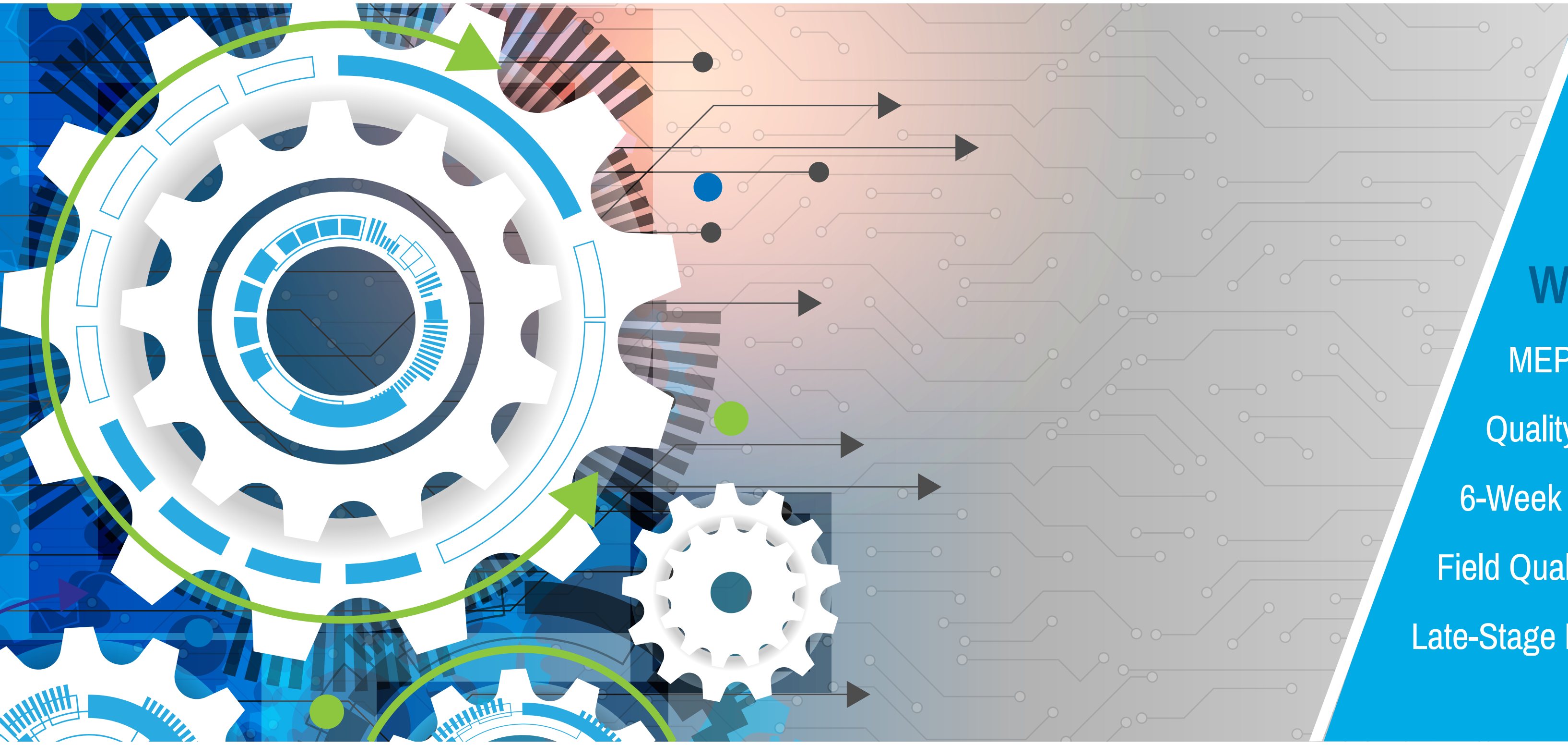
ConstructionProgressCoalition

COMMON DATA EXCHANGE



Workflow Topics

- MEP Coordination
- Quality Check Process
- 6-Week Schedule
- Field Quality Control & Inspection Process
- Late-Stage Design Change Management

2022 CDX RESEARCH REPORT

CDX COMMON DATA EXCHANGE

BLUEBEAM A NEMETSCHEK COMPANY

2022 RESEARCH SCHOLARSHIP

constructionprogress.org

If at any point throughout the document you need to know the definition for an acronym or CDX term, click the info icon at the bottom of the page to go directly to the appendix.

Table of Contents

Background

About the Construction Progress Coalition

The Construction Progress Coalition (CPC) is a 501c3 Professional Organization established in 2017 with the merging of Construction PDF Coalition (est. 2014) and the Construction Open Standards Alliance (est. 2013).

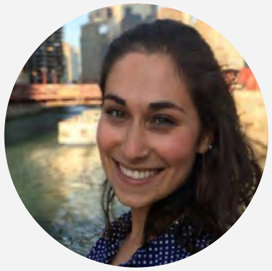
Our vision is to foster industry-wide consensus on the performance benchmarks for project delivery in the digital age. Our mission is to improve project delivery by connecting stakeholders through Common Data Exchange (CDX) initiatives.

The Construction Progress Coalition Guiding Principles

At CPC, we seek to collaborate with diverse perspectives to resolve the most pressing challenges facing the Architecture / Engineering / Construction (AEC) industry. Every initiative that CPC supports must align with one of the following pillars:

- **Care for People** Innovation requires empathy, not ego. For traditional adversaries to find common ground, it begins with a safe and welcoming environment where outsiders are comfortable letting down their guard.
- **Fix the Process** Don't blame people or technology when the root cause is bad (or no) process. Build a culture that celebrates both identification and elimination of digital waste.
- **Advance Our Industry** Equip AEC technologists with the tools to lead the crucial conversations required to resolve our #SharedPains and unlock our #SharedGains.

