OFFICE ARRANGEMENT AND LAYOUT

DEVELOPMENT OF OFFICE PLANNING

The application of industrial engineering techniques to the problems of office arrangement and work flow is a development of comparatively recent years. The reasons for this late start can be traced to a number of facts which made office planning unnecessary in the past.

During the last half century, tremendous strides were made by automation in industry; consequently, fewer factory workers are now needed to produce a given product. The resultant increased office force to production force ratio has forced office or administrative expenses into a position of greater importance in relation to the total cost of products.

Another factor which contributed to the emergence of office planning was the short supply of first-class office space. World War II and the Korean conflict so held back construction that, even with the sizable program of recent years, there exists a shortage of space in many of our urban centers. This condition, together with rising construction costs, has forced the cost of office space to an alltime high.

Many of the layout patterns which we find in the offices of today still conform to those established many years ago when buildings were vastly different. The office building at the turn of the century was usually a wing-structure building or a hollow square surrounding a central light court. The office space consisted of a series of moderately deep rooms on each side of a central corridor. As late as the end of World War I, lighting was designed for 5 foot-candles of illumination and the only ventilation was provided by opening the windows. Offices were made up of individual rooms in order to secure maximum benefit from natural light and air. All desks were oriented to the best source of light, namely, the windows, and were kept fairly close to these windows to take maximum advantage of the ventilation afforded during the summer months. The majority of the employees sat facing the door. The practice of giving the corner office to the "boss" was related to the cross ventilation afforded by such a location.

The building of today usually consists of block-type space well lighted and airconditioned and divided by a few access corridors radiating from the central core. The open area of the past was referred to as a "bullpen."

This term indicates a large noisy area with little to recommend it from the standpoint of light, ventilation, or sound control. In the modern building, the bullpen has been retitled as "open-area" space; it is well-lighted, airconditioned, acoustically treated, and can be a pleasant place to work.

Another factor of importance to the space planner is the ability with which various organizational components in an office can communicate. Offices were once generally so small and compact that communication, whether oral or by the transmission of documents, did not present a significant problem. Today the space planner must ensure that the various components of an organization are physically arranged in a manner which will facilitate communications of all types.

WORK FLOW AND LAYOUT

The relationship of individuals to each other and the interrelationship of tasks are the most important factors in any layout. The development of a layout which conforms to and complements the predominant work flow requirements of an office is perhaps the most important phase of space planning. By the systematic study of the operations, processes, and procedures involved in individual (or group) tasks, the planner is able to assist management by providing work station patterns which ensure a smooth, straight line flow of work. To avoid misunderstanding, it is proper to state at this point that space planning in no way conflicts with or overlaps the field of methods and systems analysis. The role of the space planner is to gain a knowledge of the functions as they have developed and to translate that knowledge into the best space layout possible within the limitations imposed by building characteristics, fiscal allotments, etc.

In a well-planned office, paper work goes from one desk to another with the least amount of handling, traveling, and delay. The geometric axiom that a straight line represents the shortest distance between two points can also be applied to office layout. Work should progress in a series of straight lines with a general forward movement, avoiding crisscross patterns and backward motion. When tentative office layout has been developed, the flow pattern should be traced from desk-to-desk. Desks that are out of the straight line flow will become obvious. Those desks should be shifted so that they are between the desk from which the work is received and that to which it will be passed. It is that simple.

PRIVATE OFFICES

The private office is the source of some of the most perplexing problems facing the space planner; the questions of who should have an office, and whether or not it should be furnished with ceiling-high partitioning, are ones which must be settled by top management acting on the advice and recommendations of the space specialist. Unless top management interests itself in this problem and sets forth the criteria that shall be used, the space planner faces endless controversies.

It would be well, at this point, to define the term "private office," as used herein. It is a room occupied by one individual and includes rooms constructed of either ceiling-high or bank-type partitions. (This definition is important as one frequently hears of a room occupied by two individuals or by a man and his secretary referred to as a private office.)

Although the Government space planners are confronted with many problems not encountered by their counterparts in industry, there are sufficient points of similarity to justify a brief review of the current trend in industry with regard to private offices. Generally speaking, the high cost of office space has forced management to take a more conservative approach to the assignment of private offices, especially at the middle echelon. The number of private offices assigned to this group is on the decline and, when provided, they tend toward modest sizes. Increasing emphasis is being placed on decor rather than size in view of the economic advantage in satisfying requirements in this manner rather than to pay, year-by-year, for excess space.

