# INDUSTRIAL BUILDINGS, GENERAL

#### 1. Administration

The following organizational relationships must be worked out before the planning of this area can be developed:

a. Recoption Room

Number of seets

Receptionist-special or part of the general office, extra duties (typing, etc.), equipment

b. Executive Area

Private Offices -- number, occupant of each, size of each, furniture and equipment for such, closets

c. Departments and/or Divisions

Accounting, bookkeeping, production, etc.

d. Private Offices in Each Dopartmant Number, occupant of each, size of eech, furniture and equipment for each, closets General Work Areas in Each Department

Personnel in each, equipment in each, storage requirements for each ,

f. Special-Process Rooms/Areas

Conference room Library , Projection room , Mail and shipping Reproduction room Secretarial pools Telophona equipment rooms liospital areas FDX room—type of board number of positions IBM room File room Private tollels and showers Stock and storage rooms Rest rooms

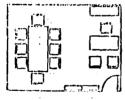
v. Gozeral Information

Interrelationship of person and department Clothing space Tima ciocks Water coolers

ACMINISTRATION EXPANSION RECEIVING EMPLOYEE FACILITIES INTERNAL AND SHIPPING RESEARCH AND CONTROL ENGINEERING FIXED FACADE -RAILROAD AND OR TRUCK EXTERNAL ENGINEERING

Lampiran berikut merupakan standar macarh ruang yang umum terdapat pada kantor perusahaan industradan modul besaran ruang yang dapat dipakai sebagai acuan dalam

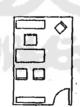
Fig. 3 Paperangangan.



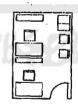
(a) PRESIDENT 300 SQ.FT.



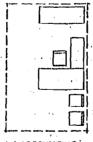
(b) COMPTROLLER AND SENIOR V.P. 196 SQ. FT.



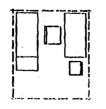
(c) ASSISTANT V.P MANAGEMENT 150 SU.FT.



(d) AUDITORS (SHARED OFFICE) 150 SQ. FT.



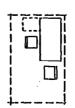
(e) ACCOUNTING 130 S.Q. FT.



(i) EXECUTIVE SECRETARY 85 SQ.FT.



(6) SUPLAMISCA (DEPARTMENT HEND) SU SULFY.



(h) GENERAL OFFICE SPACE 50 SQ. FT.



(i) GENERAL OFFICE SPACE NO OUTSIDE CONTACT 48 SQ.FT.

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Building Name	Main Admin Building		Changing Facility	Mosque	Cafeteria	Lab	
Population	200		200	400 -	200 (shift)	15	
No. of Stories	3		1	1	1	1	
Blast Resistant	no		no	no	no	no	
Frame	Reinf Conc		Masonry	Masonry	Masonry	Masonry	
Exterior Walls	Masonry		Masonry	Masonry	Masonry	Masonry	
Interior Partitions	Masonry		Masonry	Masonry	Masonry	Masonry	
Function	Reception Administr		Changing Room	Prayer Room	Food Prep & Dining	Central for all process units	
Office(s)	yes	7	no	no	yes	yes	
Meeting Rooms	yes		no	no	no	yes	
Locker Rooms *	yes	10	400 lockers only	no	yes	yes	
Restrooms	yes	W.	yes	yes w/ ablution	yes	yes	
Training Facilities	yes	4 6	no	no	no	no	
Recreation Area	yes	171	no	no	no	no	
Store Room	records arch.		yes	no	yes	yes	
Workshop	no		no	no	no	yes	
Computer Room	yes		no	no	no	yes	
Lighting	offices		area	subdued	indoor area	indoor	
Prayer Room	yes (12)	5	no	na	no	yes (6)	
HVAC/Ventilation	HVAC		HVAC	HVAC	HVAC	HVAC .	
·				- W. W. L.	7/1		
Sprinklers	yes		yes	no	yes	yes	
Fire Suppression Sys	yes		no	no	no	no	
Fire Detection	yes		yes	no	yes	yes	
Extinguishers	yes		yes	no	yes	yes	
Overhead Cranes	no		no	no	no	no	
Remarks	elevators		Issue protective			waste?	
* includes showers			clothing & hats				
			NO showers				
Approx. Area 3000 n			100 m2	1200 m2	600 m2	650 m2	

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## 3.2 BUILDING PRESSURIZATION

