Doors, Windows, Stairs & Fireplaces

Doors – Outdoor Entry

- 36" minimum entry
- Main/guest entrance open to social area
- Easy use lever handles

Doors – Outdoor Entry

- Weather resistant surface
- Solid wood or foam centered
- Frame bolted lock
- Weather stripping
- Storm door
- Airlock/entry room/mud room

Doors – Outdoor Entry

- Entry way – Porch
- At least 5′ by 5′
- Well lit
- Side protected
- covered

Doors – Outdoor Entry

- Sidewalk
- Hard surface path from driveway to door
- Preferred flat = 1′ riser; 20′ run
- Steps = 6:12
- Minimum 4′ width

Doors – Outdoor Entry

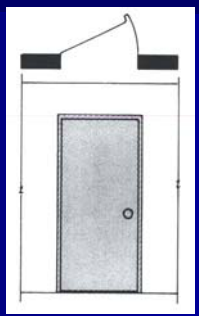
- Closet should be located near outdoor entry door for coat storage.
- Small bench
- Boot storage
- Water resistant floor

Doors – Indoor Entry

- 32" minimum
- Block out light & sound
- Privacy
- Hollowed or solid core
- Bigger entry = more spacious room feels

Doors – Door Types

- Flush Door
  - Can be used for exterior.
  - Smooth cover



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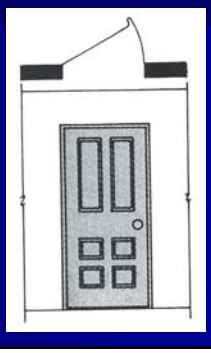
Doors – Door Types

- Panel Door
  - Can be used for exterior.
  - Outside "paneled"



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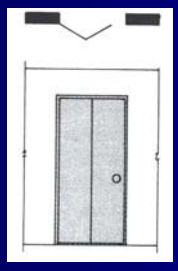
Doors – Door Types



- Bifold
  - Closets
  - Door width 1′ or 2′
  - Installed in pairs

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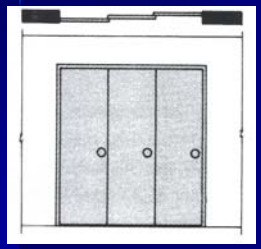
Doors – Door Types



- Sliding
  - Large openings

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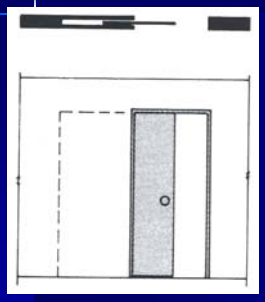
Doors – Door Types



- Pocket
  - Sliding door
  - Rests in wall
  - Kitchen, dining room

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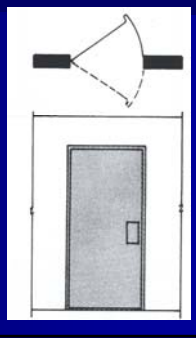
Doors – Door Types

- Double action
  - Swings 180º
  - High traffic entries



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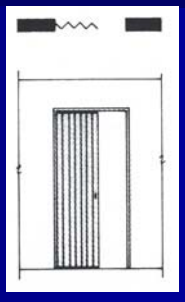
Doors – Door Types

- Accordion
  - Large openings that bifold or sliding will not fit



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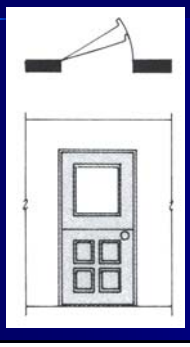
Doors – Door Types



- Dutch
  - Upper & lower half seperated
  - Used to improve light & ventilation
  - Exterior door

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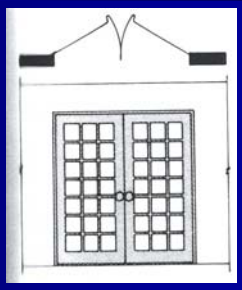
Doors – Door Types

- French
  - Panel door w/ glass panels
  - Entrance to patio or terrace



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Windows

- Admit light from outside
- Provide fresh air
- Create an atmosphere inside by framing exterior view
- Improve aesthetics of exterior of house

Windows - Lighting

- Glass area = 20% floor area
- Better light face windows south
- 1 large window better contrast than several small windows

