CODES IN OHIO
A Short Primer on the Basic Concepts of the Ohio Building Codes

Rhode Island Club Fire

Using the Codes
To Serve & Protect
We provide services and protection that society expects...through our system of electing representatives who make laws

Government’s Role:

Why we do what we do:
1. To Promote The Public Welfare.
2. By Responding To Society’s Needs Through:
   • Federal Laws & Rules
   • State Laws & Rules
   • Local Ordinances & Resolutions

Legislative Changes Often Result From:
1. Excessive enforcement
2. Inadequate enforcement.
3. Disasters
Responding to Society’s Needs:

Protection demanded after an unacceptable loss:
• San Francisco Earthquake & Chicago Fires 1,000
• Triangle Shirt and Waist Factory Fire - 1880’s 146
• School Fires of the ’40s & ’50s
• Coconut Grove Fire in Boston - 1948 492
• Beverly Hills, Kentucky Restaurant Fire 165
• MGM Grand Hotel Fire (Las Vegas) 84
• Kansas City Hotel Walkway Collapse 114
• Earthquakes, Floods, Hurricanes
• Scottstown, Ohio Consumer Fireworks Store 8
• Possible Results From 11 Sept. 2001 Attack 3

Government’s Role:

What Are the Codes?
1. Responses to the Law
2. Rules to be Enforced
   • Administrative & Process-oriented
   • Primarily Specification, also Performance
3. Established Limits
   • Establishes uniformity for design and application
   • Establishes ACCEPTABLE thresholds

Purpose of the Building Code

3781.11 ORC

To Manage Risks With Consideration For:
1. Uniformity
2. Performance Objectives Consistent With Intended Use
3. Permitting Materials & Methods That May Reduce Costs While Maintaining the Acceptable Risk Thresholds
4. Encouraging Standardization of Methods & Materials Without Preference to Any Type or Class
Model Codes Objectives

**Primary Considerations:**
1. Life Safety – save occupants/protect those around
2. Health – ventilation, plumbing, etc.
3. Property Protection – reduce the impact of the loss
   - Critical Facility Protection - level of necessary operation
   - Reduced Replacement costs for community facilities

What About the Code?

**The Code:**
1. What is the Building Code?
2. How is it developed?
3. What is its structure?
4. What about other standards?

Code Types

1. Land Use & Environmental
   - Zoning, Architectural, Environmental Review
2. Building Design & Construction
   - Building, Mechanical, Electrical, Plumbing Codes
3. Community Safety
   - Fire Prevention & Safety, Property Maintenance Codes
   - Licensing Agencies
How do the Codes Stay Current?

The National “System” Requires Continuous Evaluation of Existing Provisions to Account For:
1. Updated Statistics
2. Changing Materials, Methods, Engineering Analysis, Societal Objectives
3. Cost Impact & Availability of Resources
4. Developing Consensus Standards
5. Capabilities of Testing Laboratories and Certifying Agencies

Delay Times

<table>
<thead>
<tr>
<th>Event Description</th>
<th>% Min</th>
<th>Std Dev</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-rise office</td>
<td>54%</td>
<td>63.9</td>
<td>186</td>
<td>104</td>
</tr>
<tr>
<td>High-rise office</td>
<td>26%</td>
<td>26.5</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>High-rise office</td>
<td>15%</td>
<td>8.4</td>
<td>43</td>
<td>22</td>
</tr>
<tr>
<td>High-rise office</td>
<td>12%</td>
<td>1.8</td>
<td>5.6</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Speeds

<table>
<thead>
<tr>
<th>Event Description</th>
<th>% Min</th>
<th>Std Dev</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-rise office</td>
<td>54%</td>
<td>63.9</td>
<td>186</td>
<td>104</td>
</tr>
<tr>
<td>High-rise office</td>
<td>26%</td>
<td>26.5</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>High-rise office</td>
<td>15%</td>
<td>8.4</td>
<td>43</td>
<td>22</td>
</tr>
<tr>
<td>High-rise office</td>
<td>12%</td>
<td>1.8</td>
<td>5.6</td>
<td>3.2</td>
</tr>
</tbody>
</table>
Egress Time

*Evacuation Time* = \( T_N + T_R + T_{PA} + T_T \)

Where:
- \( T_N \) = Time to Notification
- \( T_R \) = Reaction Time
- \( T_{PA} \) = Pre-evacuation Activity Time
- \( T_T \) = Travel Time

