ICC Plumbing Update

St Louis Missouri ASPE Chapter
March 5, 2013
Agenda

- Welcome & Introductions
- Introduction to the ICC
- Code Development Process
- Significant Changes in the 2015 IPC
- PERC Phase II Testing
- Questions
Introduction to the ICC

Who we are and what we do.
ICC’s VISION:
To protect the health, safety and welfare of people by creating better buildings and safer communities
ICC by the Numbers

- 50,000 members
- 350 chapters
- 300 staff in 4 regional offices
- 15 model codes used in 50 states
- 62k code interpretations
- 1000 days of training
ICC - Built On A Solid Foundation

- More than two centuries of collective experience
- A history of support for public safety
- Widespread recognition and reliance throughout the U.S. and the world.
ICC’s Products and Services

- Laboratory Accreditation
- Standards
- Product Certification & Testing
- Code Development
- Training, Education & Certification
How are Model Codes Developed?
What is Meant by a Consensus Process?

- Open Public Forums
- Decision Transparency
- Representation of Interests
- Due Process
- Appeals Process
- Majority Consensus
What is the Governmental Consensus Process?

- Leaves the final determination of code provisions in the hands of public safety officials who, with no vested financial interest, can legitimately represent the public interest.

- Meets the principles of the U.S. Standards Strategy of 2005 and National Technology Transfer and Advancement Act of 1995

  - OMB Circular A-119: Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities
Why Public Hearings?

Provide an *open forum* for all those *in favor* of and all those *opposed* to the proposed code changes to voice their *support* or *opposition* or to provide *any other relevant information*.
Wide Industry Involvement

- Code officials
- Design professionals
- Trade associations
- Builders/contractors
- Manufacturers/suppliers
- Government agencies
- Advocacy groups
- Utilities
- Anyone else!
I-Code Development Cycle

1. Code Changes Submitted
2. Code Changes Posted & CD Distributed
3. Code Development Hearing
4. Public Hearing Results Posted & CD Distributed
5. Public Comments Sought on Public Hearing Results
6. Public Comments Posted & CD Distributed
7. Final Action Hearing
8. NEW EDITION PUBLISHED
## Everyone Does Have a Voice

<table>
<thead>
<tr>
<th>Development Process</th>
<th>Non-Member</th>
<th>ICC Non-Gov. Member</th>
<th>ICC Gov. Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Change Proposal Submission</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Comment Submission</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Code Development Committee Membership</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Hearing House Votes*</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Code Development Hearing Floor Motion</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Code Development Hearing Floor Vote</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Final Action Hearing Motion</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Final Action Hearing Vote</td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Appeal</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*House votes are for certain points of order at hearings, not for approval/disapproval of code changes or comments.*
2012/13
Code Development Plan

Codes divided into three groups for development.

- **Group A**: IBC, IFGC, IMC, IPC, IPSDC
- **Group B**: IEBC, IECC, IFC, IPerfC, ISPSC, IPMC, IRC, IWUIC, IZC
- **Group C**: IgCC
Moving into the Future: cdp ACCESS
2015 Code Cycle

- Revisions to the 2012 IPC took place during the calendar year 2012 as part of Group A.
- The changes approved will appear in the 2015 IPC.
- Completed codes will be correlated with other codes completed in Group B.
- All 2015 codes (except IgCC) will be released together in spring, 2014.
Chapter 13 (New Chapter): Nonpotable Water Systems

- Replaces existing chapter on graywater recycling and subsurface irrigation
- Addresses collection, treatment, storage and distribution of alternate nonpotable water sources – graywater, rainwater, reclaimed
- Based in large part on 2012 International Green Construction Code provisions
Section 403 Minimum Plumbing Facilities

- 403.1 Section no longer requires that the IBC occupancy classifications be used to determine the min. number of plumbing fixtures. Now based on “actual use.”

- 403.3 Allows public access areas of a building that are 300 square feet or less and are used for quick transactions to not require public toilet facilities. Examples:
  - Dry cleaning drop off
  - Pizza pickup
  - ATM use
Section 423.3 SPECIALTY PLUMBING FIXTURES

423.3 Footbaths, pedicure baths and head shampoo sinks. The water supplied to specialty plumbing fixtures such as pedicure chairs having an integral foot bath tub, footbaths, and head shampoo sinks, shall be limited to a maximum temperature of 120°F by a water temperature limiting device that conforms to ASSE 1070 or CSA B125.3.

Source: http://www.sakhisalonnspaequip.com
Section 410 DRINKING FOUNTAINS

- Definitions added for:
  - Drinking fountain
  - Water cooler
  - Water dispensers

- Substitution of up to 50% of drinking fountains with water dispensers permitted

- Electrical drinking water coolers must be listed to UL 399

Source: Elkay Manufacturing Company
Section 504.6 Requirements for discharge piping

- Minimum gap requirement of 2X pipe diameter added for discharge pipes on water heaters

- Further specifies waste receptor flood level rim
Chapter 6 WATER SUPPLY & DISTRIBUTION

- Safe Drinking Water Act Revisions
  - 605.2.1 Lead content of drinking water pipe and fittings. Pipe, pipe fittings, joints, valves, faucets, and fixture fittings utilized to supply water for drinking or cooking purposes shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent lead or less.