- 3.2.1 Buildings or portions of buildings may be pressurized with safe air to facilitate:
  - a. The use of general purpose equipment in a potentially hazardous area.
  - b. Proper operation and maintenance of computers in a clean environment.
- 3.2.2 Pressurizing systems shall be designed to maintain a positive pressure of 1/4 inch (6.35mm) of water with all building openings closed.
- 3.2.3 Methods of achieving proper sealing include weather stripping at exterior doors, caulking and sealing around cable tray entries and other openings, air locks at all personnel exits from pressurized areas to non-pressurized areas, and positive latching hardware and door closures for all air lock doors. Preferably, no windows shall be provided. If windows are required for visual observation, the window area shall not exceed 5 percent of the wall area in which it occurs. Glazing shall be insulated, double pane.
- 3.2.4 In the case of a pressurized room in a non-pressurized building, the walls shall be sealed to the roof, or the suspended ceiling shall be constructed of gypsum board with cemented acoustical tiles and surface mounted lighting fixtures.

# 4 REQUIREMENTS FOR THE BUILDINGS

### 4.1 ADMINISTRATION BUILDING

- 4.1.1 Provide an entry area for receptionist, security, and a waiting lounge for visitors.
- 4.1.2 Provide a large multimedia conference room with video conferencing capability on ground floor (first floor). Provide a medium conference room on each of the other floors which can be reconfigured to be 2 small conference rooms.
- 4.1.3 Provide reconfigurable cubicle space and supervisors' hardwall office spaces as required by Client.
- 4.1.4 Provide appropriate bathroom facilities with at least one set containing showers and clothes changing facilities.
- 4.1.5 Provide appropriate office furniture and equipment (chairs, desks, file cabinets, bookshelves, etc.)
- 4.1.6 Provide computer systems and networking capability throughout the building. The capability should exist for each desk to have a computer and the network should be sized to operate at 80% of capacity. The network should include the Central Control Building,

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Maintenance Office, Field Office and Medical Center, and Fire Station as well as access to the outside world.

- 4.1.7 Include adequate parking.
- 4.1.8 SPACE REQUIREMENTS
  - a. The plant office building may contain some or all of the following spaces as requested by the Owner.
    - 1. Office space
      - a) General offices
      - b) Private offices
    - 2. Reception area
    - 3. Conference rooms
    - 4. Training rooms
    - 5. File room
    - 6. Reproduction room
    - 7. Mail/supply room
    - 8. Toilet rooms (men and women)
    - 9. Lounges
    - 10. Janitor's closets
    - 11. Telephone switchroom
    - 12. Electric closets
    - 13. Mechanical equipment room
    - 14. Canteen for office staff
    - 15. Document & Drawing Library

#### 4.1.9 DESIGN AND CONSTRUCTION

- a. Building shall have reinforced concrete frame and a flat roof.
- b. Architectural treatment shall provide a simple, pleasant appearance without artistic embellishments.
- c. Typical area allowances for office personnel shall be:

Large offices
 Medium sized offices
 Small offices or cubicles
 Secretarial area
 General office, per person
 225-300 square feet (21-28sm)
 150 square feet (14sm)
 120 square feet (11.2sm)
 100 square feet (9.3sm)
 75 square feet (7sm)

d. "Open Planning" is preferred for interior space layout. Low, movable acoustical panels or partially glazed screens permit more natural light, more communications among personnel and greater flexibility for future space requirements.

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- f. In accordance with type of food service to be rendered, service space shall provide for delivery, storage, food preparation, dishwashing and waste disposal.
- g. Design of lunchroom shall present a pleasant and relaxing atmosphere apart from the work environment, by prudent selection and use of materials, furniture and color scheme.

#### 4.10 LABORATORY

- 4.10.1 Laboratory work may be performed in small sample testing rooms located in buildings such as maintenance buildings or a more elaborate chemical laboratory that may be located in a control building, office building or a separate facility.
- Small laboratory rooms for specific tests consist of a simple laboratory bench with work counter 8 feet (2.4m), 2 feet (.61m)long, with or without sink and/or fume hood as required. A hung ceiling shall be 8 feet, 0 inches (2.4m) above the floor.
- 4.10.3 Small laboratories located in a control building shall face the process area with one outside door and be isolated from the rest of the building. Walls shall have washable surface and floor shall be dust-proof concrete.
- 4.10.4 Small laboratories in office buildings shall have finishes similar to adjacent office space, resilient tile flooring and furred drywalls appropriately painted.
- 4.10.5 Medium or large laboratories shall provide some or all of the following spaces:
  - 1. Entrance area
  - 2. Main laboratory area
  - 3. Offices for chemists
  - 4. Space for typist/file clerk
  - 5. Areas with emergency shower/eye wash
  - 6. Sample room
  - 7. Laboratory storage
  - 8. Toilets (men and women) with janitor's closet
- 4.10.6 Fume hoods shall be located away from possible drafts.
- 4.10.7 Wall and floor finishes shall be chemical resistant.
- 4.10.8 Balance table shall have an independent footing if a balance room is provided.
- 4.10.9 The laboratory equipment shall include the following:
  - a. Equipment for safe handling of flammable and toxic samples.
  - b. Fixed and portable instruments suitable for the sampling schedules developed by process licensers.
  - c. Initial chemicals, reagents and consumables for the specified tests.

