

 **Top Issues in Design Review:  
An Interactive Session**

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 **Session Overview**

- Catching issues early saves time and \$
- Intro to Design Review Tool Project
- Energy Design Resources: Cx Assistant
- CxP Survey Preliminary Results
- Karl's top design review issues
- What are your top design review issues?

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 **Design Review Tool**

- Top 30-50 issues found repeatedly during design review
  - based on CxP surveys
- Library of supporting information
  - Brief overview, example, other resources
- Integration with Cx Assistant
  - List of design review issues based on system type entered

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**Cx Assistant Modules:**  
Output based on project specifics

- Probable Cx cost
- Appropriate Cx scope (& draft scope)
- Customized draft design intent
- Customized draft basis of design
- Sample Cx Specifications
- Sample Sequence of Operations (reflects T24)
- Customized draft Cx Plan
- Customized draft Cx training plan
- Customized draft systems manual

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**Levels of Cx in the Cx Assistant**

Cx Path			Commissioning Process Element
Abbreviated	Standard	Comprehensive	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Design Intent Document
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Commissioning Plan
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Design Development Design Review
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Construction Documents Design Review
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Commissioning Specification Development
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Submittal Review

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## Design Review Issues: Survey Cx Providers

- What is the issue ?
- What systems are commonly associated with the issue?
- What areas of building performance are affected by the issue?
- In what phases of design review can the issue be corrected?

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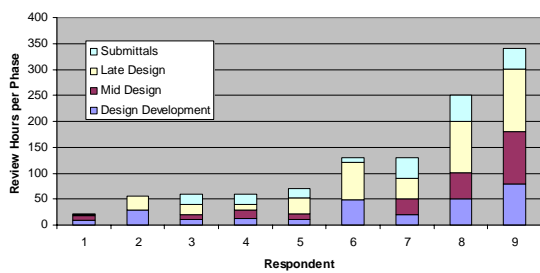
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## Preliminary Survey Results: Extent of Design Review




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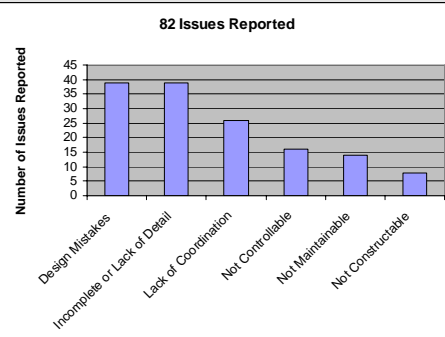
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## Preliminary Survey Results: Summary of Issues Reported




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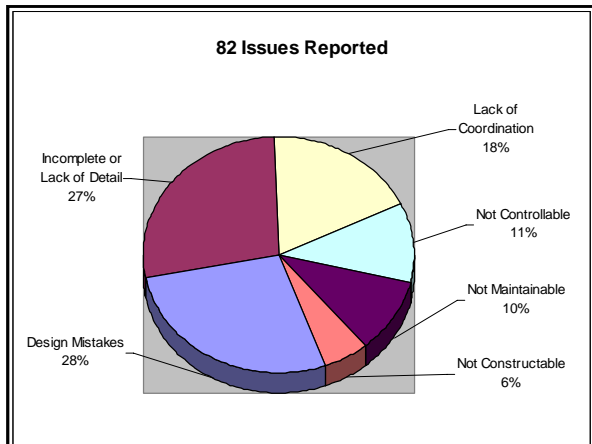
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### Karl's Top Design Review Issues

1	Heating water system hydraulics (piping correctly--no bypass or in wrong location; improper isolation)
2	Chilled water and cooling tower system hydraulics (piping, isolation)
3	Leaving cooling tower condenser water control inefficient
4	Fire alarm response matrix missing or incomplete
5	Emergency power response matrix missing or incomplete
6	Unclear sequences of control
7	Unoccupied mode sequences of control missing (night low limit, warm-up, cool-down, night flush)
8	Unclear AHU control authorities between packaged and BAS controls
9	Unclear boiler control authorities between packaged and BAS ctrls
10	Unclear chiller control authorities between packaged and BAS ctrls

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### Your turn to tell us your biggest design review issues

- How many of you are typically involved in design development phase?

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## Areas of design review comments

- Energy efficiency opportunities?
- Coordination between drawings?
- Controllability?
- Maintainability/equipment access?

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## Which phase to best address?

- Design development
- Mid-design Drawings
- Late-design Drawings
- Submittals/Shop Drawings

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## Project Timeline

- Complete surveys – April
- Select top issues – May
- Complete library content – October
- Implement with Cx Assistant -TBD

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## Surveys

Thank you for your input!

For an electronic survey, please email  
Kristin Heinemeier  
kheinemeier@peci.org

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## Top Design Review Issues

11	Pump impeller trim and fan sheave change requirements missing
12	Training requirements missing or incomplete
13	Controls network communication speed requirements missing
14	Controls workstation graphics requirements missing
15	VAV terminal unit access
16	Inadequate contractor requirements for control sequence submittal
17	Inadequate contractor requirements for control drawing submittal
18	Missing air riser and balance diagrams with OA, SA, RA; EA quantities
19	Flow diagrams for major systems missing (CHW, HW, Air)
20	List of required points, including monitored only points missing
21	Sensor calibration requirements poor or missing
22	Balancing requirements are too generic and not detailed enough

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 <b>Top Design Review Issues</b>	
23	Duct fitting not clear and not taking advantage of energy savings potential
24	Turning vane reqr's not clear & not taking advantage of energy svgs potential
25	Equipment with no defined sequences of control
26	Boiler staging plan unclear or won't work well
27	Chiller staging and short cycling issues
28	Unclear or inadequate demand controlled ventilation (CO2) strategy
29	O&M manual requirements are insufficient and not detailed enough
30	Not taking advantage of occupancy sensors
31	Undefined minimum OA quantities and justification
32	Additional P/T ports needed
33	Project closeout requirement incomplete
34	Low leakage dampers not specified
35	No resets (missed energy savings)
36	Competing resets (SAT, CHWT, duct pressure)
37	Outdoor air intake location poor

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