AABC Commissioning Group

AIA Provider Number 50111116

Managing Commissioning in a 180-Facility Health Care Corporation

Course Number: CXENERGY1928

Robert Langford
HCA

April 17, 2019

Above all else, we are committed to the care and improvement of human life

Utilizing Cx Database for HCA Commissioning Course Number – CxEnergy1928

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April 16, 2019

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

Hospital Corporation of America (HCA) currently owns 185 hospitals across the United States and United Kingdom.

The yearly capital improvement budget program wide reaches $3 Billion ($1.5 Billion – New Construction)

This presentation will focus on how HCA utilizes Cx Database to assist two commissioning agents with this workload.

HCA is also applying Cx Database to improve the Cx process by identifying and eliminating common issues as well as monitor contractors performance.

Learning Objectives

- How HCA implements their MEP Guidelines
- Use of cloud-based Cx web application to track and manage the large amount of projects HCA builds every year
- How HCA organizes meeting minutes and site visit observations on Cx Database
- How HCA sorts Common Issues and better ways to input issues for more accurate categorization

Table of Contents

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HCA Commissioning

- HCA spends $1.5 Billion dollars/year on construction across 185 hospitals
- Two Cx Agents for all work
- Some work is contracted 3rd Party
- Types of Projects:
  - Greenfield
  - Vertical Expansions
  - Horizontal Expansions
  - Renovations
  - Central Energy Plants

Inspiration in the sky

So crews, mechanics, and other staff can be interchangeable for flexibility

Why?

Every Southwest airplane is 737

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MEP Guidelines

- Guidelines are used for every hospital in program
- Single source agreements for equipment across program (AHUs, Chillers, VAV Boxes, etc.)
- Installation requirements are same across program
- Sequences are same across program
- Only Johnson Controls or Siemens on hospitals
- Staffing is interchangeable across program

How this helps HCA Cx

Pre-Functional Checklist Templates

- 37 total PFC templates
- Templates include requirements from MEP Guidelines as well as common issues found

Functional Performance Test Templates

- 15 total FPT templates
- Tests written based on standard sequences provided in MEP Guidelines

PFCs and FPTs templates are project specific so no need to adjust for individual project

Creating Projects on Cx Database

- Master Equipment List imported to Cx Database

Equipment Name	Equipment Type	Discipline	Space	Area Served	Manufacturer	Model #	Test
RTU-8	RTU-HW & CHW	Mechanical	Roof	ED Addition	JCI		AHU-All States
AHU-2	RTU-HW & CHW	Mechanical	Roof	Lab	JCI		AHU-All States
AHU-3	RTU-HW & CHW	Mechanical	Roof	Lobby	JCI		AHU-All States
RTU-9	RTU-HW & CHW	echanical	Roof	Admin Area	JCI		RTU-DX
ACC-1	Chiller-Air Cooled	Mechanical	Mechanical Yard	CHW System			CHW - Variable Primary
ACC-2	Chiller-Air Cooled	Mechanical	Mechanical Yard	CHW System			
HU-1	Duct Humidifier	Mechanical	Trauma Room	Trauma Room	Armstrong	EHU701-CM07	Duct Humidifier
HU-2	Duct Humidifier	Mechanical	Trauma Room	Trauma Room	Armstrong	EHU701-CM07	Duct Humidifier
CHWP-1	Hydronic Pump	Mechanical	1st FLR Mechanical Ro	CHW System	Bell & Gossett	e-80 4x4x13.5	
CHWP-2	Hydronic Pump	Mechanical	1st FLR Mechanical Ro	CHW System	Bell & Gossett	e-80 4x4x13.5	
B-1	HW Boiler	Mechanical	HHW Service Vestibul	HW System	Fulton	2000-DF	HW Boiler System
B-2	HW Boiler	Mechanical	HHW Service Vestibul	HW System	Fulton	2000-DF	

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Commissioning Kickoff Meeting