#### RESEARCH LABORATORIES

if the latter should step back unexpectedly. Experience has shown that 4 ft 5 in to 5 ft is ideal; 4 ft is cramped. It must be admitted that there are laboratories in which one man works between benches separated by as little as 3 ft 3 in, but such a small space should certainly not be thought of when planning a new laboratory.

In student and routine laboratories where there is less bench space per person and often two people will be working back to back immediately opposite each other, the space between the benches should be greater than 5 ft so that there is room for others to walk down the center.

#### Legant of Laboratory

Having established the module, it is now necessary to settle the size and position of laboratory offices, the depth of laboratories and the position of service laboratories, fume cupboords, and service ducts. All of these are vitally important in themselves, and of course they actually determine the type of layout which is to be adopted. Let us consider each of these items.

Laboratory Offices There are many scientists still alive today who have worked in laboratories where offices were not provided; the lucky ones had tables in the laboratory and the others just hifted some equipment off the bench to make space for report writing. For a number of years now, it has been standard practice to provide every scientist with an office; it is quite usual to provide individual affices for senior technical cofficers also, whilst laboratory assistants are expected to share offices or have writing spaces provided for them in the laboratories.

The best location for laboratory offices is always a controversial subject. Are they to be within the laboratory, adjoining the laboratory, on its, opposite side of the corridor, or grouped in a separate part of the building? Is it essential for all offices to be on an external woll?

Some senior scientists consider an 8-ft by 6-ft office within the laboratory entirely satisfactory. These people spend most of their time actually working in the loboratory and the closeness outweighs the advantages of greater privacy and silence in a larger office across the curridor. In ony case, for report writing it is much more satisfactory to use a carrell in the library. The internal office shown in Fig. 1 has a 6-ft by 2-ft 6-in table with backshelves above and a filing cabinet beneath. This leyout has the advantage that the full length of the building is available for loboratories and, with an off-center carridor, the service laboratories can be conveniently located along the opposite side.

Offices which adjoin laboratories also have the advantage of closeness and they can be larger than the internal office—one dimension is fixed by the module of 10 ft—but they do have the disadvantage that they use the more expensive serviced area. The alternative is to provide offices along the unserviced area on the opposite side of the carridar, but many scientists consider this separation from the laboratory undesirable, and the further the offices are from the laboratories, the more serious this becomes. In the case of offices grouped on another floor, the scientist may even think twice before making the effort to get to his laboratory.

Some scientists consider 10 ft by 10 ft an absolute minimum for an office, and others argue strongly for 10 ft by 12 ft, or even 10 ft by 14 ft. Certainly, when the offices are along one side of a corridor, a depth of 14 ft makes it possible

to get a more satisfactory levous for stairs, tailett, etc.

For large projects, it is necessary to consider laboratories on both sides of the corridor; in this case, offices must be either in (or adjoining) laboratories or grouped in a separate wing of the building. For still larger schemes, the double-width layout provides the best solution.

Details of the various positions of offices are shown in Figs. 2, 3, 4, and 5.

Dapth of Laboratories. Over the last 40 years, the depth of laboratories has increased from about 16 ft to 24 or 25 ft, with some going to 27 and even 30 ft. This has resulted in a botter utilization of space and, as the span is within economic limits, the additional area is obtained

of a lower can persuper foot. For the standard byte of perinadar has a lay ut, a diam display of 24 H is recommended.

Senden Laboratedan. These loboratories are either planned to be integral with the laboratory and laboratory office unit or they are provided on the opposite side of the certidor; opain, the verifous positions are shown in Figs. 2, 3, 4, and 5. Much of the equipment housed in there rooms is expensive and therefore it must be should be follows that this equipment must be located as that it is convenient to the maximum number of statis.

