Computers Changed the Way We Work

Compiled from interviews, Winter 2008

First there were the room-filling IBM mainframe computers, then the Texas Instruments calculators and the Wang word processors. By the 1970's we had moved into the Computer Age, bringing changes and improvements to our work processes and products.

In the early part of the 1970's, the Bureau of Public Roads (BPR) began a new era when it was moved from the Department of the Interior to the Department of Transportation and reorganized as the Federal Highway Administration (FHWA). The new identity happened to coincide with a move into another new era: the Computer Age.

Willis Grafe, who worked for BPR in the Vancouver, Washington, office through much of the 1950's, recalled that by the 1970's the big mainframe computers in headquarters were available to the field offices for many applications, and that the field offices were "wired into Washington." That was "bad news," he said, because states would send drivers license registrations "into Washington to see if (applicants) had a record anywhere in the U.S. So they were using up all of (the computer) capacity a lot of the time."

Willis was working in Headquarters at the time of his retirement in 1976, but didn't fail to notice that **John Mors**, Director of the Office of Federal Highway Projects in Vancouver, was a driving force in bringing Wang computers to FHWA. "John was a real innovator," Willis said. "He brought them into the modern day. He challenged them."

While the Wang desk top word processing system streamlined preparation of correspondence and many other office tasks, it was the introduction of a small device offered by Texas Instruments that made the engineers' calculations go much faster. **Ray Westby** remembered that just before he retired in 1982, he helped **Pat Wlaschin**, the hydraulics engineer at Western Direct Federal Division (WDFD), get training for the new product. "Those little computers...would do a lot if you knew how to do it," Ray said. Pat became the office expert, Ray observed, and "he taught quite a few of the guys around here how to use them."

Texas Instruments introduced the TI-59 Programmable Calculator in the 1970's.

Ray also recalled that WDFD was probably one of the first FHWA offices to get IBM computers. "It took a whole room to take care of all (of) what one of these little ones does now," he said, and the room had to be "ventilated, air conditioned. It was chuck full of enormous equipment."

John Bucholtz also remembered that old IBM. "Where the rest rooms are upstairs, that's where Design stopped and there was a fire door there." Aside from a small coffee room, there was nothing but warehouse beyond that fire door. "Finally, along the warehouse area," he said, "they built some offices right by the windows," including the computer room. "They would program it with boards and wires," John added. He remembered that **George Robertson** showed him a computer print-out covered in 0's and 1's. "They'd have to learn how to read that... It was quite crude."

Ray remembered that **LeRoy Borstad** was heavily involved in programming once computers came into this office and that he was in charge of computer operations. LeRoy came in from the field

about the time we got computers, John recalled. He and a few other field people wrote some of our first computer programs for design work. Because of their on-the-ground experience, John said, "they knew what they were doing when they designed the programs, and so the programs were very good." LeRoy and his team also continued to fine-tune the programs, making many modifications.

"When (headquarters) went to computer-assisted design, like they have now," John said, a group was put together "to take that program and convert it." Although WDFD's program had all of the kinks worked out of it, "they went back to the original basic program... They were trying to reinvent the wheel. That was a poor situation," John said, observing that they should have taken LeRoy's program and "gone with it, but they didn't. So they could never succeed."

Up until that time, John had worked mostly in drafting and design, but when computers came onto the scene he got involved in programming. "One summer when they were changing from one computer type of programming to another," he said, "they needed some work done in programming." A call went out for volunteers and a number of people from the field and the design staff stepped up to take programming courses at Clark College. Because they already had some experience with the programs, "we didn't start at the beginning," John said. "We basically started in the middle."

The instructor thought it was a recipe for failure when five or six students from FHWA came into his mid-level class. John remembers him saying, "this is impossible, you'll never learn it." But they always returned to the office after each day of class, he said, and "we'd work on it. We had our own little cubbyhole downstairs." There they had been given the time and space to practice and apply what they'd learned in class, and that's what they'd do for the rest of the day.

"He wasn't dealing with kids just out of high school, which most of Clark was at that time," John said. "He was dealing with people who were more mature—in their 20's and 30's." At the end of the term, the whole group passed their final test, and John noted, "the instructor says... 'You know, I'm amazed!'... He was proud of us. It was good."

By the time John retired in 1993, he was head of the CADD office and was teaching engineers how to use that system. They installed the CADD system in an upstairs office on the west side of the building, just north of the elevator. "We had two large black-and-white screens, a big digitizing table (we had two units and Survey had one)... We had one plotter." Acquisition of the CADD system thrust John into a study of workplace ergonomics: "I had to make an environment that would work for that."

At the time there were only bare lights in the room and no carpets anywhere in the building. He had carpeting laid in the room, partitioned it into two sections, and "I had these type of light fixtures put in," he said, pointing out the lighting now in that room. "We had two switches...so we could control the two sections of light." The CADD machines occupied the half of the room adjacent to the hallway and employees doing manual drafting sat on the side by the windows, to take advantage of the natural light. "People would walk in and... they'd say, 'ooh, this is just like a night club.' They thought that was kind of neat. Now I see you have this kind of lighting all over. It's easier on the eyes."

Look around the office today: There's a computer on every desk and employees think nothing of conducting the majority of their business electronically. In the space of an average FHWA career, computers have totally redefined the way we work and do business.

"When I retired, they hadn't gotten into the real computers," Ray Westby remembered. That was 1982, and "they were talking about it, but hadn't got into it yet."

Stories in this series have been developed by Marili Green Reilly from interviews and correspondence. Retirees and employees are invited to send in their memories of our advancement into the computer age or other memories of work in the Vancouver office to marili.reilly@fhwa.dot.gov.