CLASSIFIEDS

FOR SALE

■ '96 Dodge Avenger ES, v6, sharp, 68K miles, brand new tires & brakes, Looks & drives like new, $11,900. Call (847) 438-3193 or Joe x3743.

■ '92 Nissan Stanza SE, 4dr sedan, 5 spd manual, a/c, pb,ps, pw, moon/sun roof, 58K miles, $5,500. K. Gray, x4013 or kgray@fnal.gov.

■ '89 Toyota Corolla, 120K miles, very good cond., 4 door, a/c, $3,500 x8614 or wolfram@fnal.gov.

■ '89 Ford Taurus Wagon, 105K miles, $1,300 (avail. mid Oct), x8614 or wolfram@fnal.gov.

■ '89 Honda Accord DX, White, 5 spd, am/fm/cd, clean, 135K miles, new cv joints, very recent brakes, front tires, timing belt, water pump, & alternator. Very good cond. runs great, $2500. Call x5768 or (630) 879 – 5650.

■ '86 VW Golf GTI 3-dr htchbk, black, 5-sp, 133K highway miles, a/c, CD am/fm, sunroof, tint windows, looks & runs great, no rust, maint. records for last 6 years, $1,950 obo. Dima x2409 or vavilov@fnal.gov.

■ '85 Honda Civic, 4 dr sedan, auto, a/c, 87K miles. Small cosmetic damage but runs smooth. Good local getting-around car. $800 o.b.o. Contact John, x6088 or johnzhou@fnal.gov.

■ '85 Bronco ll, 105K miles, 5 spd, V-6. Good winter transportation, $900 obo. dfreeman@fnal.gov or (630) 588–8037.

■ Mountain Bike, 18 1/2″ Gary Fisher, 18 spd, like new, accessories included, $200 obo. Carol (630) 969–6330.

■ 30 used Iomega & Fuji 100 Mb zip disks, $7 each, georges@fnal or x4515.

■ House, 10 acres of country living, great for horses, 3 bd, 2 bath 2 1/2 garage, living rm w/ fireplace & vaulted ceiling, oak throughout, gazebos, 76' deck, asphalt drive, fruit trees, storage bldgs, plus income. Lake Holiday vicinity (Sandwich/Somonauk area), $239,900. (815) 498–9402.

RENT

■ House, adorable little 2 bdrm, overlooking Fox River. Front porch, lrg private yard, surrounded by trees, 2 garage w/plenty of storage space, fireplace, lawn-care & yard eq. for tenant use, close to lab, $650/mo. Call Linda, (757) 930-1463 or (757) 269-7308.

WANTED

■ Garage space for classic vehicle storage Nov 99-Apr 99. Don Carpenter, (630) 406-6941, x3366 or donc@fnal.gov.

■ Astrophysicist/computer programmer to help develop program for ancient night sky. I am researching/writing book that will discuss implications of paleomagnetic reversals & the mechanism that created changing night sky according to ancient histories. Will collaborate findings. Please call Elenore (630) 736-8459 or tomlen3@earthlink.net.

■ Looking for cheap Notebook PC w/modem, suitable for WP, e-mail, etc. Will pay bottom dollar for yesterday's technology, but no Etch-a-sketches please! Contact Paula, x4505, lambertz@fnal.gov.

FREE

■ 12 yr old Siamese male, chocolate point, neutered & declawed, loves to cuddle & very vocal. Call x3316 or poore@fnal.gov.

CALENDAR

OCTOBER 3

Fermilab Art Series presents: *The Lark Quartet with Peter Schickele.* $19. Performance begins at 8 p.m. Ramsey Auditorium, Wilson Hall. For tickets or more information, (630) 840-ARTS.

OCTOBER 4

The Fermilab Barnstormers Radio Control Model Club will host Control Line Contest. This is the last event of the season. Flying begins at 10 AM and continues through the late afternoon. Two different events will be held including a Fox Sport Race & Carrier event. The Fox Sport race is limited to a specific engine size & aircraft type. Three racers fly at one time making for an exciting event. The Carrier event includes a takeoff from a simulated aircraft carrier, both fast and slow flight, eventually leading to a carrier landing. For further info, call Fred Krueger, x5516, or Alan Hahn, x2987.

OCTOBER 6

Wellness Works presents: *"Big Brothers Big Sisters"*, Kelly Clason & Janice Smith, Curia II, noon – 1 p.m.

OCTOBER 9

Fermilab International Film Society presents: *8 1/2* Dir: Federico Fellini, (Italy, 1963, 135 mins). Film at 8 p.m., Ramsey Auditorium, Wilson Hall. Admission $4. (630) 840-8000.

OCTOBER 11

Barn dance, Kuhn Village Barn, 7 - 10 p.m. Music by the Hired Honchos & calling by Bill Sudkamp. Dances are taught, all ages & experience levels welcome. Admission is $5, children under 12, free (12-18 $2). Barn dance sponsored by the Fermilab Folk Club. For more info, contact Lynn Garren, x2061 or Dave Harding, x2971.

OCTOBER 13

Smoking Cessation Programs. Orientation meeting, 1 West, Noon - 1, by Kenneth Kessler, Ph.D., Rush-Copley Medical Center.

OCTOBER 15

All employee's volunteer work day, every 3rd Thursday. Keeping our lab clean.