Utilize the Meetings section under Reports

Have made one meeting agenda template and copy to every project to use

Take meeting minutes for record

Copy meeting minutes into field observation report to be accessed while onsite

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Contractors Complete PFCs

Contractors use Cx Database to complete PFCs as equipment is installed

Require picture be taken of each VAV box to show duct inlet conditions as well as service area

For phased projects, checklists are broken into phases for easier tracking

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Contractors Complete FPTs

Contractors use Cx Database to complete FPTs after Test and Balance

Afterwards, HCA Cx goes to site to verify FPTs have been completed accurately

Field Observation Reports

Use field observation reports each site visit

Try not to make issues from this report which will be explained later

Observations from visit are recorded as well as completion or other important dates

Also use Field Observation Reports for Test and Balance Report review comments

Previous Field Observation Reports can be viewed from field tool while onsite for reference

Tracking Issues

01 All Cx issues are created in Cx Database

02 Lots of useful data for HCA

03 Goals: Find most common issues
Find best/worst contractors

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Cx Database by the Numbers

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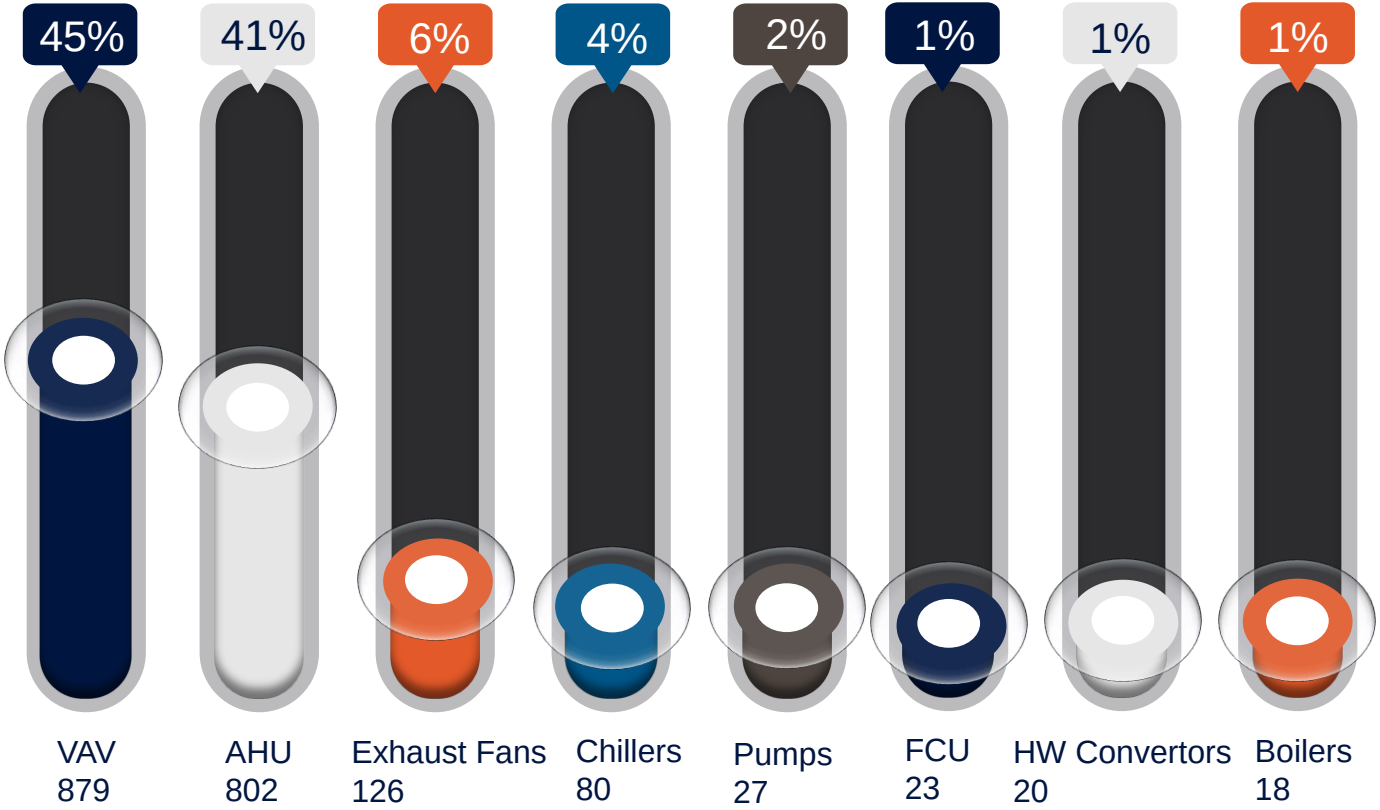
Issues by Equipment Type