People Movement

*People Movement Calculations:*

- Avg. Walking Speed = 250 ft./min.
- Shuffling Speed = <145 ft./min.
- Avg. Flow Rate
  - Level Passages = 27 people/min./ft. width
  - Down Stairs = 21 people/min./ft. width
  - Upward Travel = 19 people/min./ft. width
- Flow rates can increase 50% in passageways less than 10 ft. long.
Falls

Unintentional-Injury Deaths Due to Falls 1986-1995

Rates per Million Population

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate per Million Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>20</td>
</tr>
<tr>
<td>Mexico</td>
<td>85</td>
</tr>
<tr>
<td>South America</td>
<td>30</td>
</tr>
<tr>
<td>China</td>
<td>50</td>
</tr>
<tr>
<td>Japan</td>
<td>25</td>
</tr>
<tr>
<td>Europe</td>
<td>15</td>
</tr>
<tr>
<td>Australia</td>
<td>20</td>
</tr>
<tr>
<td>New Zealand</td>
<td>10</td>
</tr>
<tr>
<td>United States</td>
<td>30</td>
</tr>
<tr>
<td>Canada</td>
<td>10</td>
</tr>
<tr>
<td>Japan</td>
<td>15</td>
</tr>
<tr>
<td>France</td>
<td>10</td>
</tr>
<tr>
<td>Italy</td>
<td>10</td>
</tr>
<tr>
<td>Germany</td>
<td>10</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>15</td>
</tr>
<tr>
<td>China</td>
<td>10</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
</tr>
<tr>
<td>Australia</td>
<td>5</td>
</tr>
<tr>
<td>New Zealand</td>
<td>5</td>
</tr>
<tr>
<td>United States</td>
<td>5</td>
</tr>
<tr>
<td>Canada</td>
<td>5</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
</tr>
<tr>
<td>Europe</td>
<td>3</td>
</tr>
<tr>
<td>Australia</td>
<td>3</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3</td>
</tr>
<tr>
<td>United States</td>
<td>3</td>
</tr>
<tr>
<td>Canada</td>
<td>3</td>
</tr>
<tr>
<td>Japan</td>
<td>2</td>
</tr>
<tr>
<td>Europe</td>
<td>2</td>
</tr>
<tr>
<td>Australia</td>
<td>2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>2</td>
</tr>
<tr>
<td>United States</td>
<td>2</td>
</tr>
<tr>
<td>Canada</td>
<td>2</td>
</tr>
</tbody>
</table>


Falls

Unintentional Injury Deaths Due to Falls: Data on U.S. Death Certificates

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Falls on or from Structure</th>
<th>Falls on or from Surface</th>
<th>Falls from or into Vehicle</th>
<th>Falls from or intofixtures or other structures</th>
<th>Falls from or into Stairs or Escalators</th>
<th>Falls from a higher Level</th>
<th>Falls from a burning, flaming, or smoking object</th>
<th>Other or unknown (Possible Falls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1983</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1984</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1985</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1986</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1987</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1988</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
<tr>
<td>1989</td>
<td>10,158</td>
<td>688</td>
<td>520</td>
<td>77</td>
<td>607</td>
<td>471</td>
<td>9</td>
<td>330</td>
<td>8,013</td>
</tr>
</tbody>
</table>


Fire

Assumptions for Evacuation from Fire:
Method(s) to save (bring to safety) those not intimate with fire.

Considerations:
Jeopardy from fire
- Combustibles/Commodities burn
  - Smoke Developed/Toxic Gas Build-up – data from tests
  - Rate of Burn – data from tests
- Tenability of Space
  - To Six Feet Above Finished Floor
- Travel Distance to Safety
- Proximity to Fire

Board of Building Standards
Fire

Fire + commodity creates smoke/toxic gases

Added time increases descent of smoke/toxic gases

Added Time increases decent of smoke/toxic gases until...
A fire scenario generally works like this:

A commodity X (oak as a baseline) in the corner of a room is ignited that will produce a certain level of toxic gases:

- Those toxic gases grow at a greater rate as more or other combustibles are added
- Increased heat ignites other combustibles
- People within a burning building have a certain predictable amount of time to reach safety. We can predict, with some degree of certainty, how many people can safely evacuate based on straight line travel distance and uncomplicated circumstances.