A logical interpretation of the pattern developed from studies of private business is that private offices are assigned on the basis of the job to be done. Where offices can be used as a vehicle to promote a company's product, there is no hesitation to devoting extra money for additional space and elaborate furnishings. Also, in the so-called prestige fields, spacious and luxurious offices are accepted as a necessary and prudent business expense. On the other hand, few firms now provide large offices merely to indulge the whims of officials.

There are relatively few instances within Government where justifications extended for large offices which exceed functional requirements will withstand objective scrutiny. A simple fact which all space planners should bear in

mind is that the status argument for excessive space is usually offered only when more practical reasons cannot be generated. There is no question that ceremonial areas have a place in the Government space picture, but they should be kept to a minimum. The offices provided for our elected representatives in both houses of the Congress are quite modest and should set an example for the space used by the Executive Branch of the Government.

Private offices should be provided only when there is functional need, and then they should be only large enough for the occupant to conduct his normal business in an efficient manner and with a reasonable degree of dignity. Speaking generally, experience indicates that the need for an office larger than 250 square feet is rare within the Federal establishment.

The question of the location of private offices is one which is being given new thought. Traditionally, these rooms have been situated along the perimeter of buildings with the interior space given over to the more routine operations. This practice is discouraged by many space planners who believe that the freedom of movement of private office occupants and the nature of subordinate positions indicate a need to reverse the situation. Modern building designs have improved interior space to an extent that inside private offices are more acceptable, and the technique of assigning window space to large clerical operations is gaining favor. The psychological advantages of permitting the "lower echelons" an outside view have been very effective in many cases where tried.

In most agencies, the occupants of private offices will receive the majority of visitors; in fact, the receiving of many visitors is one of the principal factors in the need for private accommodations. Whenever possible, these offices should be situated in such a way as to make it unnecessary for visitors to traverse the principal work areas. Locating private offices away from window walls facilitates such an arrangement.

PARTITIONS

Partitions are one of the more valuable tools of the space planner. Their indiscriminate use, however, is one of his major problems. The main point to be considered in connection with the use of partitions is that each one of ceiling height introduced into an office scheme reduces utilization flexibility.

Before recommending installation of partitions, be satisfied that a functional need exists. If it does, determine the type which will permit the greatest flexibility and still satisfy the requirement. Explore carefully the use of less-than-ceiling-high types. In addition to the comparative ease with which these can be moved, there are the advantages associated with job cost, ventilation, heating, and lighting. The two most popular types in this category are the so-called three-quarter partition (7' to 7'6") and the bank-type which is usually about 5' high. The three-quarter partition is often preferred on the basis of additional audio privacy. Actually, the advantage over bank-type in this respect is insignificant. Both kinds provide adequate visual privacy. The bank-type has the advantage of providing almost maximum flexibility as it is generally of much lighter construction and is secured by means of an occasional anchor bolt. It can be shifted one foot, or 100 feet, in any direction to conform to organization or staffing changes with little damage to the building, and, more importantly, with minimum disruption of office operations.

The separation of various units within an office into separate rooms or areas should be avoided unless there are compelling reasons for such a separation. There is a tendency on the part of management to encourage this separation but an objective analysis of the requirements will often indicate that such subdivision is unnecessary. The provision of a separate room for each unit is a great deterrent to flexibility of space use and curtails communication. As a rule, units of an office need not be separated from others unless noisy work practices, heavy visitor loads, or a similar distraction exists in one or the other offices which would annoy neighboring units.

Components of an organization not separated by partitioning have a greater awareness of the overall job being done instead of being limited to the problems of a particular division, branch, or section. The open concept provides communication between employees, which contributes to office efficiency. Elimination of unwarranted partitions further provides an opportunity to balance growth in one section of the office against shrinkage in another.

AUDIO PRIVACY

The space planner hears many reasons why people in Government need places where confidential discussions can be held and a variety of suggestions as to how this should be accomplished. The private office is the most popular, if not always the most practical, solution. The Federal establishment undoubtedly has a greater problem in this respect than many branches of business. The most important consideration of course, is that of national security which sometimes requires that extreme protective measures be taken.

In addition to the security requirements, the Government is faced with privacy situations involving investigative agencies and other activities which have occasion to inquire into the most confidential aspects of individuals' personal lives and the operations of business concerns. There is no question as to these persons' entitlement to reasonable privacy regardless of whether they are summoned to the office or appear voluntarily to render assistance, or avail themselves of services offered by the agency. There are alternatives, however, in determining the methods to be used to satisfy the various requirements.

