DISCLAIMER

Facilities Quarterly

LAWRENCE BERKELEY LABORATORY PLANT ENGINEERING AND CONSTRUCTION & MAINTENANCE NEWSLETTER

AUGUST
1992

EXPEDITING SMALL & MIDSIZE PROJECTS

This year, the Laboratory will obtain funding for about 90 small to moderately large construction projects. This number has increased markedly in recent years, and the backlog of proposed projects has grown accordingly, now totaling over 600. In response to this dramatic growth, Plant Engineering has implemented a revised "call" system that takes an active approach to reducing the backlog and establishes a coordinated system for identifying, prioritizing, and funding small to midsize construction projects.

These projects range in value from a few thousand dollars up to $1.2 million, and include a wide variety of construction activities. Depending on their size and type, they fall into two categories: non-capital alterations (non-cap projects) and general plant projects (GPPs).

The objective of a non-cap project is to modify or improve an existing facility so that it better serves its established purposes. Examples of non-cap projects are remodelling conference rooms, removing or installing interior walls, modifying heating systems, installing a door in a wall, and installing new lighting fixtures that save energy or reduce maintenance. As the name implies, non-cap projects are not intended to add significantly to the value of a facility, and rarely exceed $250,000. Non-cap projects are financed using Laboratory operating funds.

GPPs may involve significant improvements and additions to existing facilities or construction of new facilities, and may cost as much as $1.2 million. Examples of GPP projects are converting an office to a computer room, replacing standard walls with fireproof walls, installing a fire sprinkler system in a building that did not have one before, and installing new utility system components that significantly increase system capacity. GPPs are funded by DOE.

Each fiscal year, Plant Engineering is responsible for compiling, through the call process, a prioritized list of GPP and non-cap projects. This year, several improvements have been made in the call system. The improved system is designed to ensure that all needs are addressed reasonably, efficiently, and in the shortest possible time.

The annual call process begins in May, when the Associate Director for Operations issues a "call" to the Divisions for project proposals. In past years,

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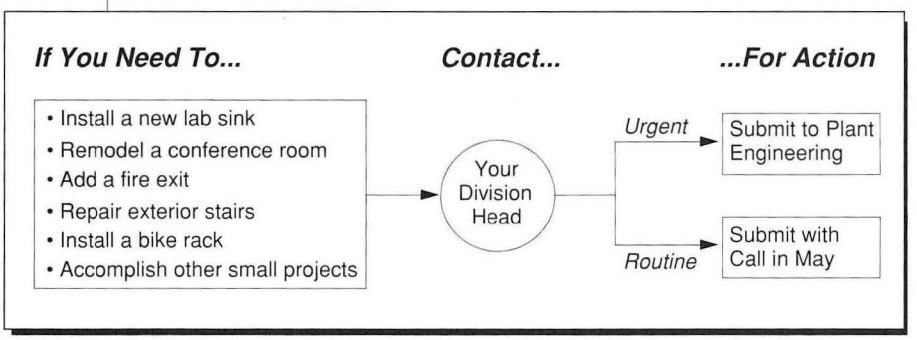

RIGGING & HOISTING SAFETY

The Tiger Team's assessment of the Lab highlighted the paramount importance of a safe research and work environment. One of C&M's major responses to the assessment has been a new safety program for cranes and hoists at the Lab, with the following components: the reorganization of rigging and hoisting personnel and responsibilities into a single group; an updated training program for all operators of cranes and hoists; reinspection and testing of all cranes, hoists and rigging equipment; and a new predictive and preventive maintenance program. Publication 3000 and the Rigging & Hoisting manual are also being revised to reflect updated safety requirements in this area.

The potential for significant release of stored energy or hazardous material resulting from the improper use of cranes and hoists at the Lab

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PROJECTS

ON THE DRAWING BOARD

projects in study or conceptual design

Safety and Support Services Facility

An environmental document is in preparation for the Safety Support Services Facility, a 35,000 SF building to house Central Stores; Materiel Management; Environment, Health and Safety; and Electronics Engineering. Facilities currently occupied are inadequate, and the new structure will bring together interactive service and support activities under one roof. A site has been selected for the new facility in the Building 69/75 area, and a committee has been established to select a design firm. If Congress approves funding in the fall, design work will begin in early 1993.

Site Mechanical Utilities Upgrade, Phase II-Sewer Monitoring

Part of a major upgrade of site utilities, this project includes construction of an East Canyon Utility Center in the Bldg 74/83 area, new waste monitoring facilities at the West and East Canyon Sanitary Sewer outfalls, and modification of the East Canyon Sanitary Sewer Monitoring System. The monitoring system will separate LBL sanitary waste from that of UCB. If funded in the fall, the design process will begin in early 1993.