Windows - Lighting

- Better light placement = windows on multiple walls
- Higher window placement = more light penetration
- Window shape assist in light penetration

Windows – Ventilation

- Summer
- Window opening = 10% floor area
- Openings take advantage of prevailing winds
- Locate windows to assist in air movement in room

Windows – Improve View

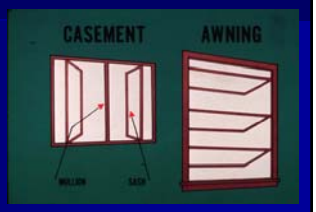
- Large area of fixed glass best
- Divisions small
- Sill height determined
  - Furniture
  - Room arrangement
  - view

Windows Types

- Sliding windows
  - Double hung
  - horizontal

Windows Types

- Swinging
  - Casement
  - Awning



Windows Types

- Swinging
  - Hopper
  - Jalousie

Windows Types

- Picture
  - Circle top
  - Special shape

Windows Types

- Skylight
  - On roof

Halls

- 6-8% of total square footage
- 36”-48” wide
- Storage areas built in to hallway

Stairs

- Must follow local building codes
- Stair types
  - Straight
  - L shaped
  - Double L

Stairs

- Stair types
  - U stairs
  - Winding
  - Spiral

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  - U stairs
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Stairs

- Stair types
  - U stairs
  - Winding
  - Spiral

Stairs

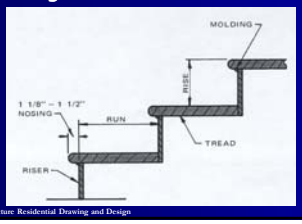
- Basic criteria
  - Appropriate & consistent rise & run
  - Functional handrail
  - Good visibility
  - Excellent lighting

Stairs -Design Determination

- Determine opening by ceiling height
- Calculate rise and run
- Uniform rise height and tread width
- Minimum tread width = 11″
- Riser slope > 60º

Stairs -Design Determination

- Stairway headroom > 6′-6″
- 30º< stair slope < 35º
- 1″ < nosing < 1.5″



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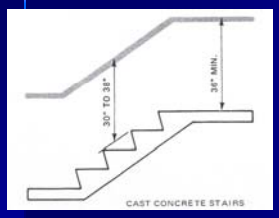
Stairs -Design Determination

- Treads
  - Not tapered
  - High friction
  - Contrasting color to rise
- Accommodate 12′ 4″ on house plan for stairs and landing
- Rise increases, lower tread width
- Doors should not open towards stairs

Stairs -Design Determination



- Handrails
  - 1.5" diameter
  - No more than 1.5" from wall
  - 30" – 38" from floor
  - Guardrails require ballasts 4" apart

Layouts are courtesy of Architecture Residential Drawing and Design

Stairs -Design Determination

- Lighting
  - As much as rest of house
  - Light switch located at top and bottom of stairs – 3 way switch

Stairs -Designing

- $30^o < \text{stair slope} < 35^o$
- 2 risers + 1 tread = 25 in
- Riser height * tread width = 75
- 1 riser + 1 tread = 17-18
- 1 more riser than tread

Stairs - Examples

- Design a straight stairway for a house with a basement. Distance between the floor and basement ceiling is 8'-0". The ceiling is made of drywall. The floor joists are 2x10's (1.5" x 9.25")

Stairs - Examples

- What is the total rise of the stairs?
- Have to go from finished floor to finished floor
  - Floor to ceiling 8' – 0"
  - Ceiling – drywall 0' – 0.5"
  - Joists (2" x 10") 0' – 9.25"
  - Subfloor – ½" plywood 0' – 0.5"
  - Finished floor 0' – 1"
  - Total 8' – 11.25" or 107.25"

Stairs - Examples

- Calculate the number of risers
  - 107.25" / 7 = 15.32 risers
  - 107.25" / 15 = 7.15"

  15 Risers
  Each riser will be 7.15"

Stairs - Examples

- Determine correct tread size
  - Stair slope between 30 and 35 degrees
  - Trial and error procedure
  - Example: 1 riser + 1 tread ≈ 17-18″, guess a size of 18″-10.5 = 7.5″, then
    Tan Θ = 7.5/10.5
    Θ = $Tan^{-1}(0.714)$ = 35.5° too large!
  - try rise = 7.25″, Θ = $Tan^{-1}(7.25/10.5)$ = 34.6° OK. (Previous example used 7.15″)

