JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

V. INDUSTRY SEMINARS AND SPEECHES - SHORT TERM

I. Other Presentations In Which Either The Date And / Or Sponsoring Organization Is Missing

1. Risk Management/Investment Related Topics

q. "Office Buildings", no date

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OFFICE BUILDINGS

I. The skyline of New York or Chicago is a dramatic sculpture of free interprise. The buildings and towers of these skylines are not the product of urban renewal, government insurance, or a sheltered monopoly.

Instead they represent the clash of urban economics, big money, big talent, and big egos. It is free interprise in a very raw form.

A. The forces of urban economics are those which impel into being a central business district and a complex commerial world which thrives on congestion.

B. The office building as we know it today orginated in Chicago and owes its existance to that ~~cities~~ city's first urban renewal project - The Chicago Fire.

1. The office building before the fire was a primitive affair. Buildings had one toilet, no elevators, no central heat, and often no water or gas light above the third floor. Nobody would or could climb more than six floors. Above the third floor as the stairs went up you met rental values coming down. The top floor generally belonged to the janitor

2. Office quarters were fixed in size because all walls were load bearing.

3. Chicago exploded in population following the civil war, mutiplying ten times in the ten years between the years 1860 and 1880.

C. What Marshall Field was to retailing, Owen F. Aldis was to ~~be in~~ office building. He was a Yale graduate, a lawyer, who came to Chicago and eventually represented the Brooks family of Boston who gave him financial support for office building development. Thus began Aldis and Company, still a leading firm in this line.

D. In 1881 he teamed up with Burnham and Root to build the Montauk building. It was ten floors tall, had two elevators, a unique floating foundation, and dozens of features to simplify maintenance , prevent fire, and attract renters.

E. This engineering masterpiece was the first steel building in Chicago, although its outside walls were loadbearing. The home insurance was the first continous steele frame building. The Montauk building provided central heating, full plumbing, elevator service, janitor service, some office flexibilty, and low and behold, as the tallest building in town the top floors commended the highest rent. Yet the advances Aldis and Brooks introduced in their next building made it obsolete in 20 years. Located on North side of Monroe Street between Deerborn and Clark it is now under First National Bank.

F. In correspondenc with Brooks, Aldis Stated his fundementals of office building design, most of which are still valid(6):

1. The office building that gives up the most for light and air is the best investment.
2. Second-class space costs as much to build and operate as first-class space, Therefore build no second-class space.
3. The parts every person entering see must make the lasting impression. Entrance, First story lobby, elevator cabs, elevator servoce, public corridors, toilet rooms must be very good.
4. Generally, office space should be about 24 feet deep from good light.
5. Operating expenses must be constantly borne in mind. Use proper materials and details to simplify the work.
6. Carefully consider and provide for changes in location of corridor doors, partitions, light plumbing and telephones.
7. Arrange typical layouts for intensive use. A large number of small tenants is more disirable than large space for large tenants because:
   a. A higher rate per square foot can be added for small tenants.
   b. They do not move in a body and leave the building with a large vacant space when hard times hit.
   c. They do not swamp your elevators by coming and going by the clock.
8. Upkeep of an office building is most important. Janitor service must be of high quality, elevator operators of good personality, management progressive.

G. Chicago pioneered ~~in~~ the design of structure because it had a combination of young architects, imaginative investors, and smart, tough, contractors who are engineers not tradesmen. The best known of the latter ~~was~~ were George A. Fuller and Paul Starretts, and his four brothers. All began in Chicago and then moved to New York to lead the building developement of that city

H. In 1853 a man by the name of Elisha Graves Otis invented the safety elevator, and he continued to improve his product to pave the way for skyscrapers. In short, vertical transportation made extensive horizontal transportation unnecessary. An example of how elevators control building: elevators used DC current and the only place DC current was available was on the tip of Manhatten Island. Therefore, the first skyscrapers were in the Wall Street Area. High raise development then skipped to the 40's in the second building boom of the late 20's, leaving a long strip of lower buildings.

I. The number of occupants of a floor or building must be defined or assumed in the design stage. There are many formulas in use for this. Each state has an industrial or commercial building code: There are various proposals for a national building code.

1. The NFPA and NBFU code would require an occupancy rating for an educational structure that ~~is~~ divided the gross area in square feet by 40, to determine the station capacity. Station capacity is then adjusted by a percentage representing occupancy. For example classrooms would be rated at 2/3 station capacity while research laboratories would be rated at 100%.

2. Assume a building 200 ft. long and 54 ft. wide. 10,800 sq. ft. Population per floor would be about 270 persons. The code would require 22 inches width for each 100 persons, subject to a mimimum of 60 inches. In this case a corridor 66 inches would be required, or about 197' x 5'6" or 1,084 sq. ft., 10% of the floor or 4 sq. ft. per person.