LAB NOTES

Charities Program

The Charities Program has a new procedure this year. Check out the Fermilab at Work web page for directions & instructions how to properly fill out your form. If you have any questions, concerns, need assistance or do not have access to the web you may request paper forms by phoning Ruby Coiley, x8365. http://www.fnal.gov/faw/charities/charity.html

Winter Recreation

To stay in shape, get in shape or just have fun check out the recreation web page. Many classes and leagues are starting up. See http://fnalpubs.fnal.gov/benedept/recreation/recreation.html.

MILESTONES

RETIRING

James Szyplik, I.D. # 8912, from Laboratory Services / Visual Media Services on October 9.

DIED

Bob Jackson, former machinist, on September 7.

FermiNews
Fermi National Accelerator Laboratory

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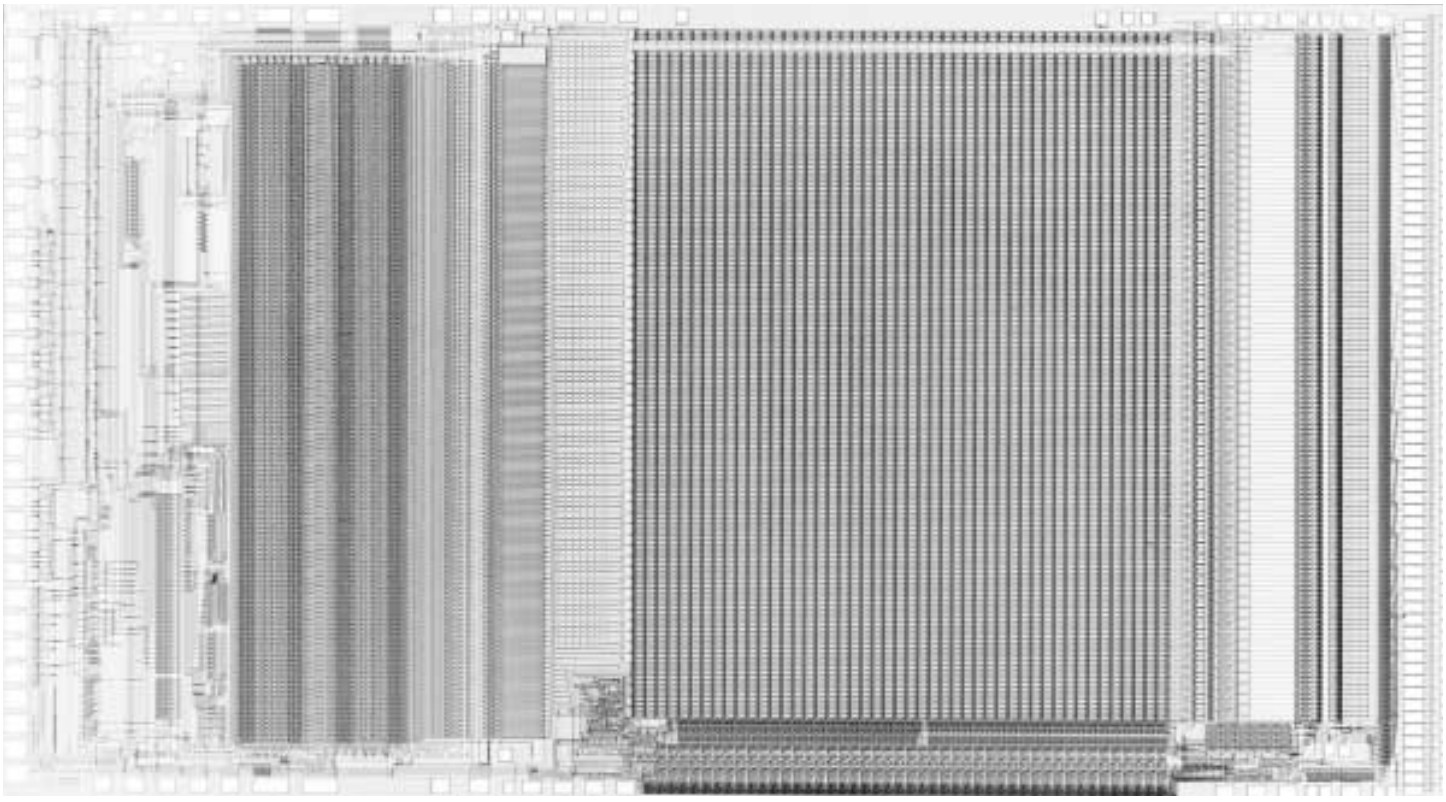
FermiNews

Fermi National Accelerator Laboratory

Volume 21 **Friday, October 2, 1998** **Number 19**



Photos by Reidar Hahn

This highly magnified SVX3 chip, with enough miniature electronic circuitry to blow your mind, measures a mere 6.3 mm by 12 mm.

INSIDE

The SVX3: CDF's New Miracle Chip

Fermilab's alchemists turn ideas into silicon—silicon chips, that is.

By Sharon Butler, Office of Public Affairs

"Oh yeah, I was sweatin'," said Tom Zimmerman, an electrical engineer at Fermilab. He laughed heartily, but there was a nervous edge to his joviality. "Especially toward the end." That was when, in the long three years of creating the now-famous, just-completed SVX3 chip for the CDF detector, the Fermilab director began asking, not so innocently, how things were going.

Zimmerman was Fermilab's lead engineer for the design of the SVX3—the upgraded chip that the CDF collaboration wanted to build for its detector for Run II.

The trouble is: The collaboration didn't want just an upgrade; it wanted a miracle.

