

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

3. Development Topics

m. "Industrial Development", no date

INDUSTRIAL ~~LAND~~ DEVELOPMENT

- I. Industrial land development has become exceedingly complex since the days when one looked for the cheapest land adjoining a railway track or a waterway. There are a variety of viewpoints which might be considered, including that of the developer, the industrial space user, the local community or regional and national economic impact. The viewpoint changes with the level of abstraction or level of aggregation one takes for perspective.
 - A. The viewpoint of the ^{developer} ~~developer~~ can be briefly summarized by referring to his feasibility problems:
 1. Strategic objectives for leverage or ~~spin-off~~ benefits
 - a. Pricing of land--purchase ~~by~~ the acre/sell by the foot
 - b. Spread between market rent constants and debt service constants for cash throw-off
 - c. Spread between cash cost for development and mortgage loan power
 2. Spin-off objectives
 - a. Construction
 - b. Mortgage banking
 - c. Kicker participations
 - d. Brokerage and leasing
 - e. Estate building
 - f. Employment and tax base for non-profits
 3. Marketing and merchandising is far more difficult and unpredictable than residential development as will be shown by consideration of the user viewpoint
 4. Legal-political constraints have become a study in contradictions between the short and long-term use, local vs. regional, and growth vs. no growth philosophy
 5. Physical-technical constraints make speculation difficult in terms of finished product
 6. Financial constraints are relatively simple except for planning the time-line of development
 - B. The user of industrial space is confronted with a classic economic problem in adjusting his location and facility choices to his present and future costs of production and distribution. The variables affecting his choice are infinite and often subject to rational specification in modeling. But since many firms lack ~~the~~ sophistication, the potential complexity for the individual decision gives the developer his major competitive edge--namely simplicity and assumption of responsibility for the detailed decision.
 - C. The community viewpoint is shifting rapidly from an innocent ^{perspective} ~~viewpoint~~ that all new tax base is good to more elaborate consideration of:
 1. External costs created for the community net of external benefits
 2. Compatability ^{of} ~~at~~ new industry with existing community resources and values

3. Growing realization that short term benefits vs. long term derivative impact militate against most major industry

D. While ^{these} regional and national economic theory will profoundly influence the ~~3~~ parties above in the aggregate, the study of these forces is left to other courses. We will look at a single decision maker and the choices he can make. Nevertheless, industrial development is directly tied to some basic economic philosophy which affects the equity of the decisions made:

1. Urban concentration Vs. employment dispersion for ecological and defense purposes

2. Need for mobility of capital and labor in a price economy

3. System efficiency in export vs. import vs. local stability at the cost of economic surplus

4. Primary growth vs. resource conservation and non-growth

5. Short-term equity and opportunity vs. long term national interest and responsibilities

II. The industrial developer begins with land in search of an industrial user or an industrial user in search of a site which best serves his economic system. ~~First lets~~ consider the developer of an industrial park or an industrial district, which are not the same.

A. Industrial park means a planned or organized industrial sub-division, with immediate availability and basic utilities, operating under a specified set of controls for the mutual benefit of the community and the industries located within the park. The Industrial park is not just a tract of land set aside on the maps for industrial use and left to evolve into some nebulous complex. The industrial park should be only part of the overall community effort to promote local economic development, a tangible display of the community will to be and to do that which is necessary to attract and to hold industry.

B. An industrial district lacks the one owner, one plan, continuity ^{of} ~~to~~ a park and may exist for large land users as a result of zoning, by default as undesirable for other uses, or by historical accident and ~~a~~ ^{the} grandfather clause

C. As compared to residential parcels industrial sites are much more sensitive to engineering problems inherent in some of the following items:

1. Spoilage--undisturbed samples of site soils are a must. While percolation tests to determine the permeability to water or septic suitability are important, the most significant tests are shear tests to determine soil strength, consolidation tests to determine compressibility, and compaction tests to show the density at which fill soils can be added.

2. Topography and shape affect street layouts, side tracks and plant shape and cannot be fragmented or irregular. By the same token topography must be relatively level.

3. The quality and quantity of water service is one utility for an industrial park which cannot be improvised and the presence of metropolitan service is not only determined by quantity and pressure for fire rates but also by such indexes (expressed in ppm) as

Color not over	10 ppm
Turbidity not over	10
Iron not over	.25
Hardness not over	20
Total solids not over	100
Ph not over	8. and not less than 6.

4. Sewerage is more than a problem of existence of size of main. For many types of industry generate toxic or difficult wastes to treat relative to existing municipal systems.
5. Storm drainage is also tricky because the convenience system of the industrial park may over-tax the major system of the adjoining community. The major system is the natural path that flood waters take when the capacity of the man-made convenience system has been exceeded. The critical issue lies in determining the frequency with which the convenience system should be exceeded and the degree to which facilities should be sited above high water for a 100 year, 50 year, 25 year, or 10 year storm taxing the major system. Acres of roof and parking lot significantly shift storm water drainage patterns.
6. Utilities were not until recently a bottle-neck but in recent years distribution systems for natural gas has significantly distorted geographic availability and environmental issues are crimping electric supplies and transmission.
7. Since any industrial-commercial facility is essentially an exchange point between transportation systems, access and terrace become a dominant factor. Physical proximity is visually obvious but the intangibles of competitive tariff systems and formulas have more economic impact in the long-run. Employee access is as significant as raw material and shipping and explains many moves by labor intensive enterprises.
8. The site must enjoy linkages to services upon which if customers come, suppliers and employees rely including the after 5 environment of the employed. Research people may wish to be near universities while working wives may wish to be near shopping and schools. Even lunch hour services may be critical.

