



E = Elevators
 ES = Emergency Stairwell
 S = Stairwell
 SP = Spiral Staircase

FIGURE 2. Main Library, Second Floor
 SOURCE: U.C. Berkeley Library Orientation
 Leaflet No. 1.

DOE LIBRARY
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Introduction

Located approximately in the center of the Berkeley campus (FIGURE 1), the Charles Franklin Doe library was designed by architect John Galen Howard, and completed in 1912 at a cost of \$1,200,000. One of the most admired buildings on campus, the University's main library has been described as having "classic architecture, mingling Corinthian lines with the more delicate Ionian. Its exterior is granite with roofs of red mission tile, crested with copper. The building is steel-framed and strictly fireproof, all doors, sashes, and stacks being of metal. The main front of the building is 224 feet in length by 60 feet in height, and the figurehead of Athena is over the North entrance doors" (S.F. Chronicle, v. 11, no. 4, October, 1909, p. 357). In a recent campus structural survey the library was rated poor and the annex fair, relative to seismic safety.⁶

The original building and annex house sections listed here by floor: Morrison Library, a comfortable reading room just off the main north entrance; Map Room; Periodical Room, which is aligned with and has annexed tier 2 of the stacks; Rapid Copying Service; the Humanities Graduate Service. The second floor is comprised of (FIGURE 2): Loan Hall and Circulation Desk with general entrance for the stacks; Reference Room; Bancroft Library, which has its own entrance on the outside of the building; the University Librarians' offices. Third floor: Government Documents Department; Interlibrary Loan; the Art History and Classics Library and seminar rooms, which are aligned with and have annexed a portion of tier 6 in the stacks. On the fourth floor: South/Southeast Asian Library Service; Newspaper and Microcopy Room; the Lost and Found. Two sections receive the greatest use. These will be examined in depth.

The Stacks

Occupying the core of the original building, the stacks are made up of nine tiers, with two tiers equalling one floor in height, and tier one located below ground. The structure is supported by a steel girder framework planted in a granite base. The tiers are divided symmetrically into three sections containing the shelving; the center contains the two elevator shafts. The floors of the two outside areas are constructed from 6-inch thick, 2'x3' glass plates resting on a steel grid. Metal bookcases form a continuous segment through each of the glass levels from tier one to tier nine. Each shelf section per tier contains six rows of volumes. Usually the larger books and folios are shelved on the lower rows. The central sections are

constructed of concrete floors which support metal study carrels, storage areas, and some additional portable shelving. These carrels and shelves are also bolted to the floor and ceiling. Running along the border between the cement and glass portions of the floor are the metal stress plates designed to allow movement. New sprinkler and smoke-detector systems with safety bracings have recently been installed.

Approximately 200-300 persons use the stacks at any one time during peak hours of operation (Monday-Friday, 10:00 a.m. - 3:00 p.m.). In case of an earthquake, quick and orderly egress from the stacks would minimize injury to these patrons. However, actual access to the stacks is limited and confusing. Main access is via tier 4, where recent electronic installations have severely restricted the former width of the exit, and encumbered its use. On the tiers which do not offer direct outside access yellow marking tape directs patrons from stacks to elevators and staircase exits. The elevators are posted as unsafe in the event of an emergency. Two main sets of staircases are located in the stacks' central section (FIGURE 2). An emergency exit-only staircase is enclosed in one corner of the stacks. There are no emergency lights.

Two spiral staircases are situated at the west and east ends of the stacks, running from the first through the ninth tier. Unlike the main staircases which are supported at each level by the iron gridwork of the tiers themselves, these spiral staircases are merely joined vertically to one another and therefore present the possibility of dangerous movement during an earthquake. There are several unmarked access doors; one in the north wall gives onto offices, another in the west wall of the fourth tier opens into the catalog room of the second floor, and on the north wall of the sixth tier is a door leading into the Art History Library, and, from there, into the library's main north stairwell. Only the latter is marked as an entrance/exit. The entirety of the second tier is inaccessible from the stacks since, as was stated above, it is attached to the library's periodical section, and is surrounded by a metal cage.

Recommendations

To mitigate some of the hazards outlined above, the following modifications are recommended:

All possible exits should be marked as such.

Tiers with severely limited access, for example the caged area of tier two, should have access doors cut.

As with the elevators, the possibly emergency-unsafe spiral staircases should have warnings affixed to them.

The feasibility of securing the tiers' large glass plates to their metal framework should be studied. Their weight and flexibility could make them extremely dangerous during an earthquake.

Generally, posted warnings would make stack-users more aware of their surroundings, and better equipped to deal with an emergency situation.

The Reference Room

The Reference Room measures 53 feet by 210 feet, and is 45 feet high. The room seats 528 at 30 heavy oak tables. Skylights in the vaulted ceiling span one-third the roof area and present a great danger from falling glass. In such an event, the heavy tables do provide an aspect of safe cover. Glass bowls attached to the corners of each skylight at one time held lightbulbs, but are now merely decorative. Huge arched windows, divided into 6'x4' panes, are placed at each short end of the room. The window above the librarians' area, just off the entrance/exit, is reinforced by wire inside the glass. Large windows line the north wall above the bookcases, opening outwards with the resulting possibility that they could smash backwards, showering flying glass onto the occupants of the room below. Completely surrounding the room are bronze bookcases. They are eight feet tall, and built flush with the wall.

The one, commonly-used entrance for the Reference Room is divided into two gates surveyed by a book-detection scanner (FIGURE 2). There is an emergency exit to one side which can swing out to increase the width of the exit, but this is deceptively marked and is not immediately obvious. There is a corresponding door at the opposite end of the room used for emergency exit only. Both the regular and the emergency exits open onto the hall containing the subject catalogs. From there, there are two options when exiting. The most direct path is also the most hazardous. This route passes beneath dangerous parapets, and the nearby arched window presents a possible threat from falling glass. The other exit involves crossing the catalog hall, descending the main staircase, and passing out through the front exit which is also overhung by parapets. This exit is, however, larger and offers a lesser chance of exit-impeding congestion.

It may be pointed out that the Reference Room as a whole is considered structurally weak, due to the large arched windows in the east and west walls.¹⁸

Recommendations

To mitigate some of the hazards outlined above, the following modifications are recommended:

Dangerous parapets should be removed, to reduce threat from falling fragments.

Exit routes should be clearly marked, as in the stacks, by yellow tape indicating quickest or safest routes.

Decorative glass bowls should be removed.

Large windows above bookcases should be wired to prevent falling glass.

As in the stacks, heavier books should be placed on lower shelves.

Posted notices should remind patrons of the protection offered by the heavy oak tables.

Adequate fire-fighting apparatus should be assured.

Appendix - Santa Barbara Experience

In the Santa Barbara earthquake of August 1971, the library structures themselves (built in 1954, 1962 and 1969) received slight damage, although the stacks were thrown into tremendous disarray. An estimated 280,000 books were on the floor, though the bookshelves remained intact and upright due to their bracing, which resembles that on Doe Library's shelves.

It is fortunate that more extensive damage and injury were not sustained, in light of the potential hazards. Possible injury could have occurred from the six large card catalogs (5 feet by 6 feet) which fell over. Elevators in the two older buildings were damaged; those in the new building remained functional. Light fixtures remained intact, suspended above a false ceiling, although many ceiling tiles fell. A spacer plate outside the one main emergency exit of the new building ruptured, and in doing so blocked the opening of the exit door. The air conditioning system was completely destroyed. Though tied down, pumps, motors, and compressors were bounced up to twenty feet off their bases. A skylight, however, suffered no damage.⁹