3. Wisconsin standards for classroom buildings state a unit of exit width as 30 inches, dispite universal agreement on 22". We have a mimimum corridor width of 48" dispite some agreement on 60". Occupancy is determined by dividing classroom area by 10. The mimimum corridor must also equal ~~some~~ aggregate stairway width.

4. These details are mentioned only to emphasize that each state and each kind of occupancy have their own standards. As a result efficiency of building rentable areas, sites, and buildings of different occupancies lack a good deal of comparability which make difficult analysis of site productivity and comparable market data. These differences are always submerged in the various rules of thumb which one encounters such as gross rent multiplier or building efficiency ratio or the various FHA ratios.

5. The developer also must be aware of these regulations within which the architect must operate to proportion the building and create the desired floor plan.

II. Elevators transport millions of passengers but it is not a very effient means of transportation. An elevator can handle 2-500 people an hour while an escalator will handle 5,000 an hour but does it in too slow a manner for high rise buildings.

A. Secondly elevators take a big bite out of a building's rentable space. In a skyscraper an express elevator may serve the top 30 floors but must have shaft space through all the floors it does not serve. Moreover, it must serve floors of some size to have sufficient density of traffic per stop. Because elevators in a tall building will use as much as 25 % of lower floor area, the height of buildings is limited on small and medium sized lots.

B. Many ingenious schemes are used to reduce elevator capacity. including double decked cabs serving alternative floors and running a local and express car in the same bank or shaft. However this latter system creates lift inefficiency because of the problem of running hoisting cables of the local car past the express car.

C. The other component of vertical circulation is the stairway. These too use up rentable space. There must be two stairwells at a minimum . Generally, the entrance to any room must be not more than 75 feet from a stairway - although some experts prefer to measure safety in terms of 15-20 seconds from any starting point. The capacity of stairs to carry people is based on a 22 inch width step, which rates a one story stair 30 persons per minute for 22 inches of tread width.

D. Stair capacity is related to corridor capacity, both of which are related to intensity of or density of population and peak loads this population will place on horizontal and vertical circulation routes.

E. For example, peak corridor and stairway loads in a classroom building will be higher then in an office building with the same population density, and obviously less where density is lower. Class room halls require twice as many square feet of corridor per person as office space.

1. Studies show 1,000 square feet of corridor for 250 class room seats, or 4 square feet per person is desireable.
2. Since corridor traffic should flow evenly, class room doors should be staggered and elevator passengers should stand adjacent to but separate from the main corridor. (Commerce example)
3. Some office areas require a minimum corridor of 44 inches, the minimum width which permits two persons to pass with comfort.
4. The architects also have formulas which relate the height and width of corridors to what is esthetic as well as functional to avoid what is narrow or low. Or to permit the movement of special equipment.
5. One study of university buildings indicated corridors represented about 16% of gross building area and stairs 3%. Moreover an addition of just two feet to a corridor or stair width would increase the gross area by 4% and 1% respectively. Over design can be expensive luxury but under design means an unattractive building, particulary where stairwells create a bottleneck.

6. Note that density of floor population will determine total tread width, but these widths can be distributed in various ways among the various stairs serving the floor. For example, if 7½ units of exit width are required, it may be cheaper to build three 56 inch stairs. But it may be more functional to build one 78 inch stair and two 44 inch stairs. ~~The Commerce School is a bad example of this kind of error~~. Stairs should be planned in relation to present and future circulation patterns. Moreover highest density uses should be on ground floor and so on. ~~(again, Commerce School example)~~

III. Obviously there is a relationship between land cost, structure cost, elevator cost, and required population density. We can develop both a specific and a general example.

A. Assume a ten story building with a classroom capacity of 400 per floor or 4,000 student total. Assume a gross floor area of 10,000 square feet and a gross building area of 100,000 square feet.

B. To transport 40% of the student station capacity in ten minutes will require an investment of about $1,500,00? This is the cost, probably minimal, of twelve large (7,000 pound capacity) passenger elevators. An elevator of this size can carry 47 persons but in practice the average load would be about 33 persons. ~~passenger elevators, including hoistways.~~

C. To evaluate this kind of expenditure two questions should be asked and answered: What is the ratio of elevator cost, and how efficient is the performance of the elevators?

D. The total construction of the building in the example, without elevators, would be in the range of $2,000,000-2,500,000 , even if the gross area were distributed over three or four stories. Converting the same functions to a high-rise, elevator equipped building would thus add 60% to the cost. This additional expenditure would presumably be offset by savings in land and, to a small extent, by savings in stairwell area. The savings in stairwell area would at most equal the increment between the stair width as determined by code and as recommended in the previous section of this report. It is very doubtful if this increment would exceed one percent of the gross area of the building.