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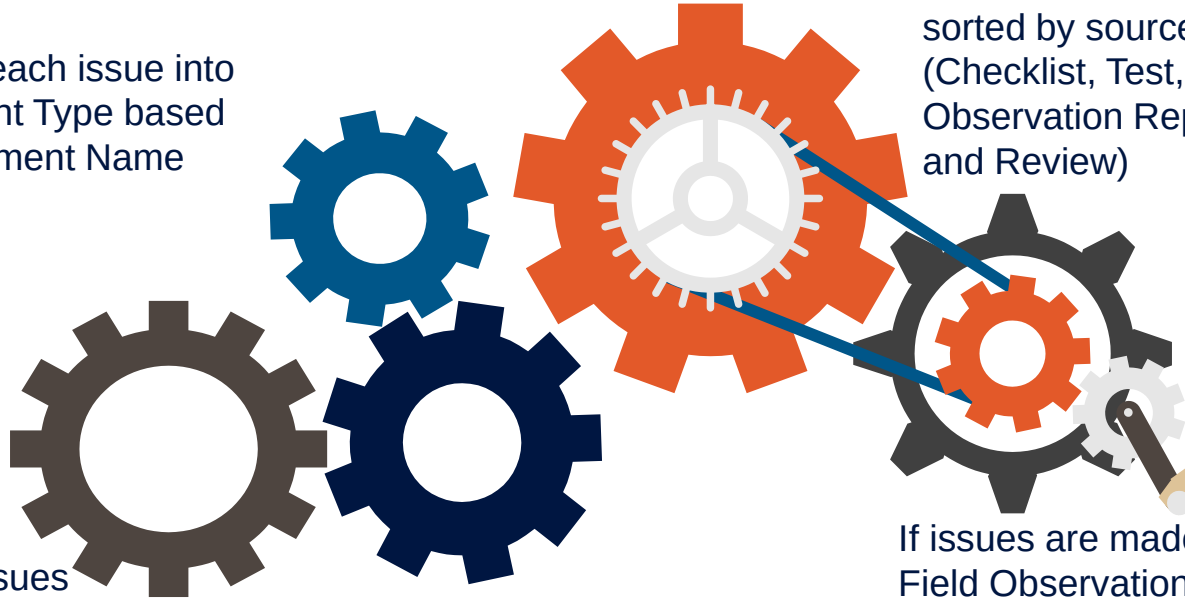
How we sorted the data

Classify each issue into Equipment Type based on Equipment Name

These issues can be sorted by source type (Checklist, Test, Field Observation Report, and Review)



Export issues from Account Export Page into CSV file

Make pivot table for each equipment type showing checklist, test lines and issue count associated with each line

If issues are made on Field Observation Report or Review, it is not associated with line and has to be classified manually