As part of the Interoperability Initiative, CPC recognized the need for real-world research and testing. In 2020, CPC began a new partnership with Bluebeam to engage young construction technologists and encourage them to tackle our #SharedPains with data interoperability. We're back in 2021 with a new set of research from some leading-edge thinkers who we expect will shape the AEC industry in the decades to come.



Sophie Macks
Academic Specialist, Bluebeam

"Congratulations to each of the winners of the Bluebeam CDX Scholarship! We have been so honored to be a part of these students' journeys as they dedicated their time to solving real industry problems. Thanks to the CPC for partnering with us to provide a platform that recognizes these students as true industry heroes!

CDX COMMON DATA EXCHANGE | BLUEBEAM A NEMETSCHEK COMPANY
2021 RESEARCH SCHOLARSHIP

Bluebeam CDX Research Advisory Panel of AEC Technology Experts

Dan Smolilo
The Walsh Group

Dr. Fernanda Leite
University of Texas

Kellie Ward
Bluebeam

Sophie Macks
Bluebeam

Todd Sutton
Zachry Construction

Bluebeam CDX Scholarship Fund

Despite technology advancements, data interoperability remains a critical barrier to streamlining construction processes. [Bluebeam Inc](#) graciously donates $20,000 annually in scholarships to support young construction technologists as they prepare for a career in the AEC industry. In return, these scholarship recipients focused both their summer internships and their collegiate studies on researching their selected real-world CDX workflows.

The CDX Intern Class of 2021 included nine (9) undergraduate students from across the country. They were independently challenged to research an AEC interoperability workflow and document their findings via the CDX Playbook provided to them. Researchers investigated workflows focusing on topics like Centralized Project Inspection, Seamless RFI Collaboration, 4D Imaging Data Exchange, Safety Documentation for Pre-Mobilization, and Schedule-to-Field Integration. Each researcher worked with an industry mentor and received feedback throughout the process from a CDX Advisory Panel of CDX Advisory Panel of AEC technology experts.

Delegates Mentoring CDX Researchers

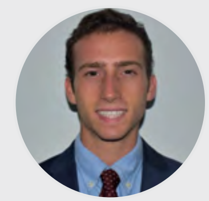
Alison Hart
Mortenson

Daniel Smolilo
Walsh Group

Erin Saiki
DPR Construction

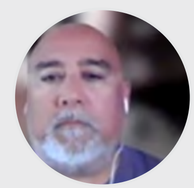
Alexis Ferguson
Suffolk Construction

Lilian Magallanes
DPR Construction

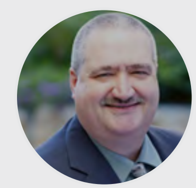


Zachary Ames
The Walsh Group

Taylor Cupp
Mortenson Construction



Ralph Romayor
DPR Construction



Todd Sutton
Zachry Construction

CDX Research Assignment & Overview

Each researcher was provided with a consistent framework and set of visual tools to document their research findings. Upon completion, each presented their findings to the committee using the CDX Playbook template.

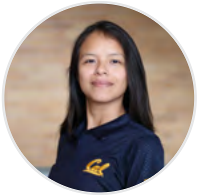
Their six week research assignment culminated with a final presentation following the 4 Ds: Digest ("How Might We" statement), Debate (Identify Stakeholders & Personas, and their interest in the key Systems & Documents), Decide (Illustrate 1-3 Shared Pains and 1-3 Shared Gains), and Deliver (Summary of Shared Pains and Shared Gains). The CDX Scholarship Class of 2021 had a record-high nine (9) students representing six (6) AEC companies. The top five (5) were selected to be featured in this report. Their profiles and topic summaries can be found on the following pages.

2022 CDX Researchers

Jacqueline Chen
Civil Engineering
Univ. of Southern California
Suffolk Construction

Johns Vellikara
MS A/E/C
Carnegie Mellon Univ.
DPR Construction

Aidan Parsons
Mechanical Engineering
Georgia Southern Univ.
The Walsh Group



Sulyn Gomez
Civil Engineering
Univ. of California, Berkeley
DPR Construction

Brayden Kirk
Architecture
University of Florida
KAST Construction

John Rosa
Civil Engineering
The City College of NY
The Walsh Group

Weston Bone
Electrical Engineering
Texas A&M Univ.
Zachry Construction

Benjamin Brea
Mechanical Engineering
Binghamton University
The Walsh Group

Research Findings

Common Data Exchange (CDX) 101

What is a CDX, Anyway?

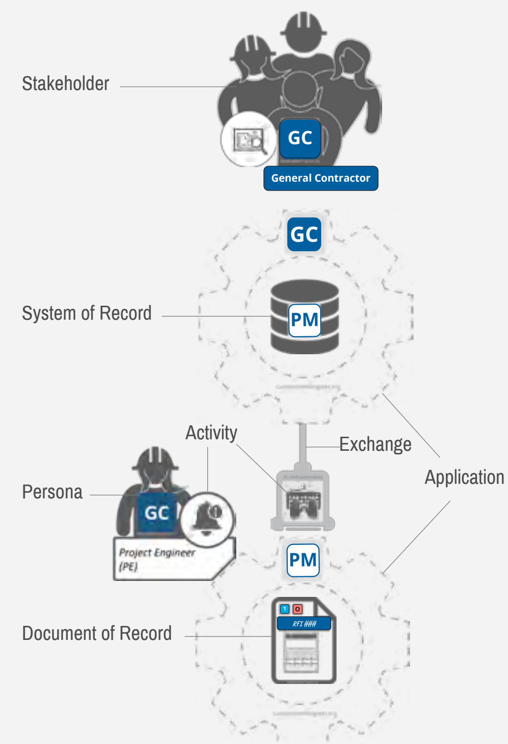
A common data exchange (CDX) scenario supports the graphical documentation of current pain points and the desired future state of a specific information transaction between two or more project stakeholders. Following the framework of CDX, impacted **stakeholders** will gather to discuss the **document of record (DoR)** in question by inviting the individual **personas** that utilize **applications** to generate, regulate, store, or share the DoR at different **points of exchange (PoE).** At a given PoE, the persona is either sharing data internally with their stakeholder's **system of record (SoR),** or externally with another stakeholder's SoR. Applying this shared language and approach to integration standards will unlock new industry benchmarks that focus on the leading indicators of project performance.