As risk conditions are added:

1. They must be offset so that the required amount of travel time to safety is assured.
2. Increasing toxic gas production has the effect of reducing the time we have to reach safety.
3. Increasing travel distance increases the time necessary to reach safety.
4. Delaying the time when the occupants are warned increases the time necessary to reach safety.
Elements of Risk
1. Whether Occupants Are Sleeping
2. Familiarity With Surroundings
3. Travel Distances or Multiple Floors to Safety
4. Capability of Responding to an Emergency
5. Willingness to Leave
6. Number of Occupants in the Space
7. Sensory Impairments or Limitations
8. Likelihood of Panic in an Emergency
9. Exposure to Potential Hazards
10. Special Loads

Managing Risk

Risk Management Strategies:
1. Evacuation
2. Protect in Place
3. Hazard Containment

Example Occupancy: Elementary School

Pre-modern codes:
- Multiple floors
- Single exits
- No alarm
- No fire drills
- Unprotected frame construction
- Wood burning & coal heat
- Systems not inspected or maintained, etc.

Resulting in multiple-death fires —

HIGH RISK

Current Codes:
- Protected egress routes
- Multiple exits
- Effective alarm system
- Emphasis on fire evacuation drills/response to alarm
- Construction Types defined
- Modern heating systems
- Combustibles storage control
- Maintenance, Inspections

Resulting in the safest occupancy for density per space occupied —

RISK MINIMIZED
Determining Safety:

• How is the building and its spaces being used?

• How is the building constructed?

• How big is the building?

Elements of Risk Management

• Fire Protection Systems
• Egress Systems
• Fire Resistance/Fire Separation
• Allowable Height and Area
• Structural Requirements
• Construction Type
• Mechanical and Electrical System

Modern Code Organization - OBC
1. How to Administer and Enforce the Code 1 - 2
2. Risk Categories and Special Provisions 3 - 4
3. Planning for Buildings 5 - 6
4. Fire Safety for Buildings 7 - 8
5. Fire Protection for Buildings 9
6. Egress Design for Buildings 10
7. Environmental Design for Buildings 11 - 13
8. Building Performance 14 - 26
10. Special Types of Buildings 31
11. Protecting During Construction 32 - 33
12. Buildings That Already Exist 34
13. Standards Referenced in the Code 35
Chapter 9 – Fire Protection Systems
(also see other Chapters 4, 5, etc.)
1. Types & where required
   • Sprinklers, alarm and detection, standpipes, smoke
     control, fire command.
2. Examples:
   a. A-2 (What is this?), 2-Stories
   b. B, 10-Stories (What is this?)

Special Provisions

Chapter 4 - Special provisions for certain
Occupancies that have uniqueness
1. Covered and Open Malls - 402;
2. High Rises - 403;
3. Atriums – 404;
4. Underground Buildings – 405;
5. Motor Vehicle Garages, etc. – 406;
6. Institutional I-2 – 407;
7. Institutional I-3 – 408;
8. Motion Picture Projection - 409
9. Stages & Platforms – 410;
10. Special Amusement – 411;
11. Aircraft Related – 412
12. Combustible Storage – 413;
14. Hazardous Groups – 415;
15. Application of Flammable Finishes - 416;
16. Drying Rooms – 417;
17. Organic Coatings – 418;
18. Live/Work Units – 419; *
19. Sleeping Occupancies – 420;
20. Hydrogen Cut-Off Rooms – 421;
21. Ambulatory Healthcare – 422; *
22. Storm Shelter – 423. *
Chapter 7 – Fire Resistance Rated Construction

1. Ratings in accordance with tests
2. Tests in accordance with standards
3. Alternative methods
4. Fire:
   - Walls
   - Barriers
5. Smoke:
   - Partitions
   - Compartments
6. Penetrations, Joints, Openings
7. Prescriptive & Calculated Fire Resistance

Managing Risk - Compartmentation

Adequate Compartmentation
Restricts the development of fire and its spread to adjacent spaces.

Inadequate Compartmentation
Permits the development of fire and its spread to adjacent spaces.

Radiant Flux Test (NFPA 253)
**Fire Safety**

*How does this all work together?*

1. Lists for Rated Assemblies (Test Number)
2. Listings
3. Labeling
4. Use in Construction Documents
5. Field Verification
Chapter 8 – Interior Finishes

1. Combustibility of materials
2. Decorative Materials & Trim
Chapter 10 – Means of Egress

1. Occupant load determination, size, and arrangement of all elements – based upon actual use of space
   Example: Church, mixed use – Assembly w/fixed seats, w/o fixed seats, business, educational, kitchen, platforms
2. Accessibility, lighting, doors, stairways, ramps, guards, etc.
3. Elevators

Egress Design

Exit Access
Exit Access Door
Exit
Exit Discharge

Code Overview
Designing and Managing the Building, its Environment and Systems
How to Administer and Enforce the Code

Chapter 1 – Requirements related to:
1. Building department administration
   • What enforcement personnel are authorized to do & for which they can be held responsible
   • What processes must be used

Chapter 2 – Definitions
1. Meaning of terms used in the code in the context of the codes use

Risk Categories

Chapter 3 - Occupancy Descriptions
1. Categories of Risks/how the structures and spaces within them are being used.
   • General groups: A, B, E, F, H, I, M, R, S, U.
   • Specific Occupancy Descriptions: restaurants, arenas, offices, clinics, hospitals, schools, child care, ammunition magazines, hazards containment, etc.

