Building Planning...part I
Groundwork for Interior Architecture

Basic organization forms

- Centralized Organization
  A central dominant space about which a number of secondary spaces are grouped.

- Linear Organization
  A linear sequence of repetitive spaces.

- Radial Organization
  A central space from which linear organizations of space extend in a radial manner.

- Clustered Organization
  Spaces grouped by proximity or the sharing of a common visual trait or relationship.

- Grid Organization
  Spaces organized within the rules of a structured grid or other three-dimensional framework.

You might generate alternatives in more than one.

Or the site, or inner organization of the clients enterprise might hint at which is most appropriate.

Ultimately these begin to form a backbone, an armature to hang the building infrastructure upon.
Deploying infrastructure

- Building planning is a design stage where the infrastructure elements of the building are located in ways that meet the appropriate codes and delineate space for the primary functions of the building.

Put these somewhere...in a way that makes the primary functions better

- Elevators
- Stairways
- Entry/Lobby
- Toilets
- Mechanical/Systems spaces
- Circulation elements, corridors, egress paths
Know the land

- From a building planning perspective, this might mean answering these questions
  - Where do we enter?
  - Where should trash and deliveries go?
  - Does the building have to be phased or planned for an addition?
  - Which orientation or orientations have the highest value? Which have the lowest?

Know a few things about the code

- ...how to get out in a fire
- ...how to arrange exits
- ...how big they have to be
- ...
Egress

- Promoter P.T. Barnum is said to have charged people 25 cents to enter a darkened room and “See the Egress.”
- Once in the darkened room, the people could only see a dim light over a door with a sign on it saying “This way to the Egress.”
- Upon opening the door and walking through they found themselves on the street!
- Egress is the term applied to the various means (corridors, stair enclosures, stairs) to be used as a means of escape in the event of a fire or other disaster in the building.

Some key IBC Definitions

- Area of Refuge: Area where persons unable to use stairways can remain temporarily to await instructions or assistance during emergencies
- Corridor: An enclosed exit access component that defines and provides a path of egress travel to an exit.
- Exit: That portion of a means of egress system which is separated from other interior spaces of a building by fire resistance rated construction and opening protective as required to provide a protected path of egress travel between the exit access to the exit discharge including exit doors, exit enclosures, exit passageways
How Many People?

- The IBC offers the choice of two processes for determining the number of people (occupants) in the building.
- The first method is to determine the actual number of people in the space.
- This is easier to do in a building with fixed seating (auditorium) than in say an open office space where, the density varies over time.
- The second method is to refer to the Maximum Floor Area per Occupant table, find your use type, divide the number of gross square feet per occupant in the table into your project’s gross square footage to arrive at the number of occupants in the building, or per floor.

Occupant load table ...excerpted

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Floor Area in Square Feet per occupant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly without fixed seats</td>
<td></td>
</tr>
<tr>
<td>Concentrated (chairs)</td>
<td>7 net</td>
</tr>
<tr>
<td>Standing space</td>
<td>5 net</td>
</tr>
<tr>
<td>Unconcentrated (tables and chairs)</td>
<td>15 net</td>
</tr>
<tr>
<td>Business Areas</td>
<td>100 gross</td>
</tr>
<tr>
<td>Dormitories</td>
<td>50 gross</td>
</tr>
<tr>
<td>Educational</td>
<td></td>
</tr>
<tr>
<td>Classroom Area</td>
<td>20 net</td>
</tr>
<tr>
<td>Vocational Areas (shops)</td>
<td>50 net</td>
</tr>
<tr>
<td>Library</td>
<td></td>
</tr>
<tr>
<td>Reading Area</td>
<td>50 net</td>
</tr>
<tr>
<td>Stack Area</td>
<td>100 gross</td>
</tr>
</tbody>
</table>

So our Business Occupancy would take the program area (40,000 s.f.) and divide it by 100 s.f. to determine we have 400 occupants.
Egress convergence

- As the occupants from a floor above exit through lower floors, they don’t impact the exit size for the floor they pass through, but the exit size cannot get smaller.

- But when exits converge at a floor, like the ground floor where they leave the building, the occupant load for the ground floor must take into account the occupant load of the floor immediately above.

- First floor, 10,000 s.f. = 100 occ + 100 from second, 200 occupants

How wide does that make the exit?

- The IBC reads “The total width of the means of egress in inches shall not be less than the total occupant load served multiplied by”
  - .3 for stairs in unsprinkled buildings
  - .2 for corridors, other egress components in unsprinkled buildings
  - .2 for stairs in sprinkled buildings
  - .15 for other components in sprinkled buildings

- So our top floor stair in our unsprinkled example could be no less than 100 x .3 or 30 inches…not nearly wide enough to meet minimums of the IBC or ADA

- So the code continues to read “nor less than specified elsewhere in this code” so it lets itself out of an apparent contradiction
Stairways

- Two required
- Fully enclosed with 2 hour fire rated construction
- Minimum stair width 48"
- Max stair width without intermediate railing = 5'
- Minimum headroom = 80" from nosing line
- Max height between landings = 12'-0"

Minimum depth of landing, 48"
Max intrusion of door on landing = 7"
Max riser 7"
Min tread 11"
Within 3/8 of same dimension for all steps

Stairways...cont’d

- Handrail height 34" - 38"
- Handrails required both sides, 1-1/4 to 2" dia, 1-1/2" from wall (clear)
- Handrails must extend 12" beyond top riser, and one tread (11" min) beyond bottom tread
Exits cannot be closer than 1/2 the maximum diagonal distance of the floor plate.