Fire and Safety Systems Upgrade

A consulting architect will be selected this year for design work to bring a number of buildings into compliance with current building, fire and life safety codes. Improvements include installation or repair of fire-rated assemblies and exiting hardware; additional exits, exit signs and emergency lighting; upgraded fire sprinkler and alarm systems; and removal of combustibles in exit corridors. If the project is funded this fall, the design process will begin in early 1993.

Hazardous Materials Safeguards, Phase I

A consulting architect will be selected this year for safety, health, and environmental protection safeguards proposed for Bldg 70. Improvements include fire protection separations for different occupancy types, exterior walkways for chemical deliveries, and upgrades to the ventilation and electrical systems. The design process will begin early in 1993, if funding is received this fall.

IN PROGRESS

funded projects

Bldg 48, Fire House Addition

The construction bid package is being assembled for improvements to the firehouse. A 1830 SF addition will house the Emergency Command Center and Fire Prevention Group. The existing firehouse will undergo various changes, including modifications to the Alarm Watch Room.

Bldg 88, Second Level Addition

This 4200 SF addition to Bldg 88 will provide offices for Nuclear Science Division staff and visiting users of the 88-Inch Cyclotron. A consulting architectural firm is preparing preliminary design drawings.

Site Ventilation Improvements

Review of the detailed design for Building 70/70A ventilation system upgrades is nearly complete, and a detailed construction phasing schedule has been prepared. The improvements will bring fume hood face velocities up to recommended values, update fire safety and smoke control, and replace defective and deteriorated controls and systems. Testing of a temporary ventilation air supply system for Bldg 70A has been completed.

Bldg 77, Chemical Storage Facility

The chemical storage facility for the Building 77 Waste Treatment Unit will have four separate one-story enclosures, each with secondary containments for storage of compatible chemicals. Each enclosure will have concrete footings, steel framing, and metal siding and roof. Utilities, lighting and ventilation are included, as well as an emergency shower and eyewash with secondary containment to collect contaminated wash water. Interior metals will have corrosion-resistant coatings. The supplier is ready to begin fabrication, with delivery set for late Summer 1992.

Drum Storage Rack Replacement

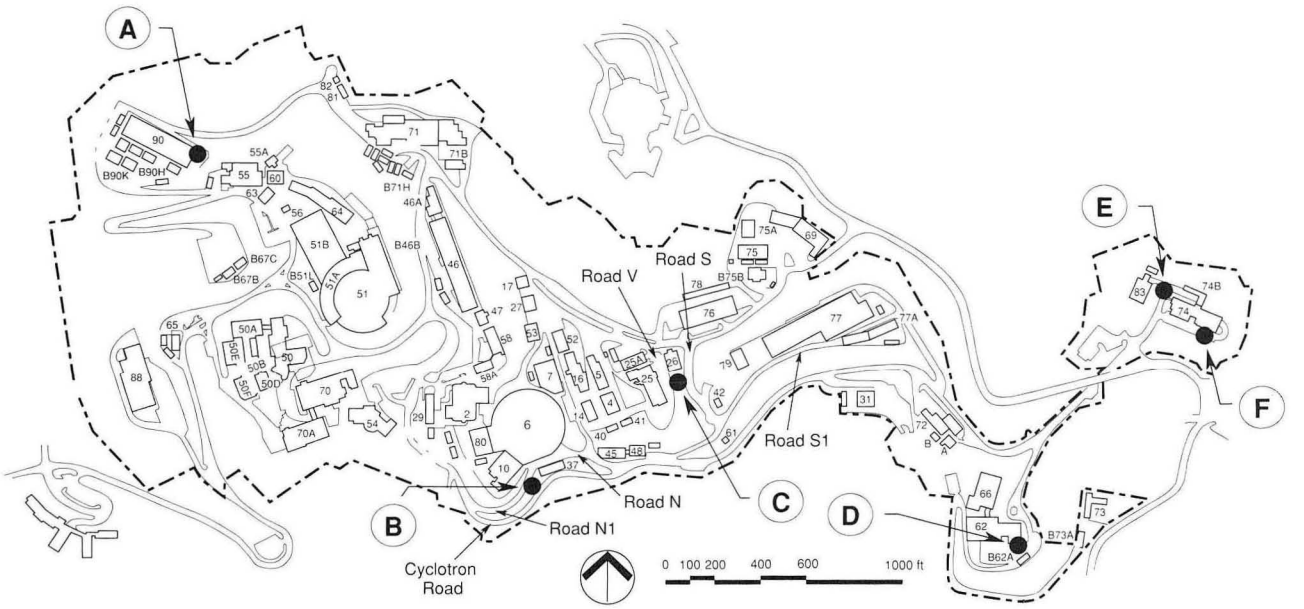
Detailed design is underway for the foundations of the storage rack facility and bids have been received for two storage enclosures. The new facility's centrally located, code-compliant storage and dispensing enclosures will replace existing drum storage racks. Storage cabinets and lockers for limited inside storage of flammable/combustible liquids are also provided. So far, 11 storage cabinets have been received.