Key terms to know:

- A **stakeholder** is a business or government entity involved in the project.
- A **persona** is any individual employed by or under contract with any stakeholder.
- A **document of record** is a project-level form, report, or certification. It may or may not be updated as the project progresses.
- A **system of record** is the location where a stakeholder stores documents and data for all of their projects.
- A **point of exchange** occurs when a document of record is shared by one persona with another, either on its own or within a system of record; when documents of record are input into systems of record; or when one system of record shares documents with another system of record.
- An **exchange activity** can be generated manually by a persona (analog), or it can be automated using a template or formula (digital). The advent of XML and API connectors now allows for data to auto-exchange between separate stakeholder systems (integrated) using conditional logic that was agreed upon at project kickoff.

CDX
COMMON DATA EXCHANGE

CDX provides a visual language for project teams to define their collaboration standards. Using:



Jacqueline Chen

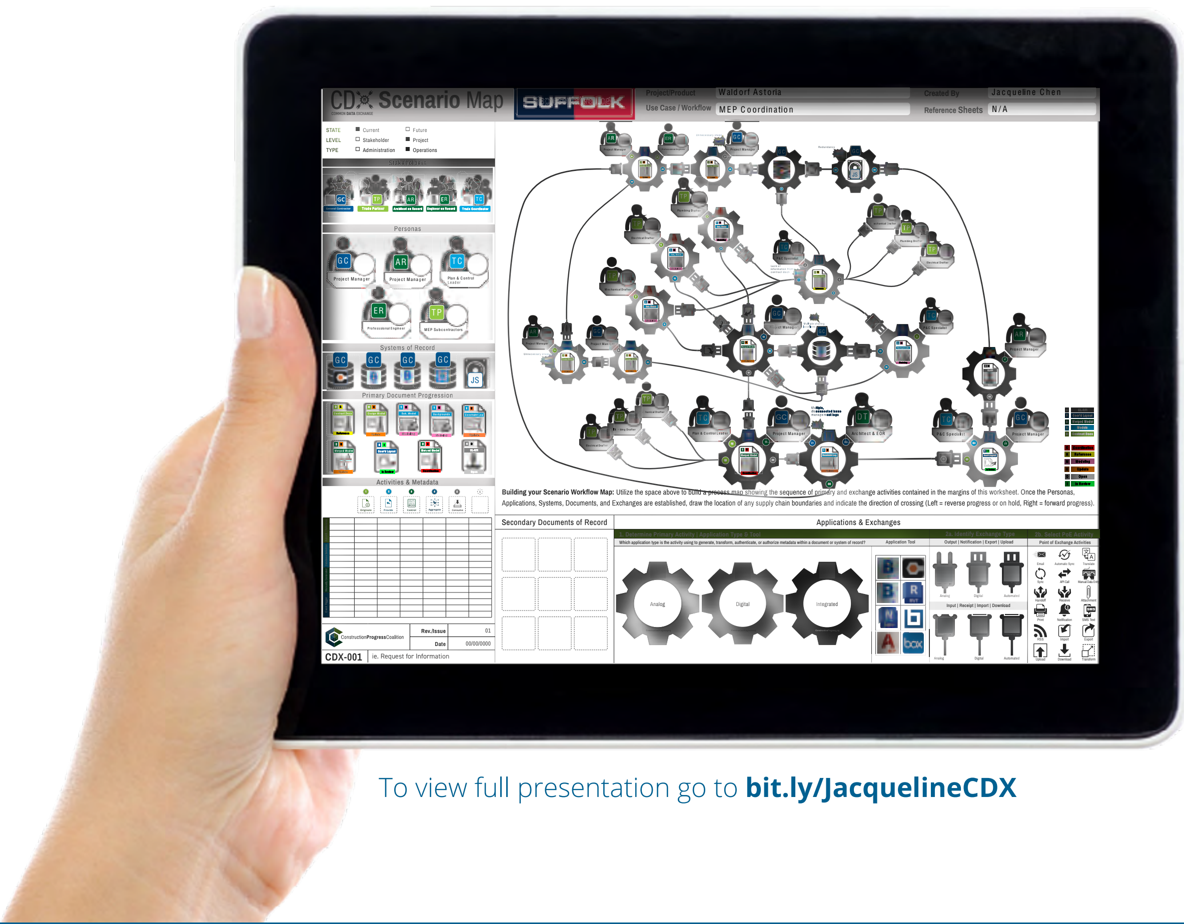
Electrical Engineering Undergraduate Student, University of Minnesota

Mentor: Alison Hart, Mortenson Construction

Jacqueline Chen won the $2,000 Innovation bonus for a total scholarship of $4,000. Congratulations, Jacqueline!

1. MEP Coordination

Jacqueline analyzed information sharing between various mechanical, electrical, and plumbing (MEP) stakeholders to coordinate necessary work.