Both Zimmerman and his boss, Ray Yarema, head of Fermilab's Electronics Support Group, had doubts about whether they could deliver. They had offered no guarantees back in 1995, when the collaboration first entertained the idea of a new chip design.

continued on page 2

" I like to think we turn ideas, dreams, into silicon—silicon chips, that is."

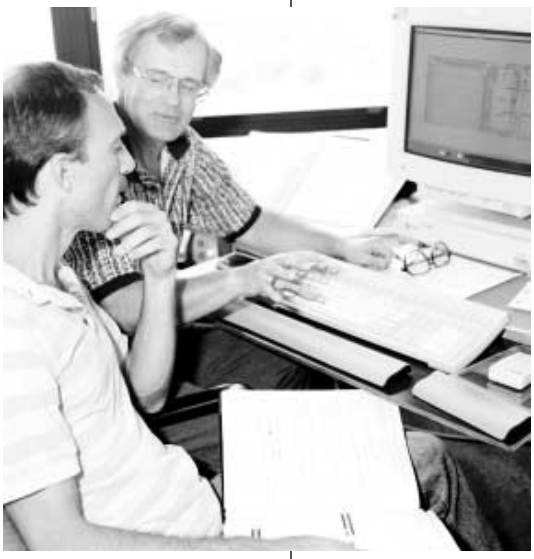
~ Ray Yarema
Head, Electronics Support Group

SVX Upgrade

The CDF collaboration used first-generation SVX readout chips in its detector during Run I, with stunning success. The readout chips sit next to, and are in fact bonded to, silicon strip detectors. These are ever so tiny detectors, each strip a mere 50 microns in width. Wrapped around the beam, they lie close to the point where protons and antiprotons collide, close enough to track and isolate the decay products of bottom and charm particles that might otherwise escape notice. As particles whiz by, the detectors fire; the information is "read out" by the SVX chips and converted into digital signals that are sent on to a bank of fast-thinking computers.

In Run I, the time between particle collisions was roughly 3 microseconds; in Run II, that time will be shortened to a mere 132 nanoseconds (132 billionths of a second). With more collisions per unit time, the original SVX chips needed to be upgraded to acquire and read out data much more quickly.

Both the CDF and the DZero collaborations signed up for SVX2, a second-generation readout chip upgrading the original SVX chip. According to Zimmerman, the key feature in this new chip was the ability to store analog information and convert it to a digital signal.



Photos by Reidar Hahn

Tom Zimmerman (left) was the lead engineer for the design and development of the SVX3 chip. Ray Yarema heads the internationally recognized ASIC group at Fermilab.

"Forming a trigger takes a finite amount of time," Zimmerman explained, referring to the decision by external circuitry whether to save for further analysis the information captured by the detectors. "You have to save the information from lots of collisions to provide enough time for computers to decide whether the signals should be recorded or discarded."

In the SVX2 chip, a charge integrator at the front end converts the charges from the strip detectors to voltages and amplifies them. The voltages from, say, 40 hits [or collisions] are stored in capacitors in what is called an analog pipeline. An external trigger decides whether the information from any given hit should be recorded. If so, the voltage of interest is sent to an analog-to-digital converter on the back end of the chip, and the information is converted into a digital signal. In contrast, the original SVX had no analog pipeline and simply presented the voltage to an output in analog form. With the conversion done right on the chip, the external electronics are simplified and readout is faster and cleaner.

The new, and successful, SVX2 design was the collaborative effort of Fermilab and Zimmerman's counterpart at Lawrence Berkeley National Laboratory, Oren Milgrome.

But then, in 1995, according to Jeff Spalding, manager of the SVX upgrade project for CDF, the collaboration decided it wanted "to guarantee the high p_t (high transverse momentum) physics and to extend the collaboration's *B* physics capability." In particular, it wanted a new chip—SVX3—with no dead time.

Dead time refers to the time the chip is not acquiring information from the collisions occurring in the detector because the chip is busy converting analog information to digital information and reading it out. Eliminating dead time requires isolation of the digital end to keep the noise in the readout from corrupting the incoming signal.

CRITICAL PATH

Spalding recognized that the requirement of no dead time "was a significant complication, and high risk."