Sitewide Lighting Retrofit

Fluorescent lighting systems throughout the Laboratory are now being retrofitted with high-frequency electronic ballasts and T-8 lamps, resulting in better light without flicker and with reduced hum. Incandescent lights are being replaced by the same type of fluorescent system. Occupancy sensors are being installed to reduce energy consumption in unoccupied areas. Phase I of this project is 90% completed, and Phases II and III are in design or under construction.

CONSTRUCTION AND YOU

current construction projects affecting parking or vehicular or pedestrian circulation



Automation & Lighting, Bldg 90 Complex

A

AUGUST	SEPT	OCTOBER

The service yard at the southeast end of Bldg 90 has been designated for the contractor's use. Completion of the automation project is expected in December. The lighting project will continue through April 1993.

ALS Chiller, Building 34

B

AUGUST	SEPT	OCTOBER

The new Bldg 34 will be completed in December. Until then, there will be no parking along Cyclotron Rd from Bldg 45 to the stop sign. Road N1 will be closed to traffic and parking during construction. Road N will remain open, but traffic may be obstructed periodically.

Addition to Bldg 26

C

AUGUST	SEPT	OCTOBER

Construction on the Bldg 26 addition will continue for the next five months. Parking will be affected in the Bldg 26 lot and along Road V, which is partially closed. Traffic will be obstructed periodically along Road S.

Lighting & Mechanical Upgrades, Bldg 62

AUGUST	SEPT	OCTOBER

D

Upgrades to the lighting and mechanical energy efficiency system will begin in October and continue through May 1993. Two to four parking spaces will be occupied by the contractor.

Bldg 74 Substation

AUGUST	SEPT	OCTOBER

E

Construction begins this month and will extend through December. During this time, the contractor will be using five parking spaces between Bldgs 74 and 74B.

Automation, Bldg 74 Complex

AUGUST	SEPT	OCTOBER

F

Construction began in May 1992 and will require the use of two parking spaces for about six months.

AT YOUR SERVICE

PLANT ENGINEERING

Plant Engineering is responsible for the planning, programming, design, engineering, project management, and construction management of new, and of modifications to existing, Laboratory facilities. This includes the renewal and upgrade of site utility systems and building equipment; environmental planning studies; in-house energy management; space planning; and assurance of Laboratory compliance with appropriate facilities-related regulations, University and DOE policies and procedures.

Department Administration
Department Head: Bob Camper, x6339
General information: June Poole, x5984

Planning & Special Projects
Project planning, site and long-range planning, coordinating call for GPP and institutional non-capital alterations, space and personnel database, key plans, *Facilities Quarterly* newsletter
Dale Sartor, x5988

Design Management
Design of new facilities and modifications
Bert Schleifer, x5261

Architecture
Programming, bldg master planning, bldg site planning, bldg design, interior space planning, landscape coordination
Joseph Hansen, x6505

Civil & Structural Engineering
Design of roads, earth retaining structures, bldg foundations and superstructure, shielding design, seismic anchorage
Fred Angliss, x4168

Mechanical Engineering
Bldg and laboratory mechanical systems, including heating, ventilating, air conditioning, water, natural gas, compressed air, LCW, treated water, storm and sanitary sewage, fire protection systems
Martin Luk, x7487

Electrical Engineering
Underground electrical utilities, electrical power systems, lighting systems, bldg elevators, contacts with PG&E, fire alarm systems
Richard Gleason, x5220

Energy Management
Temperature control systems upgrades, lighting systems upgrades, energy efficiency studies, energy accounting
Doug Lockhart, x5120

Project Management
Project management and administration, construction management and inspection
Richard Scudero, x4735

CONSTRUCTION & MAINTENANCE

The Construction and Maintenance Department provides three basic support functions for LBL plant and research facilities: 1) operation, service, minor repairs and replacements to equipment and utility systems; 2) modifications, alterations and additions to buildings, equipment, facilities and utilities; and 3) routine housekeeping, including custodial, gardening, and lighting services.