To view full presentation go to **bit.ly/JacquelineCDX**

Shared Pains

- ☐ Lack of initial information coming from the contract documents
- ☐ Multiple sharing locations rather than a centralized repository
- ☐ Multiple disconnected issue management logs
- ☐ Unnecessary, eliminable steps
- ☐ Redundancy and outdated information within the jobsite server

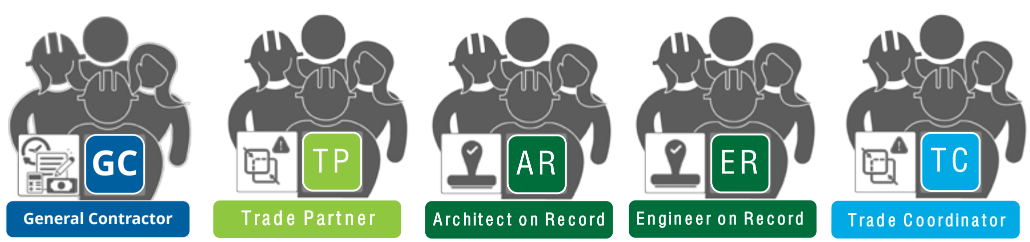
Shared Gains

- ☑ Elimination of the middle party out to reduce rework and redundancies
- ☑ Centralized system of communication and storage
- ☑ Design Team (the architect on record and engineer on record) involvement in initial information gathering

Stakeholders & Systems

On her project, Jacqueline identified five key stakeholders:

> The general contractor (GC)
> The trade partners (the MEP subcontractors)
> The architect of record (AR)
> The engineer of record (ER)
> The trade coordinator (TC)



Shared Gains Pains Challenge Statement

HOW MIGHT WE...
prevent delays in MEP coordination where construction on site is being held up

IN WAYS THAT...
lessen the time spent scavenging for information and help ease of access and communication

SO THAT...
teams are more connected, efficiency is increased, and redundancy is reduced

She also noted five systems of record:

- Procore
- BIM 360 Docs
- BIM 360 Glue
- Bluebeam
- The jobsite server

While working on the Waldorf Astoria remodel project in New York City, Jacqueline immediately saw issues with MEP coordination. "It was one of the first pain points I saw in the construction industry," she explained. "On my project alone, we're experiencing over a month's delay with one of the coordinations."

SHARED PAIN

Overly complicated information sharing leads to added work, redundancies, and delays

Jacqueline mapped the extensive process to get necessary information from stakeholders to MEP subcontractors. She explains that everything starts in Procore, but documents are opened in Bluebeam. The trade partners then generally use that information to make their own models in AutoCAD MEP while the MEP coordinator creates the respective backgrounds in Revit. Then, subcontractor models are uploaded to Glue and the MEP coordinator's backgrounds are uploaded to BIM 360 Docs, then Glue.

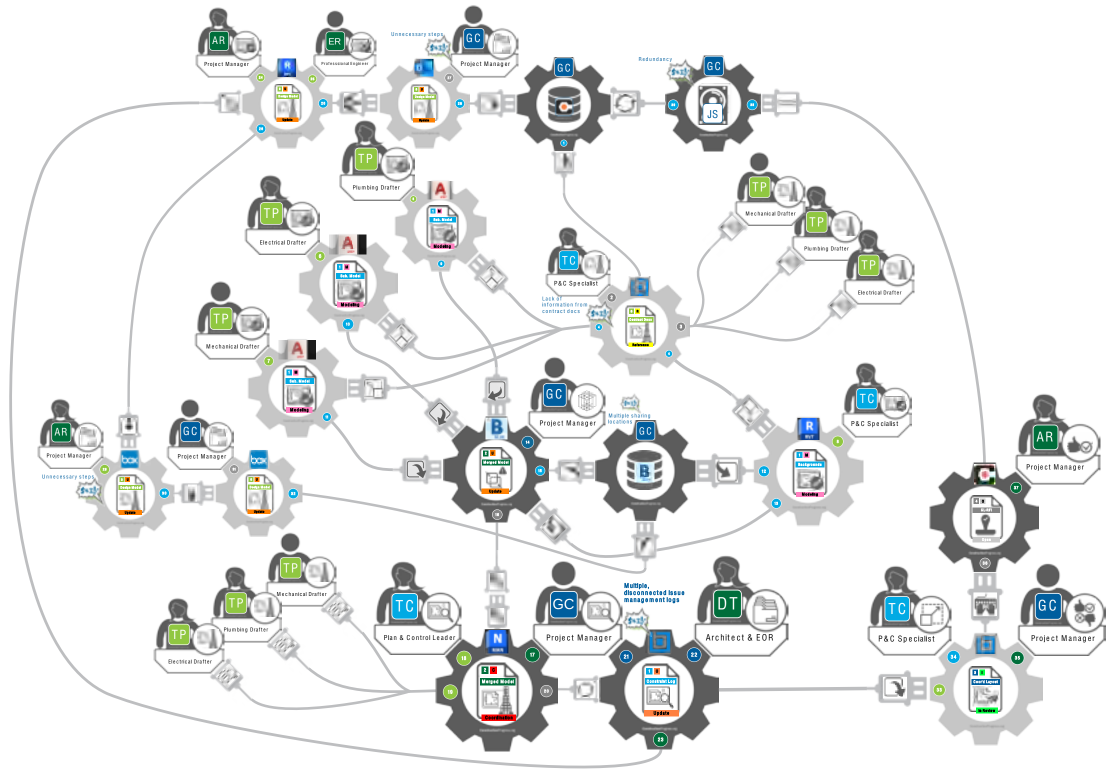


FIGURE 1 Current State: MEP Coordination

The GC uses all of that to make the Merged Model, which is continually updated through Navisworks. Issues and coordination logs found in Navisworks get tracked in a Bluebeam session to which the AR and ER (i.e., the Design Team) have access. The Design Team uses that information to create their own model in Revit, which they email to the GC to upload to Procore.