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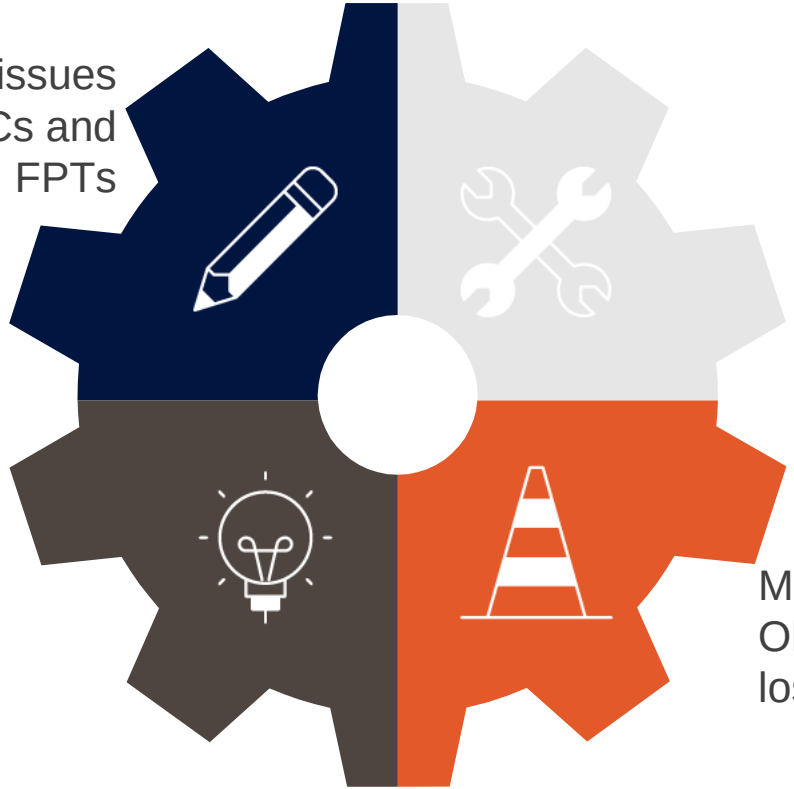
VAV Box Issues

VAV	395
Controls wiring and sensors are installed and complete	81
Required access is provided for control box for service	57
Duct insulation is complete and undamaged	48
Piping is properly supported within 3 feet of box	33
Access door is provided upstream of coil for cleaning	30
Units concealed above lay-in ceilings are marked by a marker clipped to the grid	23
Discharge air temperature sensor is installed downstream of unit	18
Power is connected to unit	8
Box is hung from structure with 4 supports	8
Transition to box inlet allows for minimum 1.5 duct diameters of straight, hard duct entering box, no flex allowed	6
Box is visably labeled	6
Piping insulation is complete and undamaged	5
Duct run out matches duct size on drawings	5
Hot water piping is not installed above air bleed valve	5
Take picture of VAV box to show service clearance and inlet conditions. Press back arrow in Cx Alloy App and then press Files and take photo	4
Piping package is installed and accessible with isolation valves and union for service	4