- Piping materials for water distribution
  - 605.17: CPVC/AL/CPVC Pipe & Tubing added
  - Asbestos cement piping removed

- ASME B16.51 added to cover copper and copper allow press-connect pressure fittings. 604.15.5 added address proper connection of press-connect fittings.
Table 604.3 WATER DISTRIBUTION SYSTEM – CAPACITY AT OUTLETS

<table>
<thead>
<tr>
<th>FIXTURE SUPPLY OUTLET SERVING</th>
<th>FLOW RATE&lt;sup&gt;a&lt;/sup&gt; (gpm)</th>
<th>FLOW PRESSURE (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathtub, balanced-pressure, thermostatic or combination balanced-pressure/thermo-static mixing valve</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Bidet, thermostatic mixing valve</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Combination fixture</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Dishwasher, residential</td>
<td>2.75</td>
<td>8</td>
</tr>
<tr>
<td>Drinking fountain</td>
<td>0.75</td>
<td>8</td>
</tr>
<tr>
<td>Laundry tray</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Lavatory, private</td>
<td>2.0</td>
<td>8</td>
</tr>
<tr>
<td>Lavatory, private, mixing valve</td>
<td>0.8</td>
<td>8</td>
</tr>
<tr>
<td>Lavatory, public</td>
<td>0.4</td>
<td>8</td>
</tr>
<tr>
<td>Shower</td>
<td>3.2</td>
<td>8</td>
</tr>
<tr>
<td>Shower, balanced-pressure, thermostatic or combination balanced-pressure/thermo-static mixing valve</td>
<td>3.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>20</td>
</tr>
<tr>
<td>Silcock, hose bibb</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Sink, residential</td>
<td>2.5 1.75</td>
<td>8</td>
</tr>
<tr>
<td>Sink, service</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Urinal, valve</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Water closet, blow out, flushometer Valve</td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>Water closet, flushometer tank</td>
<td>1.6</td>
<td>20</td>
</tr>
<tr>
<td>Water closet, siphonic, flushometer Valve</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Water closet, tank, close coupled</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Water closet, tank, one piece</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

For SI: 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 3.785 L/m.

<sup>a</sup> For additional requirements for flow rates and quantities, see Section 604.4.

<sup>b</sup> Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.
Chapter 7

- Section 705: New code section for replacement of underground sewer lines using pipe bursting method
- Section 716: Vacuum drainage covered previously in Appendix C, moved to main body of the code.
Chapter 10

- **Section 1003.3.6 Gravity Grease Interceptors**
  - Adds new language for gravity systems
  - References ASME A112.4.6 and IAPMO/ANSI Z1001, Z100
  - Design based on peak drain flow and 30 minute retention time
  - Specific requirements for FOG systems

- **Section 1002.4 Trap Seals**
  - Potable water supplied trap seal primer
  - Reclaimed or gray water supplied trap seal primer
  - Waste water supplied trap primer device
  - Barrier type trap seal protection device
Chapter 11 STORM DRAINAGE

- Chapter 11 code sections related to the sizing of roof drainage systems reworked and revised.

- ASPE Research Foundation project (Storm Drainage System Research Project – Flow Rate Through Roof Drains) discovered:
  - Ponding of water at a roof drain significantly affects how much water is discharged rate
  - Potential for pressurized flow
  - Differing flow rate among various outlet designs
  - See “Storm Drainage Design Gone Wrong” in November edition of PM Engineer magazine
Chapter 11 STORM DRAINAGE

- New code language requires
  - Flow rate of the specific roof drain to be used be known
  - Gravity drain piping system be sized for that flow rate
- 1101.7 Roof design. Roofs shall be designed for the maximum possible depth of water that will pond thereon as determined by the relative levels of roof deck and overflow weirs, scuppers, edges or serviceable drains in combination with the deflected structural elements. In determining the maximum possible depth of water, all primary roof drainage means shall be assumed to be blocked. The maximum possible depth of water on the roof shall include the height of the water required above the inlet of the secondary roof drainage means to achieve the required flow rate of the secondary drainage means to accommodate the design rainfall rate as required by Section 1106. (1101.7)
Sizing of roof drain systems to be based on:
- Maximum flow rates for each model and size of roof drain
- Maximum anticipated ponding at the roof drain

1105.2 Roof drain flow rate. The published roof drain flow rate based upon the head of water above the roof drain shall be used to size the storm drainage system in accordance with Section 1106. The flow rate used for sizing the storm drainage piping shall be based on the maximum anticipated ponding at the roof drain.
Chapter 11 STORM DRAINAGE

1106.2 Vertical conductors and leaders. Vertical conductors and leaders shall be sized for the maximum projected roof area, in accordance with Table 1106.2(1) and Table 1106.2(2).