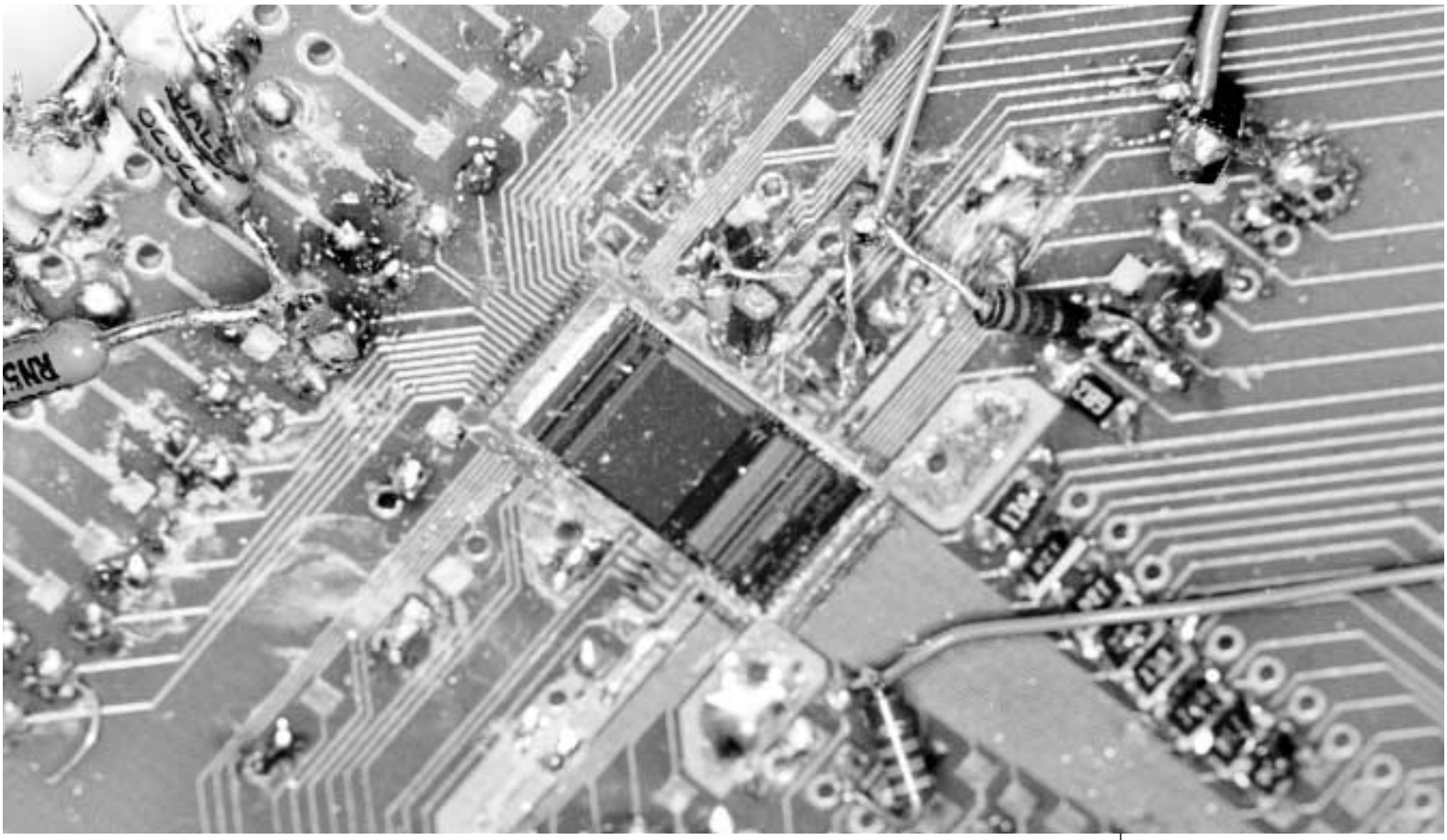
"Sure, we were nervous," he acknowledged. The CDF collaboration could have operated the chip with dead time. But Spalding said that "the technical effort and schedule delay would have been for naught [if the chip didn't succeed]. It was a calculated risk."

The ASIC Group

The task of pulling together the third-generation SVX chip design, the SVX3, fell to Zimmerman, one of five staff in the ASIC (Application Specific Integrated Circuits) group. The other members are Ahmed Boubekeur, Jim Hoff, Abderrezak Mekkaoui and Alpana Shenai. Focusing on fully customized chips incorporating both analog and digital circuits, the group is recognized throughout the international high-energy physics community for its designs and creativity.

"I like to think we turn ideas, dreams, into silicon—silicon chips, that is," said Yarema. "In the old days, alchemists tried to turn common metals into gold. The silicon chips we make today are made from sand and, ounce for ounce, are more valuable than gold."

ASIC design, he said, "is an expensive, dynamic and fast-moving business"—so fast, in fact, that "one of our biggest challenges is getting a design into production before the process in which it is designed becomes obsolete."



The SVX3 chip is fixed to a circuit board for testing.

Success

At first, the idea for SVX3 was to link two chips—one, the analog front end, Zimmerman's responsibility; the other, the digital back end, LBNL's responsibility. But the two-part design posed difficulties, among them testing problems.

Zimmerman's breakthrough was an idea never attempted at the Lab before. He proposed using the low-resistance substrate of the chip as a ground plane to suppress the noise from the digital part of the circuit and prevent it from swamping the analog part. The technique was feasible because Fermilab's chips are not "packaged," as commercial chips are; they are not embedded in plastic with metal leads, including ground wires, sticking out. To save space in the close quarters around the tiny beam, Fermilab uses bare chips.

In SVX3, then, Zimmerman proposed that "the analog ground connections of the chip run through the substrate itself." This technique allowed the integration of the two-part design on one chip.

The chip went through many iterations over its three-year design and development history, facing occasional advances and many setbacks. Simulations of the circuitry were run using a computer program called SPICE, and the chip was laid out with a program called MAGIC. A Hewlett Packard silicon chip foundry manufactured prototypes.

"There were several stages of prototypes. Each time we got a prototype back, we improved and modified it, and fixed mistakes, slowly converging on the final product," said Zimmerman. A crew of electronics and physics staff at Fermilab, LBNL, and the University of Pittsburgh tested the chip at each stage.

"Last year, we did our last radiation-soft prototype and verified its performance, and it was almost acceptable," Zimmerman said with a laugh. "So then we decided to try a radiation-hard prototype, and it was satisfactory—almost." Another laugh. "Finally, we decided to go to radiation-hard production (at a Honeywell foundry)—with a few last changes."

"We got our first production chips in June," Zimmerman said, "and declared it a success."