E. The efficiency of this building is therefore questionable. 40% represents 60% of a building used at 2/3's capacity. The real problem is that it takes ten minutes to transport all 1,600 students who ride the elevators, and one trip of the elevator takes 2 minutes 45 seconds.

F. Therefore it is necessary to restrict heavy concentration to the lower floors and light densities above. This juxtaposition is also appropriate off campus.

Example 1: We have skyscraper hotels built over low rise department stores.

Example 2: Office buildings often build to the lot line on the lower floors and then set up tall towers which become smaller as floor densities decline and the number of elevator shafts is reduced.

Optimum Relationship Between Land, Building, and Vertical Circulation

1. $(\Sigma C)_1 (\Sigma C)_2 \ldots (\Sigma C)_n$

for any one building, where ΣC is the sum of the costs and subscripts 1...n represents the various possible solutions listed in ascending order of costs. ΣC may be defined as

2. $\Sigma C = C_L + C_R + C_E$

where C_L is the cost of land, C_R is the cost of building (excluding elevators or escalators) and C_E is the cost of elevators and/or escalators.

Since the concern here is with the relation between land use and building height for a fixed volume of usable space, the problem may be considered in terms of the number of floors required under specific constraints. For any one possible solution the cost per floor may be expressed as

3. $\frac{\Sigma C}{N} = \frac{C_L}{N} + \frac{C_R}{N} + \frac{C_E}{N}$

where N=the number of floors.

Among several proposals involving differing heights the "break even" point in sacrificing land to heigh may be stated as

4. $0 = \Delta \frac{C_L}{N} + \Delta \frac{C_R}{N} + \Delta \frac{C_E}{N}$, or

5. $-\Delta \frac{C_L}{N} = \Delta \frac{C_R}{N} + \Delta \frac{C_E}{N}$

where Δ is the increment of change. Typically, the increment land cost per floor diminshes as the incremental elevator and/or escalator cost per floor increases; therefore, at some point they will be in balance and it will be possible to determine the building ehight which results in the minimum aggregate construction cost. This is expressed algebraically in the equation (4) XXXXXXXXXXXXXXXXXXX Each of the cost elements in equation (5) may then be expressed as a unit cost multiplied by a quantity.

6. $-\frac{\Delta(P_L)\Delta(L)}{\Delta N} = \frac{\Delta(P_V)\Delta(V)}{\Delta N} + \frac{\Delta(P_E)\Delta(E)}{\Delta N}$

Where p_L is the unit price of land, L is the amount of land, P_V is the unit price of building (exclusive of elevators and/or escalators), V is the volume of construction, P_E is the unit price of elevator and/or escalator capacity, E is the amount of circulation capacity and N is once again the number of floors.

Introduction

~~INTRO~~ TO COMMERCIAL LEASES

I. A lease is a risk management device which is designed to stabilize the set of assumptions which might have been implicit in the minds of the party at the time the contract was made. These assumptions have their origins in a number of areas:

A. The meaning of words
B. The identity of the parties
C. The description of the space
D. The performance of the parties
E. A change in future circumstances and conditions
F. The machinery for administration and enforcement

II. Ultimately both parties wish to eliminate so far as possible any variance in their future budgets for receipts and expenses.

A. For the office building developer, he wants to fix his capital cost budget, his operating expenses and his net income from as much business risk as possible so that he can tolerate a higher break even point and thereby borrow more money on his equity. By the same token the tenant wants to treat his rent expense as essentially a fixed expense which will adapt to his changing business volume requirement. To varying degrees the tenant is concerned with:

1. Predictable cost
2. Public image
3. Convenience to and for his customers
4. Comfort and acceptability for employees
5. Functional layout and efficiency
6. Capacity for growth

III. The marketing of office space may be done by the building management, or through a general listing with local commercial brokers, or through office space specialists.

A. Different locations appeal to different business specialties and the linkage may be to a bank, a court house, a business club, a commuting route, a primary economic function such as a stock market or simply the romance of an area.

B. The second marketing feature is ease of access by car, train, or in some cases by boat.

C. The next major selling point is the vertical transportation system.

D. Floor space is judged by its efficiency in the room layout and is then packaged by a choice of ceiling packages, partition systems, and carpeting.

E. Generally the price per sq. ft. includes a decorating allowance for the initial layout and extra costs are then amortized over the lease period. The office building developer often uses these finishing elements as a significant profit center.

F. For major corporate structures, an elaborate heirarchy of furnishing options will be set up for each position on the company organization chart. In others the deductability of these expenses leads to conspicuous consumption.