D. However, before the political, marketing, and financial problems of the developer can be appreciated it's necessary to look at the economic viewpoint of the industrial space user and the community.

III. The location and facility ^{planning} problem of an industrial space user is an extremely complex problem which is both quantitative and qualitative. It is a classic and favorite ~~planning~~ problem for modern information processing techniques and each solution is unique to the internal dynamics of the front so it is very difficult for the developer to know the needs of his potential ~~customers~~ or to rely on the irrational needs or common requirements which profit a class of home buyer.

A. Among alternative location methods are:

1. A conventional rate of return on investment ~~analysis~~ analysis
 2. A qualitative screening elimination ~~of~~ ^{of} ~~guid~~
 3. Mathematical assimilation
 4. Linear programing
 5. Heuristic programing
 6. Combinations of the above
- B. ~~In your readings~~ ^Factors influencing location are suggested by ~~The Value~~ ^Judgments expressed in an article from The Harvard Business Review, The Investment ~~Return~~ ^Return approach suggested by Fantus in a taped interview, A Matricus Approach in Urban Land and a Check List approach ~~from~~ ^{from} the Architectural Record
- C. To suggest the complexities of mathematical assimilation consider a summary of the investment approach:
1. One criterion would be annual after tax distributable earnings as a per cent of firm net worth before and after a change in location or facility.
 2. Ultimately the change in capital investment is a budgeting ~~decision~~ ^{decision} which depends on the change in:
 - a. Net sales revenues
 - b. Cost of raw materials including transportation
 - c. Total cost of labor per unit produced
 - d. Occupancy costs
 - e. Management costs
 3. The net worth position and total invested capital must shift due to
 - a. net change in land investment
 - b. Net change in facilities and equipment investment
 - c. Direct costs of moving and retraining
 - d. Indirect costs of relocating which would be capitalized

COMMENTS ON INDUSTRIAL DEVELOPMENT

- I. We have discussed previously site selection and layout of the industrial park. In our treatment of industrial development here, I would like to touch on two problem areas - (1) community industrial promotions, (2) physical plant design.
 - A. Most communities have now gone into the business of industrial land and building development. Many provide a variety of capital subsidies to industrial firms to lure new payroll to the community. The private developer cannot compete in those areas where industry does not have a natural profit motive to move to anyway. Chicago and Dallas are magnets for private relocation, but Herkimer, Kentucky or indeed, Madison, Wisconsin must provide special incentives.
 - B. Spending local tax money or making private non-profit investment is related to growing public alert of economic base, which we treated early in the semester.
 - C. The gains of industrial development should be obvious to you, but unless the development is properly timed and controlled, they will cost the community severely
 1. Individual tangible costs:
 - a. Higher taxes to support increased public expenditures,
 - b. Higher prices as demand increases, and
 - c. Higher costs for personal services.
 2. Individual intangible costs:
 - a. Time and effort in acquiring industrial skills,
 - b. Time and effort donated to community benefit activities,
 - c. Less convenience, as regulations become necessary to control public activities,
 - d. Loss of satisfaction associated with a former way of life as the regimentation of industrial society is effected, and
 - e. Reduction in identity with products, or individual pride of workmanship.
 3. Institutional or structural costs:
 - a. Modification of traditional patterns and programs,
 - b. Increased inequality of income thus aggravating the difficulty of "keeping up with the Joneses,"
 - c. Public support through changing loyalties (as in municipal administration),
 - d. Transitional tensions,
 - e. Loss of cohesion in social order as social mobility increases, and
 - f. Reorientation of social relationships.
 - D. Since the specifications for a site relocation decision by any one firm are so unique, and because the firm today has so many alternate opportunities of roughly similar characteristics, the town on the prowl for a new industry faces the likelihood of disappointment and frustration.