How to Create Issues for Tracking

Contractors create issues when completing PFCs and FPTs

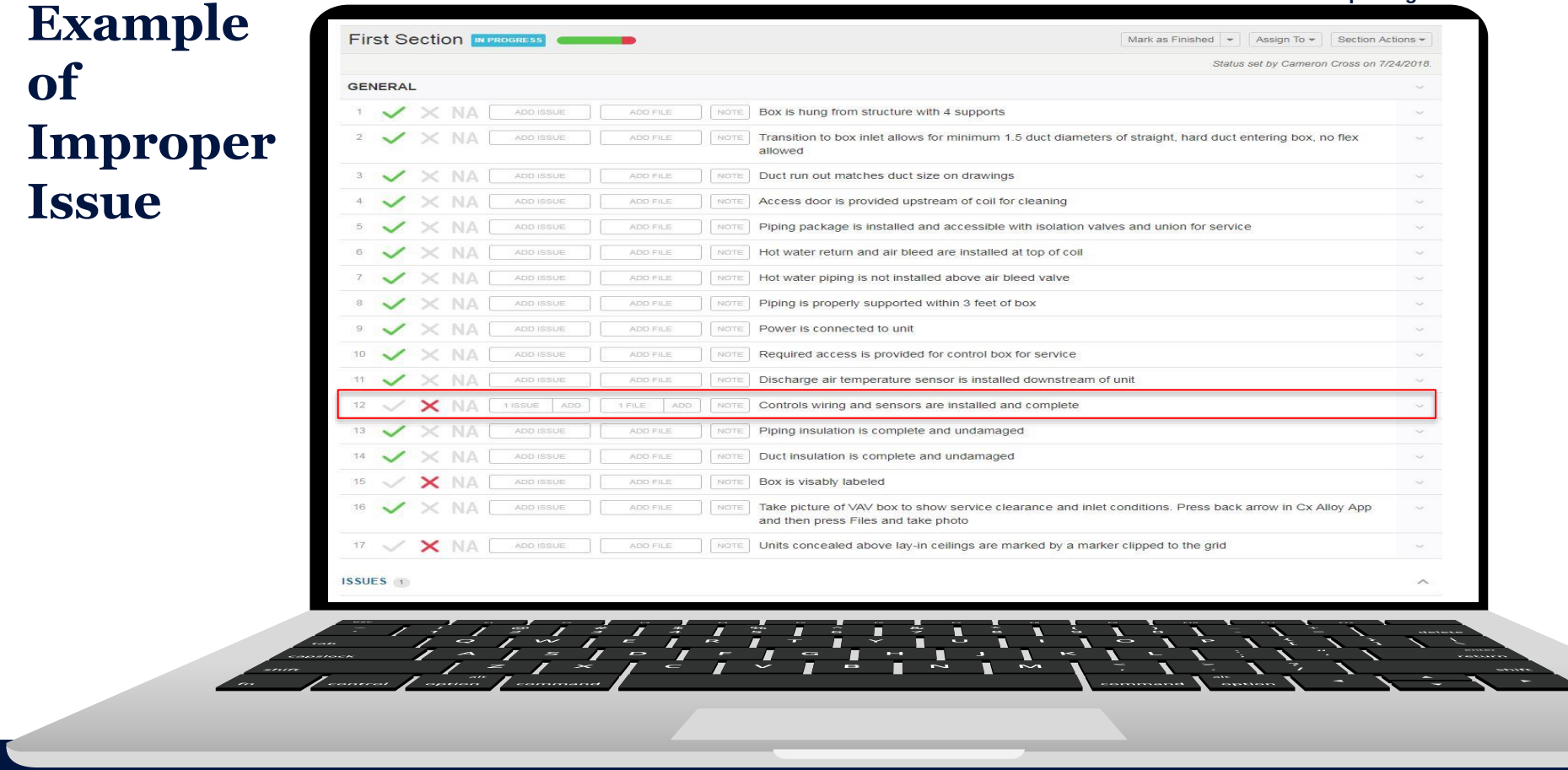


Sometimes, contractors create issues which are really a work in progress. These should either be left blank until completed or marked “No” but no issue made

