

The Village Friend



fermi national accelerator laboratory

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NEW LIFE FOR OLD STEEL

How to salvage valuable steel components from defective magnets?

Answer: Pop 'em open from the inside using supercold and electricity ... then recycle the recovered pieces to rebuild the magnets.

Fermilab Meson Laboratory experimenters have originated a unique - and dramatic - process that provides a reprieve for essential steel in magnets that have failed in operation.

And initial results indicate significant cost savings. A side benefit is reduced air pollution over "burning" in a furnace, the traditional salvage method. "Magnet Separation" is the test procedure's technical name.

John O'Meara of Meson fathered the idea. He heads a crew at Lab 6, in the Village, that is bringing the concept out of the experimental state. O'Meara told a visitor that the technique requires passing high currents through the magnet windings so that they heat up rapidly. This results in high thermal expansion of the copper coils while the iron core remains cold.

"We knew that we had to heat up the windings within a few minutes to develop the proper temperature differences," O'Meara said. Bob Flora, Energy Doubler, pointed out that a current of approximately 1000 Amperes was required to heat our copper conductors this rapidly.

To date, the process has been applied to a pair of 3Q120 magnets. "3" means three-inch diameter beam pipe; "Q" signifies the variety - quadrupole (the focusing magnet that

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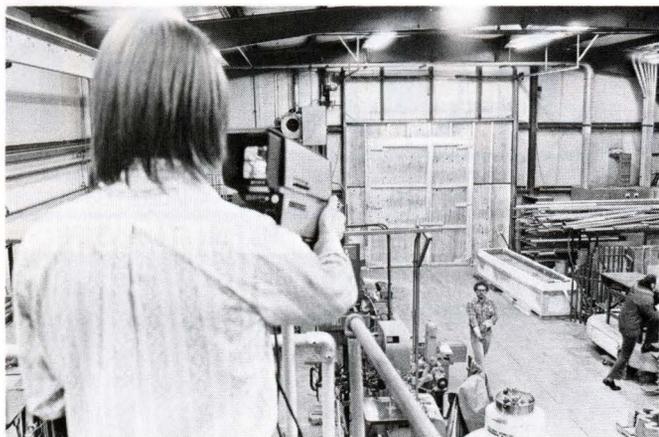
...Waiting for helium-bathed magnet to 'pop' as electricity is applied...



...Observing test are (L-R): P. Brindza, T. O'Brien, C. McGuire, J. O'Meara...



...R. Jensen is ankle-deep in helium fog after magnet separation...



...ABOVE - D. Schoo videotapes separation test for later analysis; RIGHT - salvaged steel is examined by H. Koecher...



NEW LIFE (Continued)

in the accelerator keeps accelerating particles in a pencil-like beam during acceleration); and "120," meaning 120 inches long.

The magnet "bathtub" is a wooden box measuring 12 feet by 2 feet deep and three-feet wide. A two-inch styrofoam liner separates the wood frame from a steel box inside, where liquid nitrogen runs through and around the magnet.

The process begins by filling up the bathtub with liquid nitrogen (-320°F) from a tank truck. After an hour in the cold bath, the coils are energized.

Turn-to-turn shorts and leakages to ground are typical magnet malfunctions, O'Meara said.

During last month's separation, the action was recorded on videotape and also in color and black and white still photos for analysis later. Each observer was issued safety glasses as a precaution; and the area around the bathtub was cleared during energizing.

Lab 6 people, attracted by the preparations, gathered around to watch. Tension mounted as electrical current raised: 200 amps, ...400 amps...600 amps...800 amps... 1000 amps ... the liquid nitrogen seemed to boil, as nitrogen vapors drifted from the surface and dropped onto the floor like fog.

Then, WUMPF! as the magnet shuddered and split open in the box. The top plate shifted, exposing the steel laminations and coils. Later the steel sections, in quarters, will be manually forced away from the coils.

Steel chunks are sorted and placed on skids for cleaning before reassembly.

Inspection after the separation showed one casualty: the bathtub. When the magnet top plate and insides separated, the plate was forced through a wall of the tub.

O'Meara estimates cost of the technique at about \$71 per magnet (\$70 for nitrogen; \$1 for electricity). This compares to a significantly higher expense incurred for traditional salvage operations. Currently, the procedure requires truck shipment to a heat treater in Indiana and burning in a furnace.

Bud Koecher, Bob Jensen, John Williams, and Cal Grayson of Meson Department built the apparatus. John Stoffel and Terry O'Brien of the Meson Department made the necessary power supply modifications.

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PINE STREET TRAFFIC

As those employees who regularly enter and leave the Laboratory from the west know far too well, there is a serious traffic problem at the intersection of Pine Street and Kirk Road.

Kirk Road is a high speed thoroughfare which borders the west side of the Laboratory. Pine Street is the Laboratory's main entrance; there are no traffic controls except for stop signs at the Pine Street approaches. Consequently, vehicles going to or from the Laboratory at this intersection often encounter considerable traffic back-up and delay, and entering and leaving the Laboratory by car can, at times, be risky.