Stairs - Examples

- Determine correct tread size
  - Sum of 2 risers & 1 tread ≈ 25″
    7.25″ * 2 + 10.5 = 25″

Stairs - Examples

- Determine correct tread size
  - Riser height * tread width ≈ 75
    7.25 * 10.5 = 76.125 A bit too large…

    So..adjust riser down slightly to 7.15″
    Last check is still ok : 7.15*2+10.5=24.8″

Stairs - Examples

- Determine correct tread size
  - Riser height + tread width = 17-18″
  7.15 + 10.5 = 17.65″

Stairs - Examples

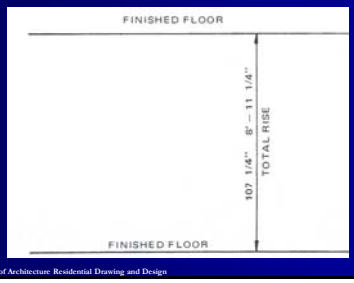
- Determine total run
  # treads * tread width
  14 * 10.5 = 147″ (12′ – 3″)

Stairs - Examples

- Draw the stairs - To Scale
- Draw 2 lines total height apart
- Draw # lines = # treads
- Add in vertical lines for # risers
- Darken in treads & risers

Stairs - Examples

- Draw 2 lines total height apart



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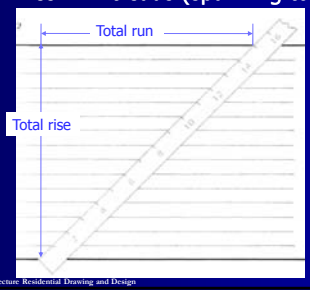
Stairs - Examples

- Draw # lines = # treads (spanning total run)



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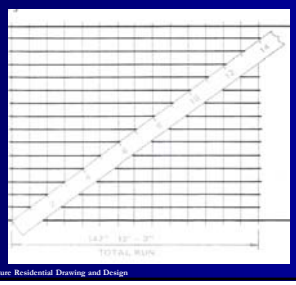
Stairs - Examples

- Add in vertical lines for # risers



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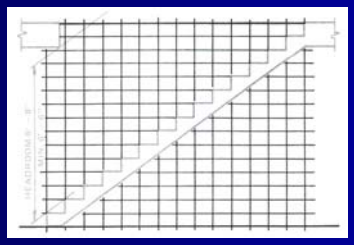
Stairs - Examples

- Darken in treads & risers



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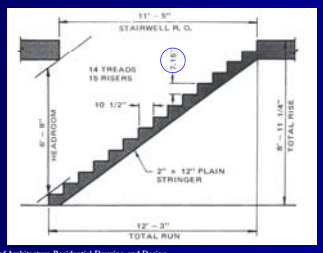
Stairs - Examples

- Dimension!



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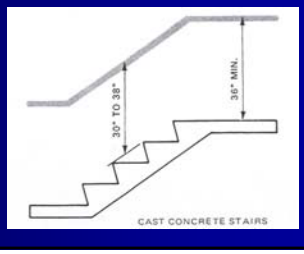
Stairs - Examples

- Add in minimum height of 6'-6"
- Place handrail 30" above stairs
- DIMENSION!



Fireplaces

- Older fireplaces were nice but really inefficient
- Lose more heat than produce
- Improve efficiency with double wall

Fireplaces

- Design
  - Opening should be 10-12 times more than flue area
  - Width should always be bigger than height

Fireplaces - example

- Flue dimensions 12″ by 12″
- Flue area = 144 in^2
- Opening 10x flue area = 1440 in^2
- Width = 45 in
- Height = 1440/45 = 32in

Fireplaces

- Damper placement
  - Regulate flow of air
  - Stops down draft
  - Larger than the area of flue lining
  - Long as the width of the fireplace

Backdraft Dampers

Fireplaces

- Flue
  - At least 4" of brick on each side
  - No liner – min of 8" each side
  - Height min = 14'
  - 2' higher than highest point on roof

Test Wednesday

- Square Footage to Foundations.
- Test has
  - Short answer
  - Multiple choice
  - Calculations
- Bring calculator, straight edge and high-liter