Fune Cupherrie The risk of accident is preater in a fune cuphoard [hood] than elsewhere in the

Towns your one towns to st. Tool face of

المتحرم ومزيء معوم الباحم

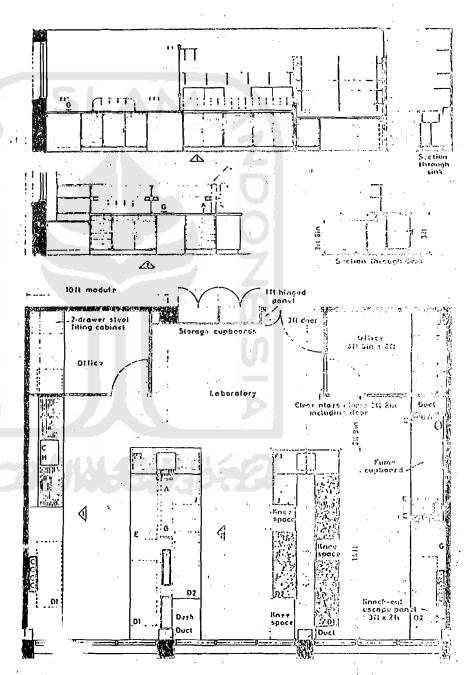


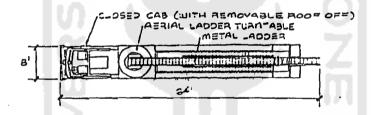
Fig. 1. Layers of a three-module, \$2500 by 24-ft inhoratory.

#### SITE PLANNING-FIRE STATIONS AND FIRE APPARATUS

Fire stations should be located near major roads, close to the center of the area being served, and set well back from the curb. Stations should be distributed in a community so they will be able to provide effective fire apparatus response times to existing areas requiring protection and be able to serve future patterns of growth. Avoid locations that can easily become jammed with vehicular traffic (e.g., near large parking garages, major intersections). Traffic light control from the station is often desirable. Consider the effects of barriers (e.g., railroad tracks, draw bridges, highways without sufficient cross streets) which can seriously reduce response times. Example fire apparatus sizes are shown below. Actual dimensions vary according to the manufacturer and to the needs and specifications of the local fire department.

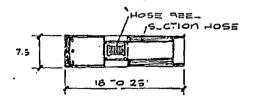
#### Ladder Truck

This type of apparatus carries a hydraulically operated aerial ladder for rescue and fire suppression operations. It also carries an assortment of ground ladders, tools, and rescue devices. Aerial ladder apparatus are either two- or three-axle tractor drawn as shown below. Tractor drawn apparatus have greater maneuverability on narrow streets or in heavy traffic, but require an additional driver to steer the trailer's rear wheels.



#### **Pumper**

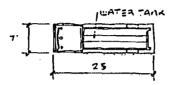
A pumper provides adequate water pressure from fire hydrants and other water sources to control and suppress fires. It also carries hose, ladders, forcible entry tools, self-contained breathing units, portable fire extinguishers, and other equipment. Pump sizes typically vary from 500 to 1500 gpm at 150 psi. Combination pumpers have a pump, hose compartment, and a water tank on one chassis.



# SITE PLANNING—FIRE STATIONS AND FIRE APPARATUS (Continued)

### Tanker

Tankers transport water to areas without hydrant or other protection for fire suppression purposes. Tank sizes typically vary from 500 to 5000 gal.



Note: Other fire apparatus include floodlight truck, salvage truck ("salvage" means to cover or remove furnishings or goods which could be damaged by fire or water), emergency rescue truck, aerial platform (i.e., cherry picker), and squad truck (with special tools and provisions for carrying several fire lighters).



## SITE PLANNING—SEPARATION DISTANCES

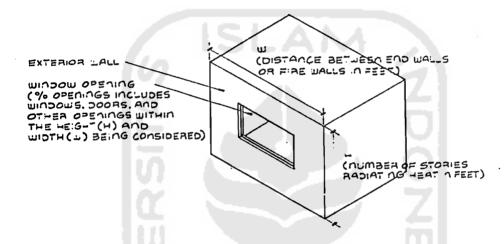
The table below lists guide numbers (N) for determining separation distances to protect exposed buildings from fire spread through equally distributed windows. Separation distance can be found by the formula:

$$d = FN + 5$$

where d = distance between buildings in ft

F =width (W) or height (H) in ft

N = guide number from table (no units)