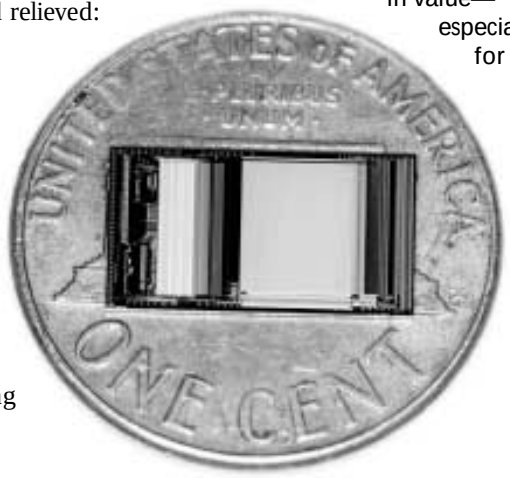
Spalding was thrilled—and relieved: "They pulled it off!"

Zimmerman said, "I was as relieved as anybody that it worked. I knew I would either look really bad or be a hero."

But success has its down side. "The problem is you build up this reputation, and people think you can do anything," Zimmerman said. "I don't want this great reputation, with people thinking I can work miracles."

SVX4, perhaps? ■

The SVX3 is smaller than a penny, but far larger in value—especially for CDF.



And Now...
A Word About Those *Other* Beams

Pilot project begins repairing beams of Wilson Hall, correcting problems from the original construction.

by Mike Perricone, Office of Public Affairs

At Fermilab, "beams" usually refers to collections of protons and antiprotons accelerated near the speed of light.

But another critical set of beams moves much more slowly, shifting perhaps five millimeters during a full year's worth of wind, rain, snow and temperature changes. They're made of mundane materials: chipped stone or gravel, sand, cement and water.

These beams are the focus of a five-year, $18.5-million repair project to correct a puzzling oversight in the construction of Wilson Hall, the twin-tower, 16-story nerve center of Fermilab.

The design called for steel slip plates between some of the beams and girders, allowing for movement as the building expanded and contracted. But slip plates were omitted in many other locations, leaving concrete beams grinding on concrete girders—producing concrete chips that threatened a meteor shower in Wilson Hall's atrium.

"Slip plates are used in bridges all the time," said David Nevin, head of the Facilities Engineering Services Section (FESS). "One side of a beam is anchored, and the other side has a slip plate to allow for expansion. Once we have the concrete in the beams restored, and have the slip plates in place—at about $125 a pair—we'll be in great shape. It's that simple."

The theory is simple, but the process is not. The first stage of the repair project involved bracing up the girders with steel brackets and dressing the joints in cloth wrappers to catch any spalling concrete.

The next stage has now begun, a pilot project on the 11th and 12th floors testing repair methods that will eventually be applied to more than 60 concrete beams comprising several different designs in the north and south crossovers of the High Rise.

During its construction, Wilson Hall was redesigned to incorporate post-tensioning concrete techniques. Post-tensioning involves pouring concrete around steel cables that extend from end to end of a beam. When the concrete hardens, the steel cables are pulled tight and anchored, putting the concrete beam into compression—the state offering concrete's greatest strength. Post-tensioned concrete allows for long spans, thin beams and the freedom for curving, soaring designs.

FESS engineers have found that post-tensioning creates major headaches for repairs. Their first approach was to chip out a spot in the middle of the beam; snip the steel cables and remove them; chip away the eroded beam ends and install slip plates; thread in new cables; pour new concrete to repair the beam ends; apply post-tensioning after the concrete hardened, and have a beam that was better than new.

Photos by Reidar Hahn

Fred Brunner of FESS inspects progress on beam repairs, part of the $18.5 million Wilson Hall repair project.

"But what we've encountered," said Fred Brunner of FESS, "is that pulling the existing post-tension (cables) out of there is a far more arduous effort than we anticipated. Hours became days, and the possible cost would be prohibitive."

The original cables were sheathed in hard plastic. But the first 12 to 15 inches of the covering had been clipped off before the concrete was cast, completely binding the cables and leaving deposits in the tubes. The ends of the cables had been shorn, so there wasn't a "pig-tail" extending from the end of the beam to provide a hand-hold for pulling out the cable.

"It's always hard to speculate about original construction," said Elaine McCluskey of FESS, "but you're really not supposed to have to go back in the way we're doing with these repairs."

Since the beams and post-tensioning cables were found to be structurally sound, FESS is developing alternate approaches. One variation involves chipping away enough eroded concrete to attach slip plates to the beam, then rebuilding the girder. The second would re-support the beam with a "saddle" unit which would have slip plates attached to it.

Both methods involve shoring up the floor from below. In the case of the pilot project, that means placing shoring on the 10th floor to support the work on 11 and 12. At the south end of the building, floors 13, 14 and 15 jut out incrementally over the atrium, so the contractor selected for the full project will have to do some creative shoring. Nevin, McCluskey and Brunner envision adding brackets to columns on each side of the tower both inside and outside the building to hold trusses that would support a "bridge" under the 13th floor. The higher floors would then be shored up with inverted pyramid scaffolding from the lower floors while repairs were made.

At the north end, above the main entrance, floors stack straight from the seventh floor upward. The seventh floor will be shored with scaffolding from the floor of the atrium, nearly 90 feet below, without interrupting comings and goings on the ground level.

Employees in the north end crossovers will have to move out of their quarters during repairs, as people have discovered on the 10th, 11th and 12th floors. Another disruption: the rest rooms will be closed as each crossover undergoes repairs. The Wilson Hall project includes replacing the plumbing, with new risers carrying water from bottom to top of the High Rise. The old riser was made of two dissimilar metals, copper and steel; adding water created a battery, producing corrosion and special effects.