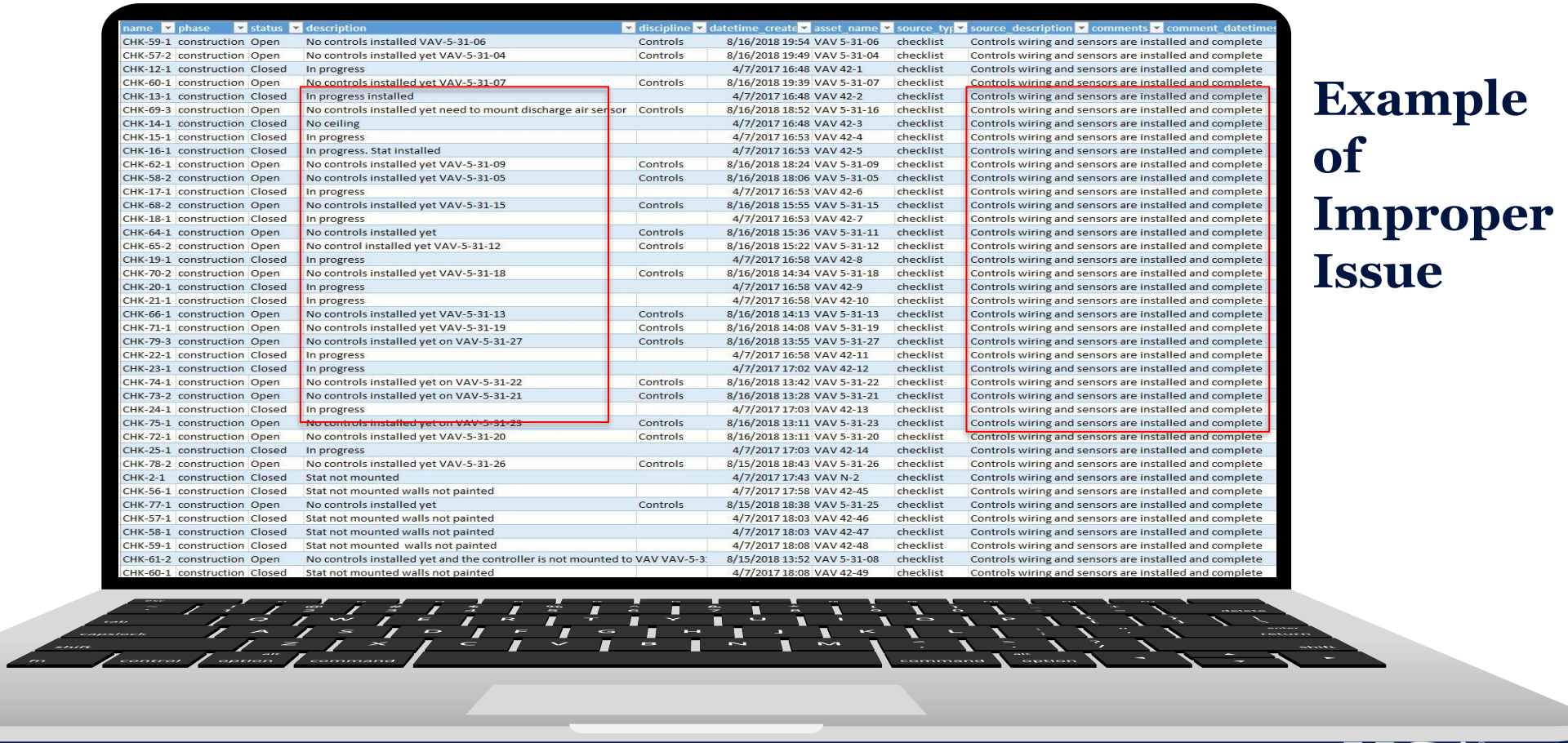
Issues should be made on the PFC/FPT line that is associated with that issue