Planning for Buildings

Chapter 5 – Allowable Bldg. Height & Area
1. Height & Area Table
2. Mixed Use and Incidental areas
3. Height & Area Modifications

Chapter 6 – Types of Construction
1. Types based on material & resistance to fire
Environmental Design

Chapter 11 – Accessibility
1. Facility usability
2. Facility access and function for people with disabilities
3. ANSI

Chapter 12 – Interior Environment
1. Space and dimensions for rooms, ventilation, lighting, temperature & sound control,

Chapter 13 - Energy Efficiency
1. IECC
2. ASHRAE 90.1
3. Etc.

Building Performance

Chapter 14 – Exterior Walls
1. Performance
2. Weather resistance & wall covering

Chapter 15 – Roof Assemblies & Structures
1. Weather resistance
2. Performance, materials, installation

Chapter 16 – Structural Design
1. Design considerations
2. Wind, snow, seismic, dead & live Loads
3. Forces, material values

Building Performance

Chapter 17 – Structural Tests & Special Inspections for specialized construction
1. Steel, Welds, etc.
2. Masonry
3. Concrete
4. Steel Fabrication
5. Seismic
6. Soils: Piles, piers
7. Sprayed fire resistant material/coatings
8. Pre-fabricated wood assemblies
9. Smoke Control
### Building Performance

#### Chapter 18 – Soils & Foundations (Footer or Footing)
1. Determining soil bearing
2. Excavation, grading, fill
3. Depth, frost, thickness, reinforcement
4. Water-resistance
5. Piers, piles, material

#### Chapter 19 – Concrete
1. Content for specs & construction docs.
2. Standards for materials
3. Durability, quality, mixing, placing
4. Forms, reinforcement
5. Revisions to standard
6. Concrete types, anchorage, etc.

### Building Performance

#### Chapter 20 – Aluminum
1. Materials

#### Chapter 21 – Masonry
1. Materials standards
2. Types, methods
3. Cold weather req. based on temp.
4. Quality, seismic, strength, bonding, etc.
5. Fireplaces, heaters, chimneys

#### Chapter 22 – Steel
1. Structural ID, connections
2. Joists, cable structures, storage racks, cold formed

### Building Performance

#### Chapter 23 – Wood
1. Standards & Quality
2. Construction requirements
3. Decking, connections & fasteness
4. Heavy timber
5. Structural panels, shear walls
6. Design factors
7. Conventional framing

#### Chapter 24 – Glass & Glazing
1. Loads
2. Sloped & skylights
3. Safety glazing
4. Special glazing installations
Building Performance

Chapter 25 – Gypsum & Plaster
1. Standards & Quality
2. Construction requirements
3. Lath & Plastering
4. In wet locations
5. Interior & exterior

Chapter 26 – Plastic
1. Use of foam plastics
2. Interior finish & trim
3. Plastic veneer
4. Light Transmitting

Building Systems

Chapter 27 – Electrical
1. Applicable standard
2. Tests & Listings
3. Emergency & standby power systems
4. Penetrations
5. Smoke detection

Chapter 28 – Mechanical
1. See the Ohio Mechanical Code

Chapter 29 - Plumbing Systems
1. See the Ohio Plumbing Code

Building Systems

Chapter 30 – Elevators
1. Other conveying systems
2. Applicable standard
3. Enclosures
4. Emergency power systems
5. Hoistway venting
6. Machine Rooms
Chapter 31 – Special Structures
1. Membrane structures, Pedestrian Walkways, Tunnels, Awnings, Canopies, Marquees & Signs, Radio & TV Towers, Swimming pool areas, etc.

Protection During Construction
Chapter 32 – Right-of-Way Encroachments
Chapter 33 – Construction Safeguards
1. Demolition, site work, required sanitary facilities,
2. Protection for:
   • Pedestrians, adjoining property
3. Use of public routes
4. Fire extinguishers
5. Exits, sprinkler system, standpipes

Buildings That Already Exist
Chapter 34 – Existing Structures
1. Maintenance, repairs, additions, alterations, changes of occupancy, historic buildings, accessibility for existing buildings, etc.
## Standards Referenced in the Code

### Chapter 35 – Referenced Standards
1. ANSI, ASTM, and other standards applicable to the extent indicated in the code section applicable.