"One bright afternoon about a year ago, we suddenly had a beautiful waterfall coming out in the atrium," Nevin recalled. "The pressure in the riser near the ground floor is about 120 PSI, and when water starts coming out, it gets very exciting."

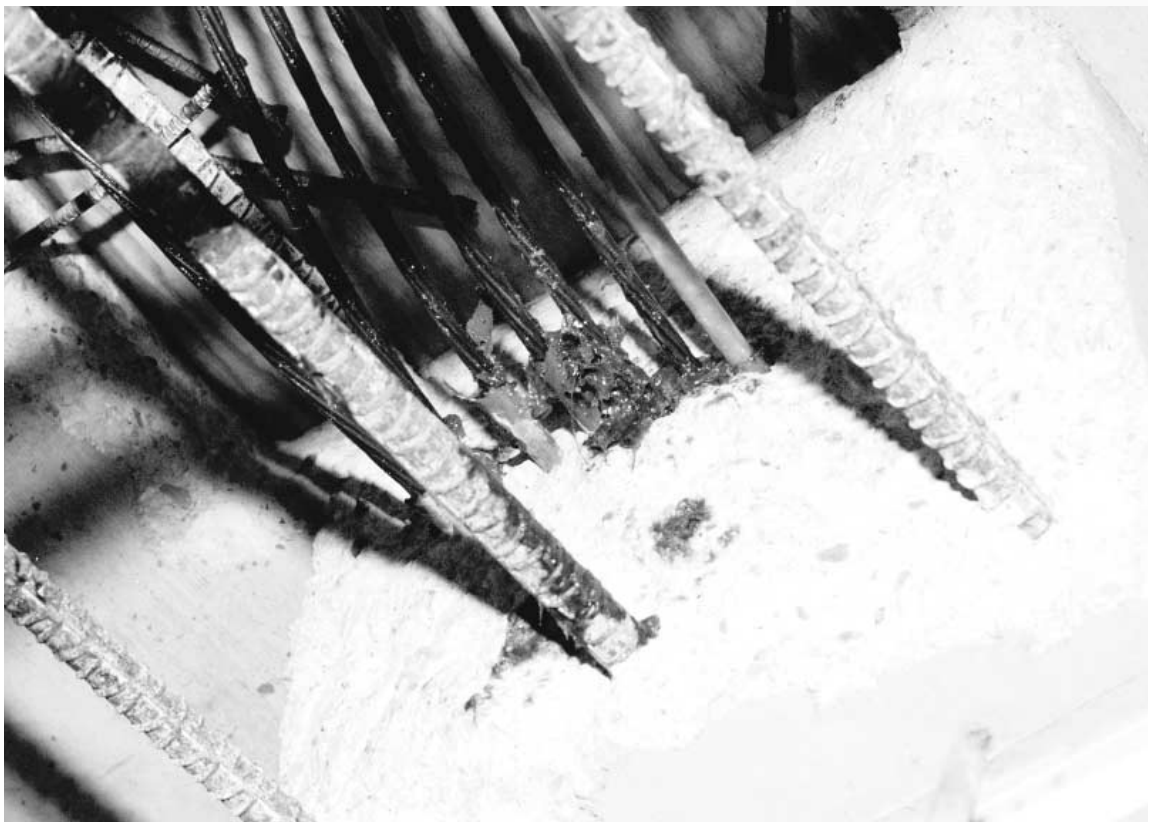
There was also excitement in the spring of 1993, when a piece of concrete fell through the sloping glass above the cafeteria. Those glass panels will be replaced with laminated safety glass— but each of those 73 glass panels is uniquely shaped and will serve as its own template.

Brunner said FESS hopes to begin a final design plan for the project within a month or so, with contractors asked to submit bids in the summer of 1999.

FESS expects the entire project to be completed in 2002, and this time they'll make sure all the slip plates are in place when the job is done. ■

Post-tensioning cables originally were sheathed in hard plastic and encased in the concrete beams.

As part of the pilot project, new cables were threaded through this beam. New concrete will be poured to repair the area that was chipped away, and the cables will be re-tensioned when the concrete hardens. FESS found this process to be long and costly.



Ladies of the Lathe

For the first time, women have bored their way into Fermilab's Machine Shop.

by Sharon Butler, Office of Public Affairs

All dolled up in blue denim work aprons and plastic safety glasses, Alice Laroche and Raven Wortman marched onto the Machine Shop floor in Lab 2, planted their steel-toed boots in front of a wicked-looking lathe, and quickly set to work.

Laroche and Wortman are the first women to be admitted to Fermilab's five-year apprenticeship program for instrument machinists. They haven't been the brunt of any good-natured ribbing yet, but Laroche said, with a laugh, they're prepared to give as good as they get.

Rosie the Riveter was the World War II poster girl used to recruit women to jobs in factories and shipyards.

Though new to Fermilab's Machine Shop, women have been in the machine-tooling trade at least since World War II, when the need for weaponry and vehicles spurred the development of new technologies for cutting and shaping metal. With men away fighting at the battlefront, women were called on to fill the millions of civilian and defense jobs in factories and shipyards. In fact, to recruit women, a poster girl was created: Rosie the Riveter.

According to Jim Schmidt, who headed the committee overseeing Fermilab's apprenticeship program this year, Laroche and Wortman stood out in the crowd of 28 that applied.

The criteria were "some sort of mechanical background, especially in a machine trade; good math skills; a good high-school or college record; and desire." Schmidt said. "Desire is probably the biggest. You have to want to make something that will be useful. A portion of your soul goes into this job."