This only scratches the surface of the extremely detailed and complicated information sharing process that Jacqueline mapped. With so many steps required for so many stakeholders — and so many systems of record — she saw ample opportunity to eliminate unnecessary steps and redundant documents and processes.

SHARED GAIN

A centralized system of communication and storage to eliminate middle party steps

Rather than using so many processes to connect so many different tools and systems of record, Jacqueline suggested centralization. Specifically, she recommended using Autodesk Construction Cloud (ACC) to store models, detect clashes, run RFIs, and more. "We're really cutting the middle party out by having stakeholders directly upload to the software needed," she explained.

She also said that this could eliminate the need for a jobsite server, instead directing everyone to Procore when they need to reference the latest drawings. As another gain, a centralized system and simplified process would give the Design Team earlier involvement, looping them into initial information gathering.

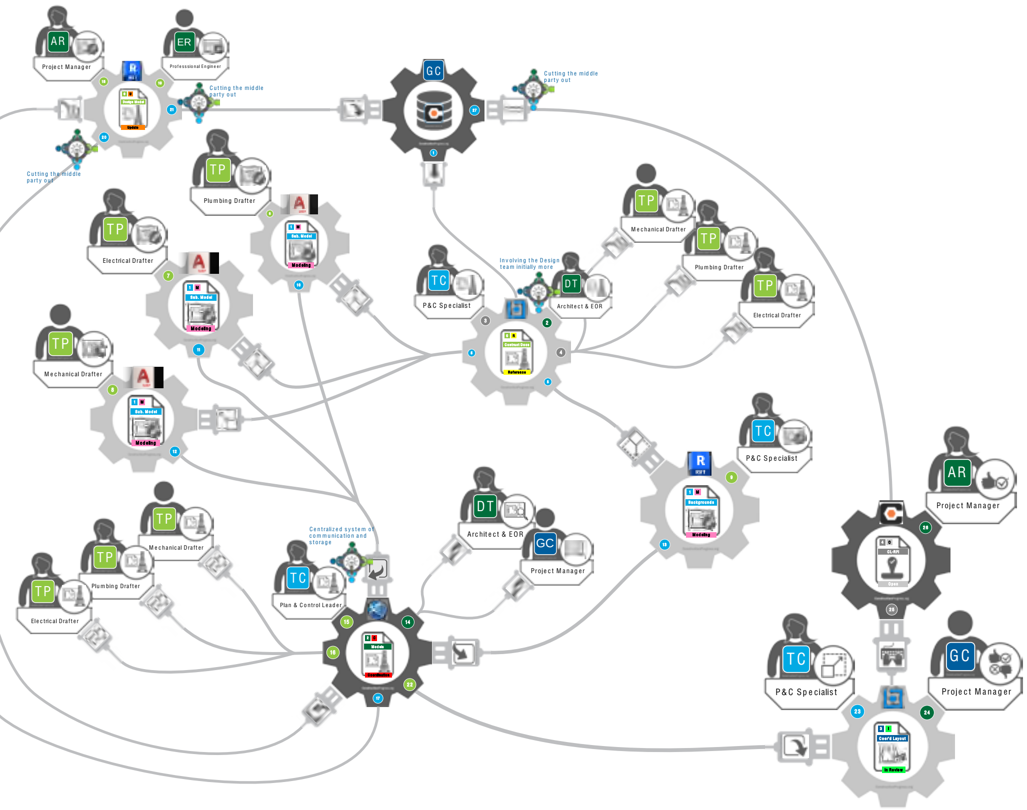


FIGURE 2 Future State: MEP Coordination

Johns Vellikara

Master of Science in Architecture, Engineering, and Construction Management, Carnegie Mellon University + DPR Construction **Mentor:** Erin Saiki, Lillian Magallanes

2. Quality Check Process

John explored the on-site quality check process, particularly the way it requires specific documentation (like drawings) and how those documents get created and accessed.

To view full presentation go to **bit.ly/JohnsCDX**

Johns Vellikara won the $2,000 Innovation bonus for a total scholarship of $4,000. Congratulations, Johns!

Shared Pains

- ☐ Tedious, screenshot-based quality check package aggregation and updation
- ☐ Difficulty in searching for and analyzing other trade drawings
- ☐ Possibility of miscommunication due to different drawing access
- ☐ Overload of on-site questions for the project engineer (PE)
- ☐ Scope of error in the communication of information

Shared Gains

- ☑ More convenient room-based aggregation and updation via location tagging in BIM 360 Field
- ☑ Packaged drawings, making them easier to access and cross-reference
- ☑ Eliminated data discrepancy as everyone refers to the same drawing package
- ☑ Fast and convenient quality checks with QR code access to the quality check package
- ☑ Direct documentation of all questions and issues via the issues tab in BIM 360 Field

Stakeholders & Systems

Johns pointed out that every person involved in the project is part of the quality check process, including:

- > The project owner (PO)
- > The general contractor (GC)
- > The trade contractors (TCs)
- > The architect of record (AR)
- > The engineer of record (ER)

SHARED GAINS PAINS Challenge Statement

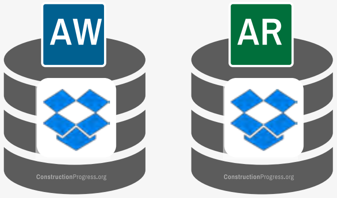
HOW MIGHT WE...
speed up the quality control process and improve document control and management on site

IN WAYS THAT...
reduce manual tasks and implement a single-source document access on site for all stakeholders

SO THAT...
costs are reduced and on-site productivity and efficiency is increased

In the current state, two systems of record come into play:

- The GC's Box
- The AR's Box



Johns analyzed quality checks on the jobsite. As he pointed out, "The quality check process is not a one-time thing that happens. It occurs every single time there's something happening on the site and it needs to be verified." With such frequency, any efficiency gains quickly become notable.