II. Every state and county has their own program for attracting industry. Generally they include a mix of the following devices:

- A. States have resource development agencies which advertise state attractions for industry and solicit directly from likely corporate candidates for relocation. At the same time these agencies lobby in their own state legislature for favorable tax laws, workmen"s compensation rules, highway programs, and other state policies which would attract or repel business investments.
- B. At the county level many states permit sales of tax exempt ~~revenue~~ revenue anticipation obligation bonds, the proceeds of which may be used to purchase land, construct plants, and buy machinery for new resident companies. This can be very attractive;
 - 1. For a ten year lease a company may occupy a fully equipped plant without a penny of capital outlay.
 - 2. Financing costs are lower because tax exempt bonds bear an interest one or two per cent less than going mortgage rates.
 - 3. Land, buildings, and equipment are exempt from property taxes for the term of the lease.
 - 4. Financing can be arranged quickly as the prime security for the loan is the taxing power of the county; unfortunately this leads to acceptance of marginal leases.
- C. The Federal Area Redevelopment Act may also designate a county as eligible for ARA funds to finance up to 65% of plant costs including land and machinery at an interest rate computed as the average current yield on US treasury notes. The other 35% of the cost of a leased plant, a lease limited to 25 years at a rate which will amortize the loan, is financed with local funds.
- D. The Federal Small Business Administration will loan up to 80% of plant development cost for ten years at 5½% either to a local development group or direct to the company.
- E. Countless communities have local development corporations for the sole purpose of financing and building plants for responsible manufacturers. Capital stock is purchased by local citizens who have no expectation of direct personal gain, the stock being non-profit in practice if not by design.
 - 1. For example the local development corporation may borrow 70% of plant cost from a lending institution, providing the other 30% through stock sale. On a net net lease sufficient rent is charged to pay the interest and amortize the loan over a 12 year period. For the next eight years a rent is charged to repay the stockholders their 30% and perhaps some modest return on their money. The tenant will then have the option to purchase or lease for the next 79 years.
- F. Local power companies often provide complete counseling service *and* market research information without charge.

G. For an example of public and private profit see the article in January 11th Business Week on page 50 - the name of the article is A One Man Magnet for Industry, Charles E. Daniel. He has built more than 400 factories in the southeast worth \$2 billion and which employ more than 150 thousand workers since 1935.

III. The structural requirements of an industrial plant have certain general specifications and some particular engineering problems. Both problem areas can be further subdivided into structural and equipment considerations:

A. The structural form, the fabric, together the building envelope is designed for the following requirements:

1. Speed of erection,
2. Free span space necessary for operation to be housed,
3. Adequate daylight or light control.
4. Provision for heavy equipment in floor load capacity and overhead provision for cranes.
5. Low maintenance
6. Flexibility of use
7. Ease of future expansion (including excess utility capacity)

B. Building equipment is a highly technical engineering field in which capital cost versus maintenance expense is used in a process of economic selection:

1. Air conditioning may not only be required for comfort but for quality control.
2. Exhaust systems and spot cooling may need to supply, wash, and return inside air.
3. Business management indicates the nature of power supply and the system by which it is distributed among users in the factory.
4. Water supply, a critical element not only for volume but for chemical content, i.e., acidity or impurity.
5. Waste disposal, which may be scrap removal or a complete plant for sewage.

→ C. Fire protection has brought about many changes in plant design. Indeed many state building codes follow almost exactly the recommendations of the underwriters' board. The Livonia fire brought about new engineering specifications and fire rating methods provide incentive to follow the new developments.

1. As a result of the Livonia fire, steel deck roofing has been redesigned to prevent dripping of hot tar and subdivision walls within the plant are brought through the roof as parapet walls.

2. Industrial and commercial buildings are all rated according to Dean's Analytical Schedule. This requires analysis by a fire engineer of structure, occupancy, environment, and housekeeping. The structure is carefully analyzed in terms of the ignitability ~~XXXXXX~~ and combustability of its materials and its effect on contents. For example open stairwells are penalized, ~~XXXXXX~~ open wood joiced roofs cause a great increase in rate, a drain on income which is generally of sufficient capitalized value to justify a more expensive original construction method. Fire engineers in the State Fire Insurance Rating Bureau will review blueprint or existing rating schedules to suggest how insurance costs can be reduced and loss prevention improved.
 3. So called fire proof materials may still not be suitable for a fire proof structure. For example steel does not burn but warps very quickly when exposed to open flame. Stress capacities of aluminum alloys disappear at high temperatures of 500 degrees or more. Asbestos products contain much cement which may cause it to crack or shatter when exposed to heat. A glass barrier will stop flame and smoke but transfer heat to ignite other areas. Materials must therefore be selected in relation to the nature of the occupancy as well as insurance penalties or savings.
 4. Fire insurance rates greatly favor a sprinkler system - with the premium reduction often paying for the system in four or five years. A good example is Bascom Hall which just recently installed sprinklers.
 5. Since the largest single factor in fire is the occupancy of the building, it may be necessary to build several small buildings instead of one. Particularly hazardous operations may be housed in one structure while other operations are put in another. Only one small area need bear a high premium rate while the other buildings can be insured at more normal premium rates.
- D. Actual layout of a factory is a matter of production management analysis and creation of a flow diagram, referring to the flow of inputs through various processing operations to appoint where they are ready for shipment. Naturally the ideal is to receive raw materials on one side of the plant and ship the completed product from the other side. For communities which have built a building and are looking for a tenant, one of the biggest stumbling blocks is that the shape and span of their building do not fit the flow diagram of a possible tenants industrial engineer. Automation has made this chart dominant in the leasing or sale of a plant.