Diagonal is 100' long so 1/2 diagonal is 50 feet.

So in this example, the exit stairs could not be placed closer than 50 feet apart.

Maximum travel distances would be for this type ‘B’ building:
- 200 feet without sprinklers
- 250 feet with sprinklers

What would be the maximum stair spacing in a sprinkled type ‘B’ building?
Dead End Corridors

- A corridor not ending in an exit is considered a **dead end corridor**
- Dead end corridors are limited to 20 feet in length in most occupancies.
- In occupancy group B with a sprinkled building, the dead end can be extended to 50 feet long.

On your way to the exit...

- **DO NOT** plan the egress path to exit through another tenants space
- **DO NOT** plan the egress path to exit through storage spaces, kitchens, mechanical rooms...or other high hazard occupancies.
- But exiting through a non hazardous accessory space is acceptable, as long as there is a clear path discernable to the exit.
Where do we enter?

- Prominence
- Number of entries
- Security
- Types
  - Public
  - Employee
  - Service
  - Shipping/receiving

A 150x250 site

- Easy Street
- Alley
- Adjacent structure
- Main Street
Zoning setbacks

Where do we enter?

Possible service

Barrier! No view!

Best public/employee entry
Now you need the insight

- If the employees have to clock in, change clothes, and report to the workspace, then the lockers/lunchroom/timeclock need to be near their entrypoint.

- If they just walk in and go to their workstation, there’s no need for this.

Now you need the insight

- If there is a public/retail first floor, the street-fronts become high value, so putting employee or utility functions there would be counterproductive.

- If the business ships and receives high volumes of product, then the side-street and alley become high value.

- Regardless, we need to keep in mind, trash storage, backup generators, and misc. delivery.
Example, multi-tenant office building

Key issues
- Return on investment
- High net to gross ratio (what’s that?)
- Clear circulation/wayfinding
- Maximize value of perimeter glass/views
- Allow for street level retail

Public/employee sequence dominates... but doesn't locate

- Double loaded lobby allows two retail tenants
- Single loaded would allow one larger tenant
- Challenge might be identity
If its an office building...

...but the tail can’t wag the dog

- The corner retail will produce higher rental costs, but will it compromise the 15 floors of building above it?
- The street-front retail will tolerate more spatial disruption due to its lower rents, but how much can we intrude on it?
Time to consider the cores

- coreS?...not just one?
- Every floor will need
  - Elevator access
  - 2 means of egress (elevators won’t count)
  - Toilets for each gender
  - Some electrical/telecom space
  - Some space for ventilation/hvac
    - Could be a shaft
    - Could be a fan room

A midrise building core
A minimal stair

• 48 inches between handrails
• 1.5” handrails (each side) that are 1.5” from the walls
• So a single run of stairs is 54” wide
• If the stair runs between 12 foot floors,
  • 12x12=144” of rise
    • divided by max riser 7.0 = 20.5 risers, say 21 at 6.8” or just over 6 and ¾ inches.
    • always one less tread than riser so 20 risers at min dimension of 11 inches so 20x11 inches = 220 inches or 18 feet 4 inches of horizontal run, add 6-5 foot landings at the top and bottom if doors open into the stairs) (and, not counting the ARA), the overall inside of the straight run stair is 31’2” x 5’4” wide.
  • now work out a dual run stair.

Building Planning… Part II

Core strategies
Other core responsibilities

* Besides housing egress, access, toilets and HVAC, cores often act as the primary space definition elements on a floor.

* They also are often used for lateral bracing of the structural frame, with walls reinforced to be shear diaphragms or with “X” bracing or chevron bracing concealed within their enclosing walls.
Core location

Lever House, NYC, Gordon Bunshaft, 1952
Core location

Sendai Mediateque, Ito atomizes the core
Considering cores...

Easy Street

Alley

Adjacent structure

Main Street

High-value corner retail

Lower-value streetfront retail
Single Tenant
Tenant- 20,520 sf
Employees: 87 (actual)
Efficiency: 224 sf/capita
Dual Tenant
Tenant A - 10,083 sf
Tenant B - 9,092 sf
Employees: 34/45 (actual)
Efficiency A: 297 sf/capita
Efficiency B: 202 sf/capita

Triple Tenant
Tenant A - 4,945 sf
Tenant B - 7,146 sf
Tenant C - 5,602 sf
Employees: 24/18/19 (actual)
Efficiency A: 206 sf/capita
Efficiency B: 397 sf/capita
Efficiency C: 295 sf/capita