Laroche worked for 19 years at Bison Gear Engineering Corporation setting up machinery for the operators to run. She wasn't learning much, she said; the shop was a production line, making the same piece day after day. At Fermilab, she could get the training she needed for certification, and the work promised to be more interesting.

Wortman, fresh out of high school in 1997, attended a two-year vocational program in machine tooling. Her uncle, who works as a locksmith at Fermilab, had seen an announcement for the apprenticeship program tacked up on a bulletin board.

"These ladies are both highly qualified," said Charles Matthews, head of Fermilab's Machine Shop. "I'm expecting great things of them."

In its early years, Fermilab ran a vigorous apprenticeship program to train new machinists to build precise but exotic parts for its high-energy physics research tools. In the mid-1980s, the program languished because of budget constraints, but it was revived six years ago by Paul Mantsch, then head of the Technical Services Section, and Matthews.

Only two months into the program, Laroche and Wortman already describe it as

Left: Alice Laroche practices her craft.

Below: Raven Wortman gets some tips from veteran instrument machinist Don Fisher.

Photos by Reidar Hahn

" You have to want to make something that will be useful. A portion of your soul goes into this job."

~ Jim Schmidt, Supervisor, Wilson Hall Machine Shop

"intense." For the first six months, they are assigned to a tutor on the floor, master instrument maker Don Fisher, an old hand at machine tooling. Together with Fisher and the other new apprentice, Gary Markiewicz, they are sequestered in Lab 2 ("Maybe they're afraid of us," joked Laroche), where drills, lathes, mills and saws have been set up to teach them the basics: how to bore a hole concentric with the outer diameter of a cylinder, how to cut a thread inside a hole. After the first six months, they'll join the other machinists in the permanent machine shops. Then they'll look official, with toolboxes under their arms. (Any retired machinists out there? Laroche is looking to buy used tools. New ones are expensive; a new V-block alone would set her back $300.)

Meanwhile, under the tutelage of Fermilab mechanical engineer Lou Kula, Laroche and Wortman have started their five-hours-a-week classroom training in math, blueprint reading, drafting, and tooling techniques. Already, they've gone home with a pile of books in trigonometry and algebra, and a pile of homework.

The apprenticeship program involves 10,000 hours of training over five years. Laroche and Wortman will learn all the tricks of the trade: how to weld, run lathes and mills, work sheet metal and repair machines. They'll take a machine apart, and put it back together again. And in the last year, they'll learn how to run computerized, or "computer numerically controlled," machines and drawing with computer-aided design programs.

"We teach [the apprentices] to think critically, to have confidence and to go about a job in an organized manner," said Matthews.

Safety is a big thing, too, Laroche noted. She has "wiped the slate clean" and is starting afresh in her shop skills. "I feel like I've been doing it all wrong up 'til now," she said. Nodding in agreement, Wortman said, "We didn't learn things in school as good as we should have, but I'm learning the right way now."

At the end of the five years, the two women will be handed certificates and formally inducted into the International Association of Machinists and Aerospace Workers as journeymen instrument machinists.

Then, along with the other 32 machinists now at Fermilab, they'll be making the specialized adapters, spools, valves and copper buses for the Main Injector, or the one-of-a-kind alignment fixtures for the Recycler.

Warned that they might also have to do some oddball projects—it was the Machine Shop that cut and pieced together the battleship wings that made founding director Robert Wilson's Broken Symmetry sculpture—both women declared, almost in unison: "Cool!" ■

Light at the End of the Tunnel

Beams Division Open House offers an unusual view of the people, parts and processes involved with accelerators before commissioning of the Main Injector.

Ralph Pasquinelli discourses on antiprotons at AP0.

More than 100 volunteers from the Beams Division took well-established principles of Fermilab project management and put on a smoothly-executed display for more than 400 Lab employees at the Beams Division Open House on September 11.

The tour encompassed all the accelerators, from the Cockroft-Walton on to the Tevatron, highlighting the soon-to-be-commissioned Main Injector with a walk through more than 1,000 feet of the recently-completed tunnel.

"I think the tour guides actually might have had more fun than the people on the tour," said Beams Division Operations Head Bob Mau. "Their voices were worn pretty thin by the end of the day." ■

Paul Gentry demonstrates specially-designed tools used in the repair of the Low Conductivity Water (LCW) system.

Dan Johnson points out some data on the monitors in the Main Control Room.

Photos by Reidar Hahn

Oversized tools draw attention at the Central Helium Liquefier building.

Steve O'Day shows off the lithium lens at AP0.

Something for Everyone

by Sharon Butler, Office of Public Affairs

When Andreas Kronfeld rings his cowbell, everybody listens.

It's the call to the Wednesday afternoon colloquium, a venerable tradition in keeping with the academic environment at Fermilab. The colloquium series covers a mix of topics: high-energy physics, of course, but also other areas of physics, other sciences, technology, and public policy relevant to science.

This year, Kronfeld and his committee of nine others are planning to have more general-interest talks, too—and drawing attention to them by printing flyers in green lettering (*g*reen for *g*eneral) instead of the usual orange-red. Last year's colloquium titled "Materials for the Third Millennium: Quantumsteel Meets Frankensteel," a subject of interest to engineers, was so well received that it spurred the committee to consider planning talks for an even broader audience.

The first such colloquium, on October 21, will be "Taking Physics to the Park," by Ronen Mir, from Tel Aviv University. Mir, a particle physicist and Scientific Director of the Garden of Science at the Weizmann Institute of Science, delights in bringing science, especially science at the forefront of research, to a general audience.

