that the 1620 Model 1 owed a great deal to its predecessor, the 610 Auto-Point Computer (IBM's first attempt at a small personal scientific computer), designed in the attic of the Watson Lab at Columbia University by John Lentz. The main differences were core memory instead of drum, no plug board (the 1620 was a true stored-program computer rather than a "Turing machine" with a long tape) and a standard high-level programming language.

The first Short Circuit program:

I early 60s I wrote a Short Circuit Program with the help of Detroit EDISON to make sure the program covered the areas of interest to power companies as well as the industrial systems. The first short circuit program could only handle radial system and calculated three-phase fault for up to 100 buses. I used this program to calculate fault analysis for **Chrysler Belvedere in Illinois**. I used the project for my thesis at Wayne State University and as part of the requirement for my thesis. Professor Szymanski approved my work as a programming stepping-stone. Electrical computation brought me fame and credit and got me nominated as **the Outstanding Young Engineer of the Year,** an award established by the engineering society of Detroit, the world center of the auto industry, to honor young men under 30 in the engineering profession who'd displayed exceptional ability in technology.

.

Computerization made an impact on meeting project deadlines by faster computation. Therefore more funding became available through our management to hire more programmers and expand our services. We kept on writing articles to keep designers informed of new approaches and computer programs available for their applications that would save time and costs. I participated in major power engineering conferences and committees and kept exchanging information with the International Institute of Electrical and Electronics Engineers to make sure standards requirements for the design of facilities' power systems were fully implemented in our software.

WAYNE STATE UNIVERSITY

COLLEGE OF ENGINEERING — DETROIT 2, MICHIGAN

DEPARTMENT OF ELECTRICAL ENGINEERING

May 6, 1966

Mr. Robert C. Lang, Chairman
Outstanding Young Engineer Award Committee
The Engineering Society of Detroit
100 Farnsworth Avenue
Detroit, Michigan 48202

Dear Mr. Lang:

I understand that Mr. Moussavi-Nasle has been nominated for the "Outstanding Young Engineer Award." I am very pleased to hear this! I have known him for three years now both as one of my students and, more recently, as one of our part-time faculty. He is outstanding in both respects and, in addition, is the most sincere and hardworking student from a foreign country that I have had in many years.

I am also very pleased that he, as one of our alumni, has achieved such tremendous strides in his professional development and experience as a practicing engineer. I feel he is most worthy of receiving this award.

Sincerely yours,
E A Szymanski
E. A. Szymanski, Professor
Electrical Engineering

EAS:h

Professor Szymanski, while I was a student at Wayne State University, gave me the opportunity to teach Electrical System Laboratory as well as computer application in power system, a pleasant turning point in my life.

FORM 531 - 10M 11-65

WAYNE STATE UNIVERSITY

DETROIT 2, MICHIGAN

NOTICE OF APPOINTMENT OR PERSONNEL CHANGE

Changes in Data As Checked Below

Name	Assign. Code	2-7 File No.	8 Assgn Code	10 First Name	11 Middle Name(s)	12-27 Last Name	
X		05666		Ali	(nmn)	Moussavi-Masle	Mr.

Address	31-37 Telephone No.	39-43 Street No.	44-59 Street Name	60-72 City	73-74 Zone	75-78 State
X	874-2734	660	Hazelwood	Detroit,	Mich.	48202

Master	28-29 P.T. Pay Code	31-32 S.R.D.C.	33-44 Account Number(s)	45-46 Percent of Acct.	47 No. of Accts.	48-53 Rate	54 Incre. Code	55-58 Service Class	59-60 Dep.	61-63 Bond	64 Union
X			105-0500-401-001		1	4/20-$134 5/20-$134 6/20-$134	-	6071	2		

65-66 Retire	67 U/F	68-71 Insurance	73 Med.	74-75 Percent of Time	76-77 P/Code	78-80 Eff. Pay - Wk. - Yr.
				.25	5	

Status	33 Cont. Code	34 Degree Code	35 CIT.	38 SEX	39 MAR.	40-48 Social Security No.	49-54 Birth Date Mo. Day Yr.	55-60 Hire Date Mo. Day Yr.	61-63 Prev. W.S.U.
X	-	1	4	1	2	363-44-0771	5-25-38	3-30-66	No

Date of this Notice	Description of Personnel Change	Effective Date
April 15,1966	Assignment	March 30,1966

From Payroll No. ____

Classification	Department	College or Division	Fraction of Time

Rate Per Hr.	Rate Semi-Monthly	Pay Periods Per Yr.	Annual Equivalent	Account Number(s)	Percent of Pay

To Payroll No. 5

Classification	Department	College or Division	Fraction of Time
the Part-time Faculty	Electrical Engineering	Engineering	25%

Rate Per Hr.	Rate Semi-Monthly	Pay Periods Per Yr.	Annual Equivalent	Contract Period	Increment Period
$10.00			$402/qtr.	Spring Quarter of 1966	-

mrs Non Board

EMPLOYEE COPY

MY TEACHING CONTRACT