SHARED PAIN

Tedious processes leave room for miscommunication

Johns began from the point at which the AR uploads the working documents into their Box cloud system. Then, the appropriate project manager takes that link and shares it with the GC's project engineer. This also gets shared with the ER and the project owner's inspector.

The project engineer then starts the tedious aggregation project to create the quality check package, which essentially means screen-shotting the drawings of every room, cropping them, and compiling them in a PDF. That gets uploaded to Box, and the resulting link gets converted into a QR code, printed, and posted on-site for the project engineer to scan.

But other stakeholders (e.g., project owners, architects) can't access the linked quality check package. Instead, they must search for and analyze other trade drawings, leading to miscommunication. Plus, when they do find issues on site,

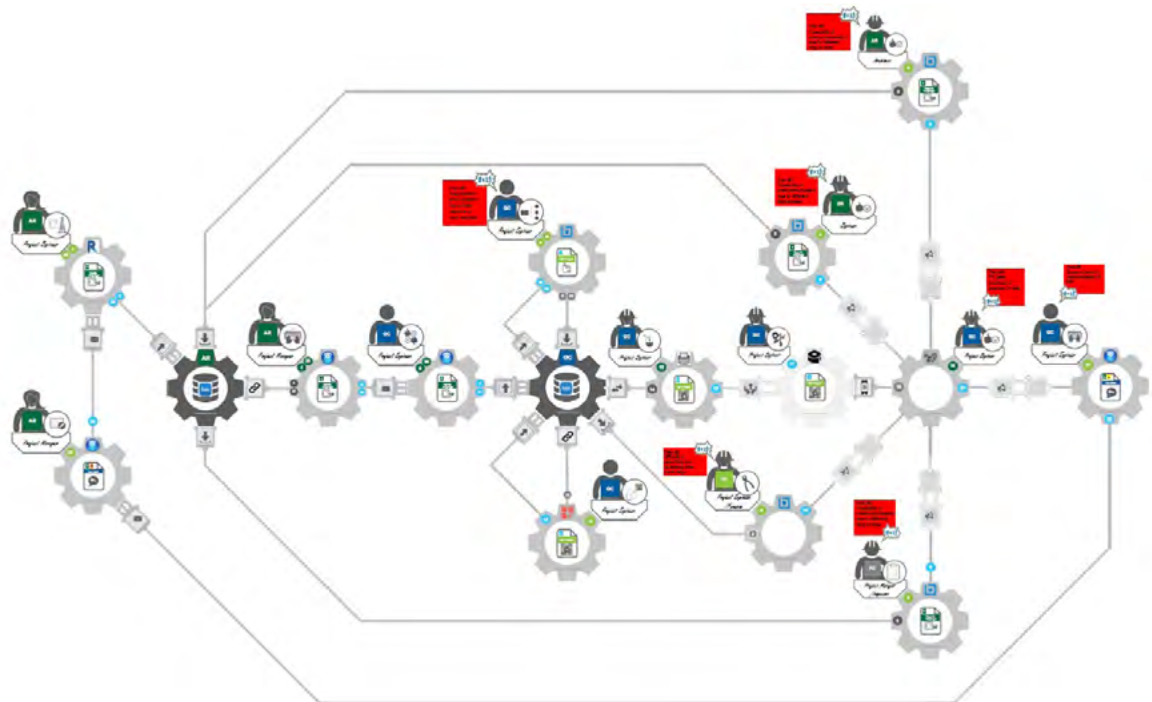


FIGURE 3 Current State: Quality Check Process

their best course of action is to communicate them to the project engineer, who communicates it to the GC's office. The office then writes an RFI and passes it to the architect's project manager. The architect creates an updated document, which gets emailed to the GC. From there, the entire process repeats.

SHARED GAIN

Faster quality check package development and easier access for all stakeholders

To deliver functionality in the field and drive collaboration, Johns recommended replacing the GC's Box cloud storage with BIM 360 Field. This solution provides quality checklist execution functionality in real-time, keeping drawings continually updated. It also includes tagging features that Johns explained could be useful. With location tagging, for example, drawings for specific rooms could be accessed and updated more easily.

Similarly, this would open up access via QR scanning to all stakeholders. And because there's an issues tab within BIM 360 Field, problems could be recorded without having to involve the PE or the GC's office. Instead, stakeholders can log things on-site. Then, the PE in the office could access the drawings and go through the issues tab to trigger RFI generation.

Perhaps most importantly, this new system would ensure that all stakeholders access the same drawings with the same details, reducing data discrepancy while streamlining the quality check process. This also creates efficiency gains. Johns found that it took 40 minutes to create a quality check package for one room with the status quo. With his proposed system, the process takes just 10 minutes. The old way required about 15 minutes for stakeholders to find the drawings they wanted; the new process would take just five minutes.