Department Administration
Department Head: Bruce Bagnoli, x6163
General information: Carol Bruzzone, x6161

Technical Manager
Bruce Bagnoli, x6163

Craft Services

Planning & Scheduling of New Jobs
Wesley Steele, x7893

Plant Maintenance Technicians
To report equipment problems: x5481.
Superintendent: Don Weber, x4741

Laborers: Jim Bruzzone, x6021

Carpenters: Floyd Poldrack, x6022

Painters: Paul Stonas, x6026

Electricians: Ken Hardester, x6023

Plumbers: Tom Reese, x6025

Refrigeration Mechanics: Ken Fletcher, x6993

Riggers: John Bowerman, x7796

Gardeners: Bob Ferrero, x4580

Custodial Services
Upper Hill: Eduardo Almonte, x5643
Lower Hill: Loretta Reese, x5129

Regulator Shop: Steve Slusher, x7669

Key Ordering: Peggy Patterson, 5232

Locksmith: Patrick DuPont, x7668

Pest Control: Rachel McGee, x7831

After Hours: x 5481
Emergency C&M access: Protective Services, x5472

C&M Materials & Equipment Expediting
Jerry Young, x6649

Computer Resources
Christopher Moll, x7891

Other Information or Emergencies: Ext 6011

NON-CAPS & GPP'S

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this process consisted of a request to the Divisions to identify new projects. This year, under the revised system, each division designated a Call Coordinator, who assembled a prioritized list of projects important to the division. The lists included new and previously proposed divisional projects as well as building equipment maintenance projects, Tiger Team projects, Self-Assessment proposals, Fire Department noted deficiencies, and Laboratory Infrastructure Improvement proposals. The Call Coordinators submitted their Divisions' lists to Plant Engineering in June.

The revised call process will identify the Lab's highest priority projects for funding in FY 1993 and target additional projects for funding through alternative sources. Having received all Division lists, Plant Engineering is currently reviewing the projects for consistency with the LBL Institutional and Site Development plans. In compliance with DOE's Capital Asset Management Program (CAMP), projects are also evaluated for their importance to continued performance of building systems, environmental quality, health, and safety. Management oversight is provided by the Associate Laboratory Director for Operations and the Directors' Action Committee.

The call process gives each division the opportunity to examine its needs and establish its priorities on an annual basis. This enables Plant Engineering to assemble a total picture of the Lab's short-term and mid-range construction needs, and to plan the coordinated implementation of the small and medium scale projects necessary for the Lab's maintenance and development. The Division lists will also support the Lab's requests for funding to reduce the backlog of projects as quickly as possible.

RIGGING & HOISTING

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necessitates vigorous safety measures. Over 70% of all industrial accidents involve "material handling equipment," a category which includes cranes and hoists, and high-consequence lifts are common here. From lifting 30,000 lb. concrete shields for the ALS to moving a 200 lb. apparatus across a lab, an accident could result in serious injury or death, as well as damaged equipment or research.

Operator Training. The operator is the most important factor in crane and hoist safety. With assistance from EH&S, C&M is providing improved crane and hoist operator training programs, which will incorporate current DOE, OSHA, Cal-OSHA, and ANSI rules, regulations and requirements, as well as specific applications of safe operating techniques. Because of the great variety of lifting equipment at the Lab, classes will reflect the specifics of the equipment used, including new daily operator inspection and recording techniques to ensure that cranes or hoists are mechanically safe to operate.

Inspection and Repair. There is great variety in the types, uses, and frequency and conditions of usage of the many pieces of lifting equipment at the Lab. This variety, as well as the evolving regulations covering the equipment, necessitates a complex inspection and repair program. All cranes, hoists and lifting equipment at the Lab are undergoing thorough inspection, repair, and certification. Throughout this process, which is expected to take two years, C&M will work closely with building managers to minimize any disruption of research or other operations. Equipment in the greatest need will be repaired first; to facilitate this, anyone with concerns regarding a particular unit should inform C&M's rigging group (x5876). Rigging equipment, including slings, will also be inspected, tested, and certified. C&M will review all new purchases of cranes, hoists and rigging equipment to ensure compliance with the Lab's safety standards.