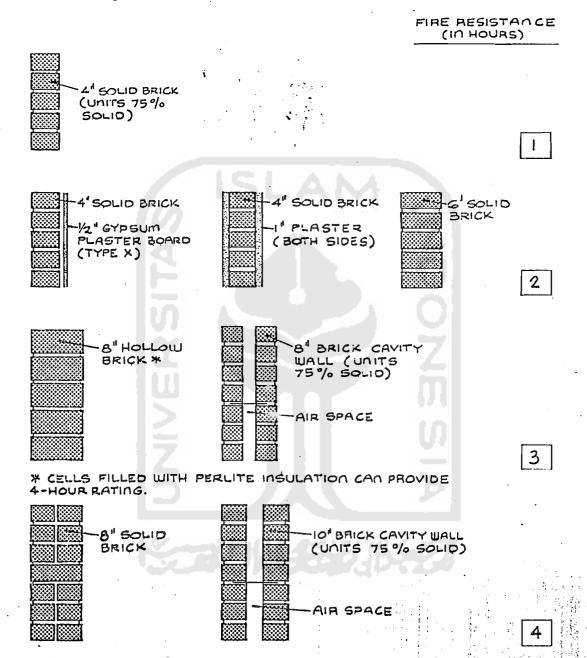


•	nings (%) lo						ide Numh					
Expo	sure Severit	y ol:				Shape	Ratio of	W/H or F	I/W			
Light	Moderate	Severe	1.0	1.3	1.6	2.0	3.2	5.0	8.0	13.0	20.0	32.0
20	10	5	0.36	0.40	0.44	0.46	0.49	0.51	0.51	0.51	0.51	0.51
30	15	7.5	0.60	0.66	0.73	0.79	0.88	0.92	0.94	0.95	0.95	0.95
40	20	10	0.76	0.85	0.94	1.02	1,17	1.27	1.32	1.33	1.34	1.34
50	25	12.5	0.90	1.00	1.11	1.22	1.42	1.58	1.66	1.70	1.71	1.71
60	30	15	1.02	1.14	1.26	1.39 .	1.64	1.85	1.99	2.05	2.08	2.08
80	40	20	1.22	1.37	1.52	1.68	2.02	2.34	2.59	2.73	2.79	2.81
100	50	25	1.39	1.56	1.74	1.93	2.34	2.76	3.12	3.36	3.48	3.52
•	- 60	. 30	1.55	1.73	1.94	2.15	2.63	3.13	3.60	3.95	4,15	4.22
	80 .	40	1.82	2.04	2.28	2.54	3.12	3.77	4.43	5.01	5.41	5.60
	100	50	2.05	2.30	2.57	2.87	3.55	4.33	5.16	5.95	<b>6.56</b> ,	6.92
		60	2.26	2.54	2.84	3.17	3.93	4.82	5,80	6.78	7:63	8.18
		80	2.63	2.95	3.31	3.70	4.61	5.68	6.91	8.24	9.51	10.50
		100	2.96	3.32	3.72	4.16	5.19	6.43	7.88	9.50	11.15	12.59

Note: To find guide numbers for shape ratios not given in the above shortened table, see "Protection of Buildings from . Exterior Fire Exposures," NFPA No. 80A, 1975.

# BUILDING MATERIALS AND CONSTRUCTIONS—FIRE RESISTANCE FOR BRICK WALLS

Shown below are fire-resistance ratings in hours for various brick load-bearing walls.



Note: Where combustible members (e.g., wood joists, beams, girders) are framed-in to 2 hour and greater wall constructions, subtract 1 hour from the rating shown above. There should be at least 4 in, of brick between the ends of the combustible members and the opposite face of the wall.

# REFERENCE

Gross, J. G. and H. C. Plummer, "Principles of Clay Masonry Construction," McLean, Va., Structural Clay Products Institute, 1970.

# Vien persembahkan kepada Uswati Estuningsih,

# mamaku tercinta yang selalu tabah dan tawakal. Juga buat m' Nung dan m'Pur sekeluarga, m'Shita, Riki dan Papa yang sudah memberikan banyak kemudahan.

Terima kasih dan hormat kepada p'Ichi atas bimbingan, ilmu dan kepercayaan yang diberikan sehingga Vien Insya Allah menjadi seorang Arsitek. Juga p'Ilya atas bimbingan dan diskuasi kecil yang berharga yang sayang sekali Vien tidak sempat untuk mempelajarinya.

Dan juga kepada guru – guru di Arsitektur yang sudah membagi ilmunya untuk Vien. Without you, I'm nothing.

Terima kasih buat Iin dan Toro jta sahabat tersayang dalam suka dan duka, INVITO cita -- cita kita ya ...

Terima kasih buat Astrid, Anna dan Ade buat persahabatan AVIA kita. Juga buat m'Brep yang selalu ngebantuin Vien. Nggak lupa buat Ratri, anak-anak Red Top. Rudi dan m'Pur yang vien rusuhin printernya di saat- saat terakhir penulisan.

Terakhir, kuperuntukan juga buat "perempuan – perempuan".