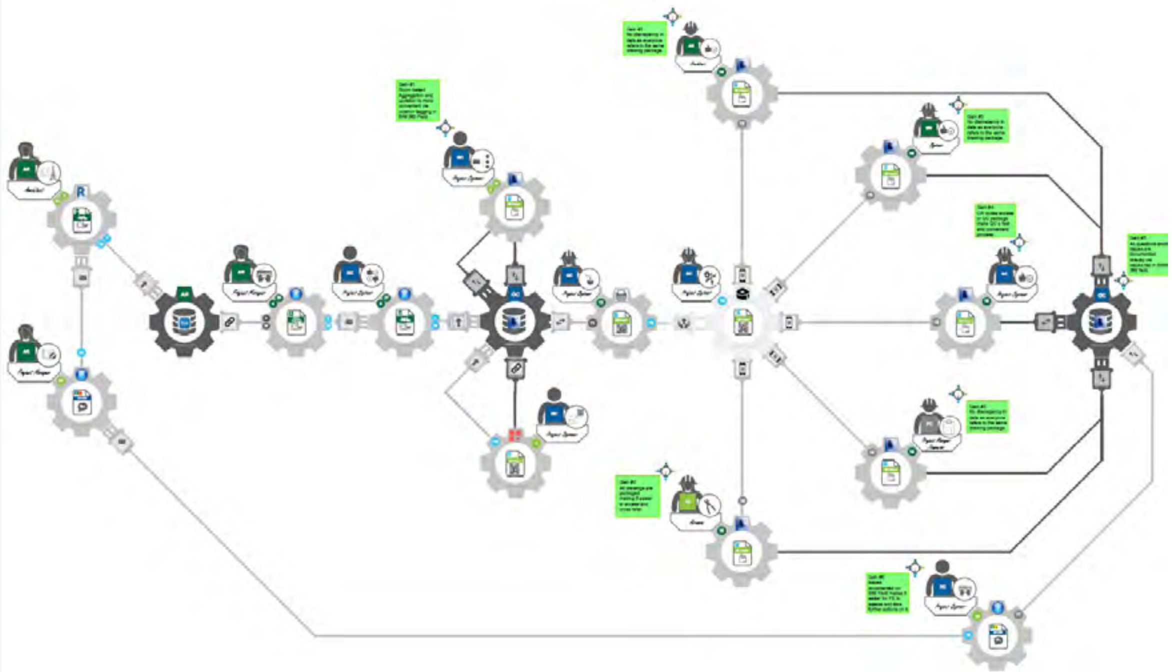


FIGURE 4 Future State: Quality Check Process

Aidan Parsons

Mechanical Engineering, Georgia Southern University + Archer Western of the Walsh Group

Mentor: Dan Smolilo

3. 6-Week Schedule

Aidan explored adjusting and adding details to the six-week schedule while improving access to it in order to better inform crews and foremen.

To view full presentation go to **bit.ly/AidanCDX**

Congratulations Aidan and enjoy your $2,000 scholarship courtesy of Bluebeam, Inc.

Shared Pains

- [ ] Not everyone has access to schedule's main system of record due to license fees per seat and access control
- [ ] Lack of six-week schedule access for owner in the system of record
- [ ] Multiple revisions of the six-week schedule due to changing crews and tasks

Shared Gains

- [x] Ability to separate the live, detailed six-week schedule from the GC's baseline schedule
- [x] Delivery of a cloud-based schedule with controlled access
- [x] Elimination of seat-based individual license fees to reduce costs

---

Stakeholders & Systems

Here, Aidan looked at three key stakeholders

> Archer Western, the general contractor (GC)

> The Georgia Department of Transportation (GDOT), the project owner

> Campbell Construction, a subcontractor on the project

This project used two primary systems of record

> Primavera P6 Enterprise Project Portfolio Management (P6)

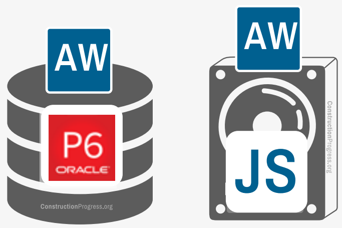
> The local jobsite server

SHARED GAINS PAINS Challenge Statement

HOW MIGHT WE...
eliminate the process time and optimize changes to the six-week schedule

IN WAYS THAT...
all stakeholders may be more efficient, reduce cost, and eliminate duplicate data entries

SO THAT...
communication between all shareholders is simplified and provides easier access to upcoming events



Specifically, Aidan looked at how the six-week schedule currently functions on I-285 bridge replacement projects in Atlanta. Because Archer Western performs roughly 70% of their work, they have to continually coordinate with Campbell Construction (the rebar and metal decking subcontractor), leading to schedule changes week by week.

SHARED PAIN

Limited access and continual revision to the six-week schedule lead to inefficiencies

In the current state, when the job is bid, the initial baseline schedule is created in P6. That gets uploaded as a PDF to the local jobsite server, where the superintendent uses it to create the six-week schedule.

Upon creating that in Excel, the superintendent uploads it to the jobsite server. The project engineer then pulls it, presents it to the project owner in a weekly meeting, and emails it weekly to the subcontractor. The PE has to collect any responses verbally or via email.

Any feedback has to be integrated into P6 and manually edited into the Excel file. All the while, the project owner and subcontractor only see the six-week schedule once per week because they don't have access to P6 (which costs $88 per seat and would give them editing access).