Ongoing Maintenance. An outside contractor who specializes in cranes and hoists will perform much of the initial work for the examination and repair program. C&M maintenance technicians will work with the contractor and receive expert training, enabling the high level maintenance of cranes and hoists to become part of the Lab's standard procedures. After the baseline repair and certification are complete, these technicians will conduct detailed quarterly inspections and certifications of cranes and hoists and annual inspections and certifications of rigging equipment.

C&M's crane and hoist engineer, Peter Neubauer (x5865), will provide ongoing guidance and supervision for the safe operations and maintenance of cranes and hoists at the Lab, including information on what individual operators can do to keep their lifts as safe as possible.

C&M Rigging Crew using a 30-ton crane to install door blocks for ALS storage ring.

PREDICTIVE & PREVENTIVE MAINTENANCE REDUCE COSTS

Predictive and preventive maintenance (PPM) are regular maintenance activities designed to predict and avert trouble before it starts – akin to changing the oil in your car at intervals based on data about the relationship between oil age and engine performance. Like such oil changes, many PPM activities are relatively minor and inexpensive, such as inspecting or replacing a belt or an air filter, but neglecting them can lead to major, expensive equipment failures. Preventive maintenance includes periodic and planned maintenance. It is utilized to maintain a piece of equipment within design operating conditions and to realize its maximum reasonable useful life. Predictive maintenance inspects and monitors equipment to gather data on its condition and performance over time, so that preventive maintenance can be performed at optimum intervals, maximizing both the performance and life of the equipment and efficient use of available resources.

At the Lab, most PPM functions are handled through C&M's PPM program, which tracks and schedules regular maintenance for thousands of pieces of machinery and components around the Lab. By ensuring that these activities are done regularly and systematically, it helps prevent breakdowns and inefficient operation, thus helping to keep the Lab functioning smoothly and ultimately saving every department time and money.

DOE Requirements

The DOE requires that each Lab department or project have a program for ensuring that its equipment receives required PPM (DOE Order 4330.4A, 6/91). Every department must first inventory its equipment and identify which components require PPM. The PPM program for each piece of equipment must be based on the following factors: personal safety, public safety, environmental protection, program mission, and cost. Safety is paramount; departments must have a PPM program for any equipment that is critical to safety. DOE normally also requires that the value of equipment be preserved, which necessitates PPM. There are sometimes exceptions to this requirement when research goals require running equipment to failure. While a PPM program may not always be absolutely required for equipment that is not critical to safety, it is still financially sensible. Attempts to reduce overhead by foregoing minor PPM are likely to result in expensive maintenance problems.

Implementing a PPM program

There are several options for a department implementing a PPM program: C&M can do the work, other groups at the Lab might be appropriate, personnel within the department can do it themselves, or the department can arrange to have an outside contractor do the work. Which of these options is most suitable must be decided on a case-by-case basis. In all cases, the personnel performing the PPM must have proper qualifications and training. C&M personnel can provide guidance on which option will work best in a given case.

• *Working with C&M.* For C&M personnel to perform PPM on a given piece of equipment, they must know its requirements. When it is brought into the Lab, ask C&M to add it to its PPM database. Provide relevant information on components that require regular replacement (such as belts and filters); the required frequency of such maintenance; the equipment's location, type, associated hazards, and contact person; and the relative importance of its function. This information goes into the central control for C&M's PPM program, a database that prints out a weekly report of scheduled PPM jobs, with the jobs clustered by location so that technicians' time is used efficiently. Clients must also provide an account number for PPM, and the designated contact person must approve its use every time the job is due. Also, technicians sometimes uncover other problems while they are doing PPM. In this case, customer approval is required for repairs that go beyond planned PPM.

Contact C&M's engineer, Weygand Younge, at x7665 to make arrangements for, or with questions regarding, PPM. C&M craft supervisors can also help with equipment in their fields.

• *Considerations.* Consider the following factors when choosing a PPM program for your equipment. First is the priority of the equipment according to the above criteria. For example, the air conditioner for a computer room serves a more crucial function than one that is simply for keeping a work area comfortable, and so should receive more frequent PPM. Next is frequency, e.g., how often does a given filter need to be changed? C&M or the manufacturer's instructions can provide information on this. Conditions can affect the frequency: for example, a particular air filter might require much more frequent replacement if construction were going on nearby for a year. However, when the construction ends, the resulting decrease in required replacement frequency must be reflected in the PPM program. The location of equipment should also be considered; doing PPM when maintenance personnel are working on that equipment or in the area is more cost-effective than arranging to have someone come to change one filter. Lastly, a PPM program must be designed within the context of available financial and personnel resources.

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