Kronfeld emphasized that the increase in general topics is not meant to, in his words, "dumb down" the colloquia. Rather, the committee is hoping to expand the audience and welcome everyone, offering appealing intellectual discussion not just to physicists, engineers and computer scientists, but to secretaries, librarians, writers and businessmen as well.

Ideas for speakers and topics come from a variety of sources: current research in the field, *Scientific American*, friends, Dad. Kronfeld, whose father is a veterinarian, became obsessed two years ago with Mad Cow disease, and invited a University of Wisconsin professor to speak on the issue. Committee member and CDF physicist Michael Albrow, who contacted Mir, got the idea from Olivia Diaz, director of the SciTech museum in Aurora. Harvard University graduate student Maria Spiropulu, another committee member, combs the roster of physics professors at her alma mater for possible speakers. For this series, she's invited Juan Maldacena, the Argentine theorist who has stirred new excitement in high-energy physics circles by proposing a way of uniting quantum field theory and string theory, using strings and "D-branes." The committee is still trying to coax Linus Torvalds, creator of the Linux operating system, to come, enticing him with a VIP tour of Fermilab and a gourmet lunch at Chez Léon—the treatment guest speakers receive, all expenses paid.

Fermilab's own often serve as speakers. Last year, theorist Chris Hill gave a talk titled "A Brief History of Mass," and physicist Alvin Tollestrup, the first spokesperson of CDF, recounted the 20-year history of the collaboration. On December 9, Heidi Newberg will give a talk on the Sloan Digital Sky Survey, a collaborative effort of more than 130 scientists in the U.S. and Japan to map a quarter of the sky, reaching back 1.5 billion light-years.

See http://www-ppd.fnal.gov/epp_www/colloq/colloq.html for an up-to-date agenda for 1989-99. And, if anyone has ideas for talks, feel free to contact one of the committee members. ■

Theoretical physicist Andreas Kronfeld rings the traditional cowbell to call everyone to the Wednesday afternoon colloquium.

Photo by Reidar Hahn

Richardson's Finishing Touch: Pledge of Continued Commitment

by Mike Perricone, Office of Public Affairs

As he prepared to tighten the bolts on the last magnet, signifying the completion of the six-year, $229-million Main Injector Project, Secretary of Energy Bill Richardson saw the ceremonial wrench clatter to the floor of the tunnel.

"Whoops, there goes the project," he exclaimed, accompanied by the laughter of the assembled Fermilab and Department of Energy officials, along with many of the scientists and technicians who had a hand in building the new accelerator that will speed the Lab toward new frontiers in high-energy physics.

That humorously human moment only served to heighten the sense of optimism and enthusiasm that Richardson brought to the Lab on September 24, as he addressed the significance of the Main Injector and the future of high-energy physics research.

"We especially thank the workers," Richardson said, turning to the people who would sign the ceremonial plaque commemorating the machine's completion. "You're the ones who made this happen. You're the ones who brought this project in on time and under budget. America thanks you." He paused, then continued: "Just don't ask me for a raise, now."

There was more laughter, but Richardson was serious about the future concerns of scientists who will be asking DOE to show them the money.

"I pledge a continued and renewed commitment to this Lab from the Department of Energy," he said. "We know we have stable funding

Secretary of Energy Bill Richardson and Main Injector Project Manager Steve Holmes tighten bolts on the last magnet of Fermilab's newest accelerator, Director John Peoples looks on.

for the next three years, but I want to do more. We think we have the best scientists and the best facilities in the world. America is the world's pre-eminent power in science, but there is a race and others are catching up. We want to win that race and insure our position as Number One."

At an all-hands meeting with Fermilab employees in an overflowing Ramsey Auditorium, Senator Carol Moseley-Braun joined Richardson in stressing the importance of communicating the benefits of science to the American public.

"We must make the case for science," said Moseley-Braun, who, along with Congressman Dennis Hastert, had participated in ground-breaking ceremonies for the Main Injector project in 1993. "Demonstrating the importance of science will provide the foundation for stable funding."

"Often, there's no silver bullet in pure science," Richardson said. "But we have to compete with other national needs in the budget, so there is pressure to demonstrate the relevance and importance of science. We can demonstrate that we're worthy of support with scientific achievement, and with efficient, cost-effective project management—as with the Main Injector." ■

At Main Injector ceremonies, Secretary of Energy says 'I want to do more' to help future funding.

John Peoples, left, and DOE Fermilab Group Head Andy Mravca welcome the Secretary to Wilson Hall.

Chez Léon

MENU

Lunch served from
11:30 a.m. to 1 p.m.
$8 / person
Dinner served at 7 p.m.
$20 / person

For reservations, call x4512
Cakes for Special Occasions
Dietary Restrictions
Contact Tita, x3524
http://www.fnal.gov/faw/events/menus.html

Lunch
Wednesday
October 7

Lasagna Bolognese
Arugula and Sweet Red Peppers
Cappuccino Ice Cream
Chocolate Cinnamon Cookies

Dinner
Thursday
October 8

Curried Squash Soup
Crab Cakes with
Red Pepper Rouille
Green Beans with Tomatoes
Chocolate Soufflé
with Frangelico Creme Anglais

Lunch
Wednesday
October 14

Raspberry Chicken
Garlic Mashed Potatoes
with Scallions
Carrots Glazed with Madeira
Apple Walnut Cake

Dinner
Thursday
October 15

Roasted Garlic
with Goat Cheese
Bouillabaisse
Garden Green Salad
Pear and Almond Turnovers