The private office, as mentioned previously, is an obvious solution but should be limited to situations which require the utmost privacy on a continuous basis. Where the need is more intermittent, small interviewing booths can be used. Another technique is to provide sound baffles for sensitive work stations. These baffles are usually 5' partition sections used to separate desks which are situated close together. These baffles deflect and deaden sound waves to a moderate degree. An additional method of obtaining audio privacy is to place desks a little farther apart than the recommended 3 feet.

All of the "open methods" of providing privacy, including private offices formed of bank-type partitions, depend on a rather unusual factor; that is the general noise level of surrounding areas. A case in point is the loan departments of many banking firms. It is not unusual to see a group of loan officers seated in open areas on the main floor each discussing the personal financial problems of applicants. Eavesdropping is not as easy as it might seem, however, because the noise generated on a busy banking floor tends to cover up individual conversations to a point where they are an unintelligible hum. This is not by way of suggesting that office noises should be allowed to become objectionable, but there are certain noise levels which are unavoidable and the space planner should take advantage of the condition.

In many offices there is the problem of attempting to keep visitors from listening to general discussions and conversations. An acceptable method of accomplishing this is to detain the visitor in a reception area until the person he has come to see is free to receive him.

Finally, there are privacy requirements which occur so rarely as to suggest improvised solutions. For example, when an individual has one or two confidential discussions per week, it is not feasible to take special measures. Rather, the situations should be handled as they arise by using a vacant private office, a conference room, etc. Frequency of need is a point which the space planner should explore thoroughly.

VISUAL PRIVACY

The need often arises to provide special accommodations for persons performing tasks requiring a very high degree of concentration. It would be impractical to try to include illustrative examples of the types of work which could qualify for this treatment because almost everyone believes that his job is unique with regard to mental demands. Generally, the qualifying tasks are in the creative fields and some form of visual shield is all that is required. Bank-type partitioning is widely used for this purpose.

FURNITURE AND EQUIPMENT

No discussion of space planning would be complete without recognizing the importance of furniture and the effects, both good and bad, which it has on utilization. Fundamentally, the space planner's mission is to devise the methods to house people and their necessary furniture and equipment in a manner which will enable them to perform their tasks efficiently and in reasonable comfort. It is essential that office space be sufficient to accommodate every item of furniture actually required; otherwise, efficiency is impaired. It is equally important that all unnecessary equipment be removed to avoid paying for space that is not needed.

The standard table found in most offices measures 60" x 34" and requires approximately 25 square feet of floor space which includes access area. At a rate of $4.25 per foot, it costs the Government $100.00 per year to provide space for such an item. This is a significant expense and it becomes an equally significant extravagance when the table is not really needed. The Government's annual rent bill for housing unneeded furniture amounts to a surprising sum and every means should be employed to eliminate this waste.

We are anxious to see each employee have all the equipment needed to do an effective job, but will resist housing unneeded furniture. Extra items such as telephone tables, bookcases, side chairs, and especially the standard tables, may represent status symbols to certain employees. They should not be supplied automatically with certain positions without a consideration of the need.

Extra furniture presents another kind of problem. Not being used for any specific purpose, this furniture is frequently the place where clutters of papers and odds and ends accumulate thereby detracting from the "clean and crisp" appearance desired for every office. One technique used effectively to reduce inventories of unneeded furniture is to begin a program of replacement with new or reconditioned furniture. This permits the selection of items of uniform appearance and creates an attractive office. Also standards can be developed so that only needed items will be provided giving comparable positions identical furniture "packages."

There have been some radical changes in furniture design in recent years, including the development of a line of functional desks and related items known as "modular" furniture.

The Federal Supply Service has developed a comparable line called "unitized" furniture which has all the functional advantages of its commercial counterparts but is standardized to ensure complete interchangeability of components. The functional effectiveness of this equipment is obvious. Our interest, naturally, lies in the effect which this new furniture has on space management. Our experience has shown that the use of unitized furniture may afford better space utilization than standard desks in a given block of space. However, standard furniture has certain features, mainly layout flexibility, which enable the planner to obtain better space utilization in most instances. The proper approach, then, is to examine carefully the space under consideration and compare the degree of utilization obtainable with each type, considering also the probable costs of alterations and new furniture which might be required. Only by such methods can the relative advantages of the two types be accurately evaluated.

Regardless of the type required, the use of oversize furniture should be avoided. There are many positions in Government with functions which require the incumbents to spend a major portion of their time away from their desks, using them mainly to prepare reports, receive assignments, etc. It is proper to consider the use of 45" desks for such positions. Further, if it is not necessary to make drawer space available for such positions, the use of writing tables should be considered. The use of the large conference desks should be limited to those having a legitimate functional need for them.