### The Plumbing Code

#### Chapter 1 - as indicated in OBC Chapter 1

#### Chapter 3 - General ...(Misc.)
1. Materials ID, installation, protection of piping & public systems, rodent proofing, trenching/backfill & structural safety, piping support, facilities for workers
2. Tests & Inspections
3. Efficiencies
4. Welding & Brazing

#### Chapter 4 – Fixtures, Faucets & Fittings
1. Materials, quality, minimum plumbing fixtures
2. Installation, washers, bathtubs, bidets, dishwashers, drinking fountains, floor drains, disposals, lavs, showers, sinks, urinals, water closets, whirlpools, healthcare fixtures & equipment, faucets floor sinks, etc.

#### Chapter 5 – Water Heaters
Chapter 6 – Water Supply & Distribution
1. Water required
2. Water Service
3. System Supply
4. Materials, Joints, connections
5. Installation of system
6. Hot water
7. Protection of system
8. Health care
9. Disinfection & treatment of system
10. Solar systems
11. Temp control devices & valves

Chapter 7 – Sanitary Drainage
1. Sewer required
2. Materials, above ground, vent & underground
3. Installation, joints
4. Cleanouts
5. Fixture units, system sizing, systems in high rises
6. Sumps & ejectors, healthcare plumbing
7. Computerized design, backwater valves

Chapter 8 – Indirect & Special Waste

Chapter 9 – Vents
1. Materials
2. Outdoor Extensions & Terminals
3. Connections, grades
4. Fixture, individual, common, wet, waste stack, relief & circuit vents
5. Vent sizing
6. Air admittance valves
7. Engineered & computerized design
Chapter 10 – Traps, Interceptors & Separators

Chapter 11 – Storm Drainage

Chapter 12 – Special Piping & Storage systems

Chapter 13 – Referenced Standards

The Plumbing Code

Chapter 1 - as indicated in OBC Chapter 1
Chapter 3 - General...(Misc.)
1. Equipment requirements, listing/labeling, electrical & plumbing associated elements of systems and equipment
2. Fuel gas standard
3. Structural protection
4. Equipment and appliance locations
5. Installation requirements
6. Misc.: Condensate disposal; clearance reductions; temp. control; explosion control; smoke & heat vents; heating & cooling calculations
7. Welding & Brazing

The Mechanical Code

Chapter 4 – Ventilation
1. General, openings
2. Natural ventilation
3. Mechanical ventilation
4. Enclosed parking garages, systems control, ventilation of uninhabited spaces
5. Required outdoor air
Chapter 5 – Exhaust Systems
1. Required systems: Aircraft fueling; Battery charging industrial uses; Dry cleaning, etc.
2. Motors & Fans, dryers, domestic & commercial kitchen exhaust & hoods, makeup air, hazardous exhaust, dust, stock & conveying systems, subsoil exhaust, smoke control, energy recovery

Chapter 6 – Duct Systems
1. General
2. Plenums
3. Duct construction
4. Insulation, Air Filters
5. Smoke detection systems control
6. Duct & transfer openings

Chapter 7 – Combustion Air
1. General
2. Indoor, outdoor air
3. Forced combustion air
4. Misc., direct connection, combustion air, opening locations, protection & obstructions

Chapter 8 – Chimneys & vents
1. General, connectors, vents, direct, integral & mechanical draft systems
2. Factory built chimneys, metal chimneys

Chapter 9 – Appliances, Fireplaces & Solid Fuel Burning Equipment
1. See individual type, sections 901-926
Chapter 10 – Boilers, Water Heaters & Pressure Vessels
1. Scope, limitations & exceptions
2. Conditions for use and installations, connections
3. Safety & pressure relief valves & control
4. Cutoff & blow off valves
5. H W Boiler expansion tank
6. Gauges

Chapter 11 – Refrigeration
1. Scope, equipment & Materials, referenced standards
2. System requirements
3. Refrigerants, mixing, purity
4. System classification
5. Application requirements
6. Machinery room requirements
7. Piping
8. Field & periodic tests

Chapter 12 – Hydronic Piping
1. Sizing, insulation, material, installation
2. Valves
3. Transfer fluid, tests, embedded piping

Chapter 13 – Fuel Oil Piping & Storage
1. Scope & referenced standards
2. Materials
3. Joints & Connections
4. Piping support
5. Installation of systems
6. Valves
7. Testing
Chapter 14 – Solar Systems
1. Scope, water supply, equipment & appliances, ducts
2. Installation
3. Heat transfer fluids
4. Materials

Chapter 15 – Referenced Standards