Making issues on Field Observation Reports get lost in the data

Example of Improper Issue



Example of Improper Issue



name	phase	status	description	discipline	datetime_create	asset_name	source_ty	source_description	comments	comment_datetime
CHK-59-1	construction	Open	No controls installed VAV-5-31-06	Controls	8/16/2018 19:54	VAV 5-31-06	checklist	Controls wiring and sensors are installed and complete		
CHK-57-2	construction	Open	No controls installed yet VAV-5-31-04	Controls	8/16/2018 19:49	VAV 5-31-04	checklist	Controls wiring and sensors are installed and complete		
CHK-12-1	construction	Closed	In progress		4/7/2017 16:48	VAV 42-1	checklist	Controls wiring and sensors are installed and complete		
CHK-60-1	construction	Open	No controls installed yet VAV-5-31-07	Controls	8/16/2018 19:39	VAV 5-31-07	checklist	Controls wiring and sensors are installed and complete		
CHK-13-1	construction	Closed	In progress installed		4/7/2017 16:48	VAV 42-2	checklist	Controls wiring and sensors are installed and complete		
CHK-69-3	construction	Open	No controls installed yet need to mount discharge air sensor	Controls	8/16/2018 18:52	VAV 5-31-16	checklist	Controls wiring and sensors are installed and complete		
CHK-14-1	construction	Closed	No ceiling		4/7/2017 16:48	VAV 42-3	checklist	Controls wiring and sensors are installed and complete		
CHK-15-1	construction	Closed	In progress		4/7/2017 16:53	VAV 42-4	checklist	Controls wiring and sensors are installed and complete		
CHK-16-1	construction	Closed	In progress. Stat installed		4/7/2017 16:53	VAV 42-5	checklist	Controls wiring and sensors are installed and complete		
CHK-62-1	construction	Open	No controls installed yet VAV-5-31-09	Controls	8/16/2018 18:24	VAV 5-31-09	checklist	Controls wiring and sensors are installed and complete		
CHK-58-2	construction	Open	No controls installed yet VAV-5-31-05	Controls	8/16/2018 18:06	VAV 5-31-05	checklist	Controls wiring and sensors are installed and complete		
CHK-17-1	construction	Closed	In progress		4/7/2017 16:53	VAV 42-6	checklist	Controls wiring and sensors are installed and complete		
CHK-68-2	construction	Open	No controls installed yet VAV-5-31-15	Controls	8/16/2018 15:55	VAV 5-31-15	checklist	Controls wiring and sensors are installed and complete		
CHK-18-1	construction	Closed	In progress		4/7/2017 16:53	VAV 42-7	checklist	Controls wiring and sensors are installed and complete		
CHK-64-1	construction	Open	No controls installed yet	Controls	8/16/2018 15:36	VAV 5-31-11	checklist	Controls wiring and sensors are installed and complete		
CHK-65-2	construction	Open	No control installed yet VAV-5-31-12	Controls	8/16/2018 15:22	VAV 5-31-12	checklist	Controls wiring and sensors are installed and complete		
CHK-19-1	construction	Closed	In progress		4/7/2017 16:58	VAV 42-8	checklist	Controls wiring and sensors are installed and complete		
CHK-70-2	construction	Open	No controls installed yet VAV-5-31-18	Controls	8/16/2018 14:34	VAV 5-31-18	checklist	Controls wiring and sensors are installed and complete		
CHK-20-1	construction	Closed	In progress		4/7/2017 16:58	VAV 42-9	checklist	Controls wiring and sensors are installed and complete		
CHK-21-1	construction	Closed	In progress		4/7/2017 16:58	VAV 42-10	checklist	Controls wiring and sensors are installed and complete		
CHK-66-1	construction	Open	No controls installed yet VAV-5-31-13	Controls	8/16/2018 14:13	VAV 5-31-13	checklist	Controls wiring and sensors are installed and complete		
CHK-71-1	construction	Open	No controls installed yet VAV-5-31-19	Controls	8/16/2018 14:08	VAV 5-31-19	checklist	Controls wiring and sensors are installed and complete		
CHK-79-3	construction	Open	No controls installed yet on VAV-5-31-27	Controls	8/16/2018 13:55	VAV 5-31-27	checklist	Controls wiring and sensors are installed and complete		
CHK-22-1	construction	Closed	In progress		4/7/2017 16:58	VAV 42-11	checklist	Controls wiring and sensors are installed and complete		
CHK-23-1	construction	Closed	In progress		4/7/2017 17:02	VAV 42-12	checklist	Controls wiring and sensors are installed and complete		
CHK-74-1	construction	Open	No controls installed yet on VAV-5-31-22	Controls	8/16/2018 13:42	VAV 5-31-22	checklist	Controls wiring and sensors are installed and complete		
CHK-73-2	construction	Open	No controls installed yet on VAV-5-31-21	Controls	8/16/2018 13:28	VAV 5-31-21	checklist	Controls wiring and sensors are installed and complete		
CHK-24-1	construction	Closed	In progress		4/7/2017 17:03	VAV 42-13	checklist	Controls wiring and sensors are installed and complete		
CHK-75-1	construction	Open	No controls installed yet on VAV-5-31-23	Controls	8/16/2018 13:11	VAV 5-31-23	checklist	Controls wiring and sensors are installed and complete		
CHK-72-1	construction	Open	No controls installed yet VAV-5-31-20	Controls	8/16/2018 13:11	VAV 5-31-20	checklist	Controls wiring and sensors are installed and complete		
CHK-25-1	construction	Closed	In progress		4/7/2017 17:03	VAV 42-14	checklist	Controls wiring and sensors are installed and complete		
CHK-78-2	construction	Open	No controls installed yet VAV-5-31-26	Controls	8/15/2018 18:43	VAV 5-31-26	checklist	Controls wiring and sensors are installed and complete		
CHK-2-1	construction	Closed	Stat not mounted		4/7/2017 17:43	VAV N-2	checklist	Controls wiring and sensors are installed and complete		
CHK-56-1	construction	Closed	Stat not mounted walls not painted		4/7/2017 17:58	VAV 42-45	checklist	Controls wiring and sensors are installed and complete		
CHK-77-1	construction	Open	No controls installed yet	Controls	8/15/2018 18:38	VAV 5-31-25	checklist	Controls wiring and sensors are installed and complete		
CHK-57-1	construction	Closed	Stat not mounted walls not painted		4/7/2017 18:03	VAV 42-46	checklist	Controls wiring and sensors are installed and complete		
CHK-58-1	construction	Closed	Stat not mounted walls not painted		4/7/2017 18:03	VAV 42-47	checklist	Controls wiring and sensors are installed and complete		
CHK-59-1	construction	Closed	Stat not mounted walls not painted		4/7/2017 18:08	VAV 42-48	checklist	Controls wiring and sensors are installed and complete		
CHK-61-2	construction	Open	No controls installed yet and the controller is not mounted to VAV VAV-5-3		8/15/2018 13:52	VAV 5-31-08	checklist	Controls wiring and sensors are installed and complete		
CHK-60-1	construction	Closed	Stat not mounted walls not painted		4/7/2017 18:08	VAV 42-49	checklist	Controls wiring and sensors are installed and complete		