<table>
<thead>
<tr>
<th>DIAMETER OF LEADER (inches)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORIZONTALLY PROJECTED ROOF AREA (square feet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainfall rate (inches per hour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2,880</td>
<td>1,440</td>
<td>960</td>
<td>720</td>
<td>575</td>
<td>480</td>
<td>410</td>
<td>360</td>
<td>320</td>
<td>290</td>
<td>260</td>
<td>240</td>
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<tr>
<td>2</td>
<td>8,800</td>
<td>4,400</td>
<td>2,930</td>
<td>2,200</td>
<td>1,760</td>
<td>1,470</td>
<td>1,260</td>
<td>1,100</td>
<td>980</td>
<td>880</td>
<td>800</td>
<td>730</td>
</tr>
<tr>
<td>3</td>
<td>18,400</td>
<td>9,200</td>
<td>6,130</td>
<td>4,600</td>
<td>3,680</td>
<td>3,070</td>
<td>2,630</td>
<td>2,300</td>
<td>2,045</td>
<td>1,840</td>
<td>1,675</td>
<td>1,530</td>
</tr>
<tr>
<td>4</td>
<td>34,600</td>
<td>17,300</td>
<td>11,530</td>
<td>8,650</td>
<td>6,920</td>
<td>5,765</td>
<td>4,945</td>
<td>4,325</td>
<td>3,845</td>
<td>3,460</td>
<td>3,145</td>
<td>2,880</td>
</tr>
<tr>
<td>5</td>
<td>54,000</td>
<td>27,000</td>
<td>17,995</td>
<td>13,500</td>
<td>10,800</td>
<td>9,000</td>
<td>7,715</td>
<td>6,750</td>
<td>6,000</td>
<td>5,400</td>
<td>4,910</td>
<td>4,500</td>
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<tr>
<td>6</td>
<td>116,000</td>
<td>58,000</td>
<td>38,660</td>
<td>29,000</td>
<td>23,200</td>
<td>19,315</td>
<td>16,570</td>
<td>14,500</td>
<td>12,890</td>
<td>11,600</td>
<td>10,545</td>
<td>9,600</td>
</tr>
</tbody>
</table>
1106.2 Size of storm drain piping. Vertical and horizontal storm drain piping shall be sized based on the flow rate through the roof drain. The flow rate in storm drain piping shall not exceed the rates specified in Table 1106.2

<table>
<thead>
<tr>
<th>PIPE SIZE (inches)</th>
<th>VERTICAL DRAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/16 inch per ft</td>
</tr>
<tr>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>87</td>
</tr>
<tr>
<td>4</td>
<td>180</td>
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<td>5</td>
<td>311</td>
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<td>6</td>
<td>538</td>
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<tr>
<td>8</td>
<td>1,117</td>
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<tr>
<td>10</td>
<td>2,050</td>
</tr>
<tr>
<td>12</td>
<td>3,272</td>
</tr>
<tr>
<td>15</td>
<td>5,543</td>
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</tbody>
</table>
PERC Phase II
PERC – Phase I Findings

- Toilet hydraulics (% trailing water and flush rate) were found to be insignificant variables.
- There is correlation between the wet tensile strength of toilet paper and drainline transport.
- 3.0 Lpf toilets create a chaotic drainline system when there are no additional long duration flows.
- 4.8 and 6.0 Lpf toilets produce more orderly and predictable movement in drainlines.
- Clearing flush failed to clear the line in 7 of 39 test runs.
## PERC – Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Diameter</td>
<td>4”</td>
<td>3”</td>
</tr>
<tr>
<td>Pitch</td>
<td>1%, 2%</td>
<td>1%, 2%</td>
</tr>
<tr>
<td>Flush Volume</td>
<td>1.6, 1.3, <strong>1.0</strong>, 0.8 gpf</td>
<td>1.6, 1.3, 1.0, 0.8 gpf</td>
</tr>
<tr>
<td>Peak Flow Velocity</td>
<td>3500, 2000 ml/s</td>
<td>3500, 2000 ml/s</td>
</tr>
<tr>
<td>Trailing Water</td>
<td>75%, 25%</td>
<td>75%, 25%</td>
</tr>
<tr>
<td>Toilet Paper Wet Tensile</td>
<td>High, Low</td>
<td>High, Low</td>
</tr>
<tr>
<td>Soy Paste Loadings</td>
<td>300, 200, 100 g</td>
<td>300, 200, 100 g</td>
</tr>
<tr>
<td>Clearing Flush Volume</td>
<td>5 gallons</td>
<td>-</td>
</tr>
</tbody>
</table>
PERC II – Data Needs

- Complete the testing of 4” pipe on 1 gpf with low tensile TP
- Test statistical validity of test runs with 50-75 flushes per run which will permit more testing with less funding
- Repeat test runs on 3” pipe for all test variables (64 test runs)

PERC II will require a total of 96 test runs,
- Includes additional 32 runs on 4” diameter pipe needed to complete the matrix from PERC I and evaluate the 1.0 gpf test volume.
PERC II - Funding

- 70 flush test plan: $111,537
- 100 flush test plan: $151,537

Funding
- $10,000 Los Angeles Metropolitan Water District
- Other funding currently being sought
- Start date TBD
Questions?

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