

Engineering Design *An Introduction*

Architectural Design

- Architect
 - Professional who designs residential and commercial structures
- Examples of modern architectural considerations
 - Sustainability
 - Safety
 - Multicultural

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Frank Lloyd Wright

- Best known for Prairie style
- One of the most prominent architects of the 20th century
- Design philosophy: form and function are one

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Architectural History

- Egyptian architects
 - Designed the pyramids
- Columns
 - First appeared in Egypt
- Greek architecture
 - Parthenon in Athens, Greece
 - Represents the Classical style

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Architectural History (cont'd.)

- Roman architecture
 - Forum amphitheater
 - Stadiums
 - Roads and aqueducts
- Andrea Palladio
 - Famous Roman architect
 - Used classical proportional system

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What Gives a Building Style?

- Elements of a house
 - Floor plan
 - Elevations
 - Roof shape
 - Shape of the eaves
 - Porch shape
 - Window and door placement and shape
 - Exterior walls

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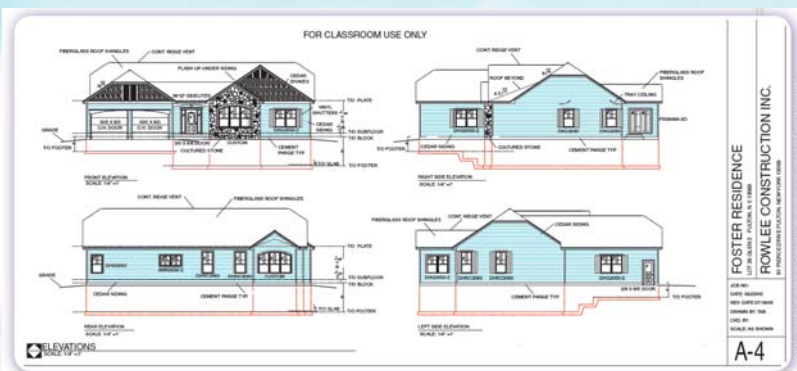


Figure 17-14 Architectural elevation drawing.

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Architectural Styles

- Most named for historical periods
 - Or influential art movements or people
- Historic American Buildings Survey
 - Drawings, photographs, and historical information about 37,000 structures in the US
 - See Web site
www.loc.gov/pictures/collection/hh

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Colonial Style

- Time period 1600-1800
- Cultural influence of native countries
 - Dutch colonial
 - French colonial
- Often one large room with a loft for sleeping
 - Or two rooms with a central fireplace

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Georgian Style

- Time period 1700-1780
- Reflected improved economic conditions in the American colonies
- Elaborate, raised, central pediment entrance with flattened columns
- Symmetric window elements
- Elaborate eave molding

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Figure 17-21: Historic Georgian house.

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Federal Style

- Time period 1780-1840
- Reflects cultural independence
- Lighter and more elegant moldings
- Porticoes
- Graduated windows getting smaller from first floor to top floor

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Greek Revival Style

- Time period 1825-1860
- Made popular by interest in Greek democratic ideals
- High classical style
- Full-length pilasters
- Multistory portico

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Victorian Style

- Time period 1860-1900
- Named for Queen Victoria
- Balloon framing
 - Allowed designers to include towers and turrets
- Indoor plumbing and gaslights
- New building materials
 - Pressed brick and plate glass

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Twentieth-Century Styles

- Growing industrial economy
- Industrial age brought nostalgia for a simpler lifestyle
 - Reflected through art forms and handcrafted products
 - Prairie and Craftsman styles

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Prairie Style

- Time period 1900-1920
- Frank Lloyd Wright considered the master
- Uniquely American style
- Design should fit in with environment
- Open floor plan with horizontal lines
- Use of stone and unpainted wood

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Craftsman Style

- Time period 1905-1930
- Based on the principles of the Arts and Crafts movement
 - Rejection of elaborate designs of Victorian period
- Use of natural wood grains
- Inspired by California architects Charles and Henry Greene

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Art Deco

- Time period 1920-1940
- Strong stepped forms
- Machine-made materials
 - Glass, aluminum, stainless steel, inlaid wood
- Elegant, functional, modern

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International Style

- Time period 1925-present
- Flat roofs
- Unornamented wall surfaces
- Metal windows set flush with stucco or glass walls
- Minimalist
- Richard Buckminster “Bucky” Fuller
 - Known for the geodesic dome

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Modern Style

- Time period 1945-present
- Ranch, split-level, and contemporary homes
- Eclectic movement borrowing design details from a variety of styles
- Colonial Revival most popular

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Postmodern Architects

- Design movement began in late 20th century
 - Reaction against creative limitations of modernism
- Design solutions focused on experience and individual need

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Postmodern Architects (cont'd.)

- Ieoh Ming Pei
 - Postmodern architect
 - Designed the Louvre Pyramid in Paris

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Industrial Design

- Creation of design for products and systems
- Optimizes function, value, and appearance
- Materials contribute to product appeal
- Famous industrial designers
 - Raymond Loewy, Henry Dreyfuss, Walter Teague

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Raymond Loewy, the Father of Industrial Design

- Began designing products for American business in 1929
- Consulted for more than 200 companies
- Created products from stamps to spacecraft
- MAYA principle
 - Most advanced yet acceptable

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Norman Bel Geddes and Streamlining

- Design style created through scientific research in a wind tunnel
- Norman Bel Geddes
 - Published *Horizons* in 1932
- Industries
 - Automobile, ship, train, airplane

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Henry Dreyfuss and Human Factors

- Founded own design company in late 1920s
- Helped create Society of Industrial Designers (became IDSA)
- Famous designs
 - Combined handset desktop phone
 - Upright Hoover vacuum cleaner

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Louis Comfort Tiffany and Art Nouveau

- Art Nouveau
 - Based on natural shapes
 - Patterns based on curving, intertwining plant and animal shapes
 - Popular in many parts of Europe
 - Example: stained glass windows and lamps by Tiffany

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William Morris and Arts and Crafts

- William Morris
 - One of the founders of British Arts and Crafts movement
 - Known for wallpaper and patterned fabric designs
- Arts and Crafts style continues in popularity today

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Walter Gropius and Bauhaus

- Walter Gropius
 - Founded German school of design called Bauhaus
- Rejected decoration
- Form follows function
- Designs suitable for machine and mass production

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Postmodern Industrial Designers

- Most industrial designers are postmodern
- Designers influenced by designs of the past
- Jonathan Ive
 - Successful industrial designer for Apple Computer