The physical condition of furniture and equipment has a great influence on the appearance of an office and appearance, in turn, affects employee morale. Good looking furniture, whether it is new, reconditioned, or merely the old items polished up, should always be encouraged by the space planner.

CONFERENCE AREAS

Conferences, meetings, and assemblies are an important part of Government operations. How is the space planner to evaluate and provide for such requirements? In the past, the private office with a full conference table setup, requiring from 350 to 400 square feet, was a widely used solution. The best solution is a system of separate conference rooms for the joint use of all components of an activity, with higher levels of management being given conference desks and/or small conversation areas within their private offices. It is entirely possible to provide space for in-office conferences of up to ten persons in 200 to 250 square feet when conference desks are used. A conversation area can be included in these offices for the informal atmosphere created by coffee table discussions of three or four persons. Smaller meetings of two or three persons can usually be held around a standard desk.

The space planner should remember that conference facilities are essential but he should attempt to maintain the amount of space devoted to this purpose at a level consistent with actual needs. Consider wider use of existing conference rooms before recommending others; if this is not feasible, fulfill requirements by the assignment of the minimum amount of space which will accomplish the job.

RECEPTION AREAS AND VISITOR CONTROL

Proper visitor control is important. The layout should provide for primary visitor entrances for the main components of an office and each such entrance should be attended by an employee who serves as a receptionist. Detaining visitors at a point where they cannot overhear official discussions will, in some instances, preclude the necessity of private offices. This is also a means of making certain that visitors are properly directed to the desk of the person they are calling to see, and avoiding the distraction of having them wander around the office.

When justified by the number of visitors, the reception area should be equipped with chairs, ash stands, and a table for reading material, as appropriate. This area also lends itself to interesting displays of program activities and other promotional endeavors.

RECORDS AND MAILROOMS

No office planning project should be undertaken without evaluating the record accumulations to determine their correct inclusion in the office layout. In many offices, the records are vital to the efficient operation of one or more components and should be situated so that they will be as adjacent to their users as possible. Depending on the type of office operation the feasibility of placing small banks of file cabinets within the using components rather than having a central file activity should be considered. Some large operations which have centralized controls require central files. Because file cabinets and shelving occupy space, they are properly considered in a space study. However, records and their use present problems which have many aspects, and the attention of specialists is often advisable. Every space planner has seen groups of records which he believes could be disposed of or sent to Records Centers, but it is suggested that records specialists be consulted on other than routine problems.

Mailrooms present somewhat similar problems. The space planner must consider the mail facilities in the general space pattern but other than routine matters should be referred to mail management specialists.

COATROOMS

An item which can add materially to the appearance of an office is the proper handling of employees' coats, hats, etc. Individual lockers use a great amount of valuable wall space and are not usually found in the modern office. Coat trees have a limited capacity, frequently requiring the use of several in a relatively small area thereby detracting from the appearance of the room. The modern valet stand is capable of holding a number of coats, hats, umbrellas, etc., and is the most acceptable equipment for this purpose. An alternative is the provision of a coat closet in one corner of the room. It is recommended that these be open to the view of employees to discourage pilfering which could occur in a room isolated by the simple act of closing a door.

STORAGE AREAS

Obviously, prime office space should not be used for bulk storage of any kind. Only working inventories of office supplies and other materials should be maintained in offices, preferably in standard supply cabinets rather than storage closets. It is much more satisfactory to locate supply operations in secondary space such as basement areas because of their proximity to shipping entrances, the elimination of disruption to office activities, and the availability of more space than can usually be spared from office operations.

ARRANGEMENT OF DESKS

The basic unit or work station around which office layouts are made, is the desk and chair of the individual employee. Generally speaking, if these units are arranged properly the balance of the furniture and equipment required for the office can be fitted into the remaining areas of the room. When confronted with the task of arranging work stations, the space planner must satisfy two main requirements. First, he must situate them in a manner which conforms to the principal work flow patterns of the office. Second, he must attain maximum utilization of the space involved, consistent with sound space management practices. This section deals with the latter requirement and, although it is written in terms of the larger office, the principles and techniques apply to even the smallest.