The Laboratory has brought this matter to the attention of the highway officials on numerous occasions. The purpose was to prevail upon them to install a traffic activated control light as they have done at similar intersections elsewhere. Unfortunately, we have not been successful because the Pine Street traffic count does not meet the State regulated criteria.

Seeking an alternative to the problem, the Lab has endeavored to employ off-duty municipal police or county deputies to patrol the intersection during the morning and/or evening rush periods. This effort has also been unsuccessful since there were no volunteers for what was viewed as a hazardous assignment.

Notwithstanding the above, some progress has been made to make the Kirk Road-Pine Street intersection safer. Actions taken to date include the installation of two sodium vapor lights on either side of Kirk Road (especially helpful at night); a blinking warning-intersection light on Kirk Road, prior to Pine Street, for southbound Kirk Road traffic; the installation of yellow road markers at Pine Street exit, between right and left exiting lanes from the Laboratory to preclude right lane traffic from making left hand turns; and TV traffic pattern analyses of morning and evening conditions by our own staff.

More recently the Laboratory has learned that the county plans to replace the 4-way stop signs at Kirk Road and Wilson with a control light. This is an intersection about one mile north of the Pine Street entrance. According to John McCook, Associate Director for Administration, this light should tend to group the traffic flow and thereby make it easier to enter or cross the traffic pattern at Pine Street. Should this not prove the case, and as a last resort, Fermilab will consider installing a traffic control system at its own expense - a costly project requiring both federal and state approval.

In the meantime, motorists who use this entrance are urged to exercise caution and recognize that good judgment and reflex actions may be more important here than at normal intersections.

ACCELERATOR SHUTDOWN ENDS

A 14-day shutdown of Fermilab's accelerator ended last Thursday (Mar. 9). In a surprise announcement, the Department of Energy gave the Laboratory permission to resume experiments. Tuning of the accelerator preceded resumption of experimentation the following Friday. Fermilab administrators had already begun appeals of the shutdown order when permission to startup was received. About 10 experiments involving 100 scientists were affected. Experiments had been stalled since Feb. 22, following a DOE directive to keep the accelerator off after a maintenance period. The order was in connection with the United Mine Workers union coal strike.

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NEW PHOTOCOPYING RULES . . . Two notices from the Department of Energy will soon be posted on each copying machine at the Fermi Laboratory. One of these concerns items which may not be copied, and the other is designed to prevent copyright infringement.



ST. PATRICK'S DAY FESTIVITIES

Invite your favorite leprechaun to lunch! Fermilab's cafeteria will feature a "St. Patrick's Special Friday (Mar. 17). John Barry, cafeteria manager, says soured fish, Irish stew, motley bread, Irish soda bread and Dublin fruitcake with a special "Pub Delight" comprise the menu. Pamphlets listing recipes for Dublin fruitcake, Irish stew and Irish soda bread will be available at no charge.



ADAMS NAMED DEPUTY SAFETY HEAD



...R. Adams...

Robert Adams was named deputy head of the Safety Group effective Mar. 1, 1978. Dug Pinyan, senior safety officer, said the appointment will run through Feb. 28, 1979. Adams will be responsible for functions of the Safety Group during Pinyan's absence or unavailability. The new deputy head has served as safety engineer and hygiene coordinator since joining the Laboratory in 1973. Prior experience was as a safety officer at the University of Iowa, University of Illinois-Champaign, NASA and Alliance Insurance Co., where he was engineering manager. Adams is a certified safety professional and a licensed engineer.

CHILDREN'S EASTER EGG HUNT

Kids through age nine are invited to NALREC's 1978 Easter Egg Hunt. The event will be held at 1 p.m. Saturday, Mar. 25, east of the Village tennis courts. In case of inclement weather, the hunt will be held in the Village Barn. Prizes will be awarded to finders of specially marked eggs; the Easter rabbit will greet children. Egg hunters will need to supply their own baskets. Free admission!

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...1977 Easter Party scene...

STORK REPORT

Penny and Dr. Manolis Dris welcomed Stephanos to their family Mar. 3. The new arrival joined his parents and a brother, Anthony, 2. Stephanos weighed 7 lbs., 3 oz. and measured 19 in. Dr. Dris is a member of the University of Pennsylvania team on Exp. 395.

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PLEASE . . . SPARE OUR PLANTS

Complaints have been received from an employee who has had office plants damaged. Without permission, a person or persons unknown has been cutting slips from plants . . . and damaging them in the process. The culprit is requested to refrain from this practice. All employees are reminded to be respectful of each other's property. Let's remember the "Golden Rule."

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'MONTE CARLO NIGHT' COMING

Beat the "Income Tax Blues" by coming to NALREC's third Monte Carlo night. This event, scheduled for April 15 at the User's Center, has always been very popular. Valuable prizes will go to highest bidders using play money. Details will be announced.

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