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Piping package is installed and accessible with isolation valves and union for service	4

Future Explorations

01

Need a way to statistically answer question “How was Cx on this project”

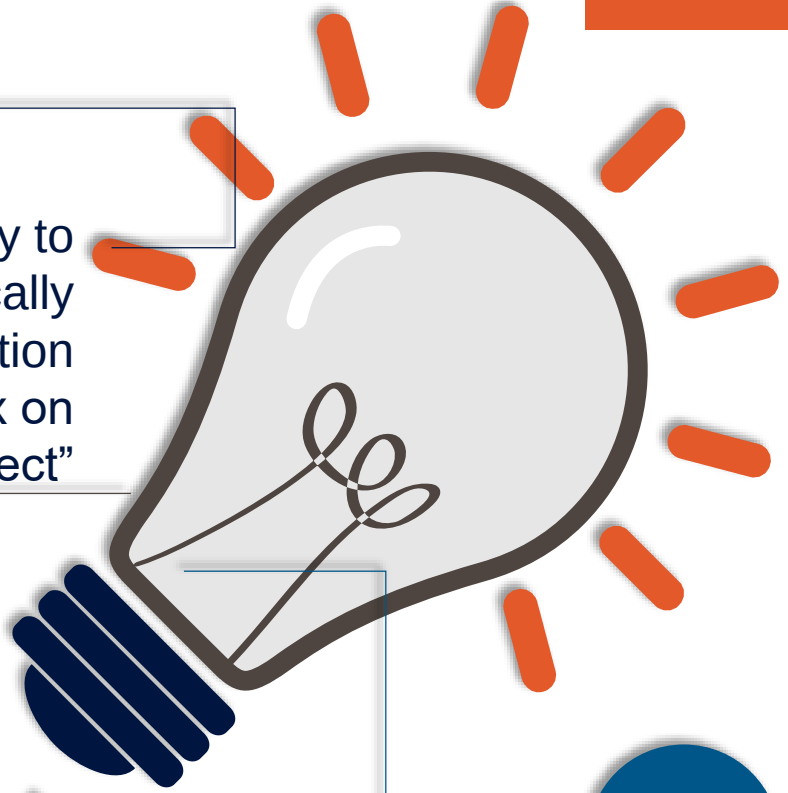
02

Tracking issues by contractors (GC, subs)

- Average # of days to close
- # of common issues found on project

03

Have dynamic “Top 10 List” of Common Issues



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Questions/Comments

This concludes The American Institute of Architects Continuing Education Systems Course