One of the most satisfactory arrangements of work stations is a single column of desks facing the same direction and running parallel to the largest window wall of the room. The desks can be placed with ends butted against the window wall and an aisle along the other side, or they can be placed away from the wall to provide access from both sides. Obviously, such a column scheme can be repeated the depth of the room. An almost equally effective arrangement, especially in large clerical operations where space is limited, are columns consisting of two desks, placed end-to-end, and running the length of the room. When these columns are placed with the ends of one row of desks against a wall, the spacing between the desks should be a little greater than normal to provide easy access for the inside employee. Although the importance of natural light is diminishing with improvements in office lighting, it is still preferable to situate desks so that windows are at the side instead of

in back of the occupant. This arrangement will generally result in having the employees facing away from office entrances, thereby reducing distractions caused by people entering the room.

Desks should not be placed back-to-back so that the occupants face each other, unless there are sound functional reasons for doing so. Space management experience has shown that such an arrangement does not conserve space and that, as a general rule, employees so situated tend to distract one another more frequently than when arranged in some other manner. Fortunately, there are suitable alternatives to satisfy almost any functional requirement which would otherwise call for a face-to-face scheme.

In the modern block-type building, desks may be placed in columns along a window wall but if there are no intervening partitions they may be facing windows in another side of the building. This can be an annoyance, sometimes producing eye fatigue, and some corrective measures are indicated. In addition to the use of venetian blinds or other window coverings, this problem can be solved by placing a bank-type divider partition across the width of the space at the center point and situating the desks so that everyone faces the partition which is just high enough to block out the window glare. A double row of file cabinets, back-to-back, will accomplish the same result.

Every effort should be made to arrange desks in straight lines, in accordance with a predetermined aisle pattern. This technique will facilitate the flow of traffic through an office, especially visitors who are not familiar with the layout, and will contribute to the general atmosphere of efficiency which is a desirable feature in all office designs.

OFFICE ENVIRONMENT

Studies conducted under controlled conditions leave little doubt that physical environment has a predictable influence on production, both in the factory and office. The more obvious environmental factors are illumination, decorative colors, airconditioning, and sound control. These will be discussed in general terms.

Illumination, with regard to both intensity and type, is generally considered the most important element in the office environment. A properly designed lighting system

provides varying intensities of illumination according to the tasks performed or service areas to be lighted. For example, corridors and washrooms require only 15 to 20 foot-candles of light while a drafting room may need 75. In general office areas, approximately 50 foot-candles of illumination, maintained in service at working height, is considered very good. There are other levels recommended for various functional areas but the variables involved limit this discussion to generalizations. The important point is that good lighting is essential and should not be compromised. The efficiency and eyesight of employees should not be jeopardized by poor lighting.

Color conditioning has, within the past few years, taken a prominent position in the environment scheme. Some of the first experiments in the field of color dynamics were conducted in factories and the results were quite surprising. It has been determined, for instance, that certain colors have a warming effect; others make a room seem cool. There also are color groups which are restful, stimulating, depressing, etc. Colors must be correlated with the lighting because the reflectance value of the paints used will affect the level of illumination reaching working surfaces. Paints which produce glare should be avoided. The cooler shades of green and blue have an almost universal appeal but the tendency is to use them to the point of monotony. The introduction of complementary colors on small walls, doors, etc., will dispel the monotony and add life and individuality to an office. Color conditioning is an interesting and complex field and the space planner with a working knowledge of it is in a position to render a more complete service.

The advantages of airconditioning are well known. It has been proved that production will generally increase, and absenteeism and employee turnover decrease when airconditioning is used. Cleaning costs are usually lower in airconditioned buildings. Newer buildings in most sections of the nation have this feature. Unfortunately, installation in existing buildings involves considerable cost and can only be accomplished on a long-range basis.

Sound control can be effected in a number of ways. The most widely used method in offices is the installation of sound-absorbing materials on ceilings. This is effective when noise levels are only moderately distracting. In large offices, an effort should be made to avoid concentrations of noisy equipment such as typewriters, office machines, etc. This obviously cannot be done in a typing pool or tabulating machine room and the only answer is to

isolate the operation, preferably by means of sound-absorbing partitions, and treat the interior of the room to make it as comfortable as possible for the employees. A reasonable noise level is to be expected in any office. Over-conditioning of offices can have adverse effects because noise generated within the area will seem amplified and distracting.

CONCLUSION

The application of the principles of space planning requires the exercise of sound judgment. There are often several alternative solutions to a problem and it is the planner's role to determine the one which will satisfy the agency's requirements and, at the same time, be the most advantageous for the Government. Generally, the best solution will be the most logical and acceptable compromise between the ideal and that which is reasonably attainable. As in any other administrative problem, the challenge can best be met by the orderly examination of each element of the problem in the light of both theory and experience. Consideration must always be given the variables which constantly face the space planner, such as building characteristics, the availability of suitable space, fiscal limitations, future plans, and other comparable factors.

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