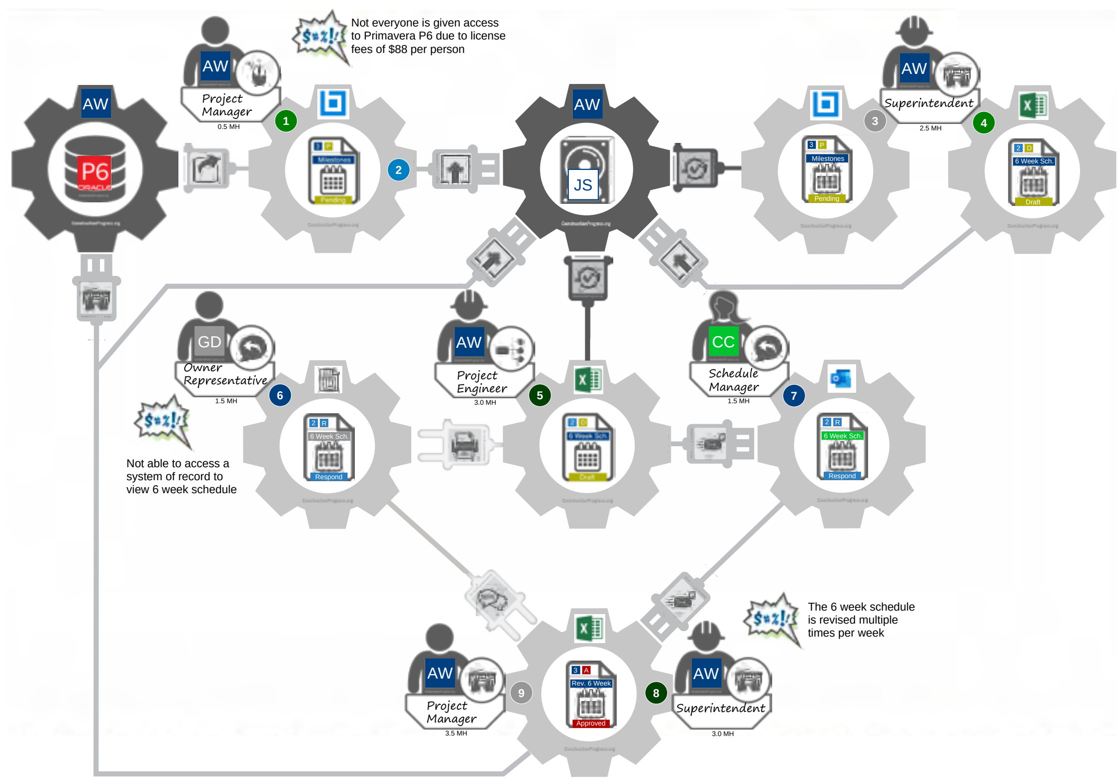


FIGURE 5 Current State: 6-Week Schedule

All of this leads to a lack of clarity and wasted man hours to manage multiple schedule revisions.

SHARED GAIN

A live, cloud-based schedule with controlled and cost-efficient access keeps everyone on the same page

To alleviate the shared pains, Aidan suggested replacing the jobsite server with Autodesk Build. While he said that other projects could potentially integrate something like P6 with Build, he recommended keeping them separate as the GC wants to protect their baseline schedule in this case.

Because the superintendent would be able to add the project owner and the subcontractor's scheduling manager to Autodesk Build, everyone would have live access to the most updated six-week schedule. What's more, they would be able to add dates and tasks, making the schedule more detailed and informative.

Just as importantly, Aidan's proposed future state slashes costs. While six-week schedule creation generally takes three days, this new process would take just one. The weekly meeting could also be eliminated, saving work hours. And because Autodesk Build comes with just one overarching licensing fee, rather than fees for individual seats, the change delivers further savings. Ultimately, Aidan conservatively estimated that this could slash the costs associated with creating and managing the six-week schedule by 65%. At Archer Western, that could save more than $26,000 a year.

In fact, Aidan's future state is so appealing that his project team is currently exploring implementing it.

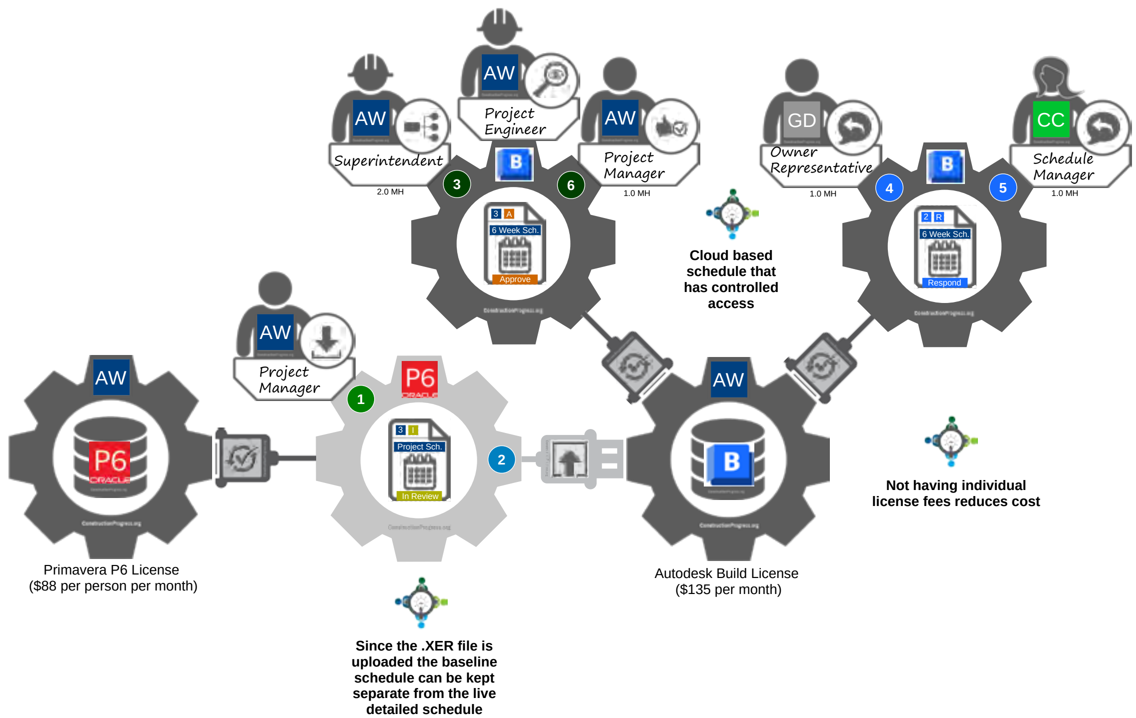


FIGURE 6 Future State: 6-Week Schedule

Sulyn Gomez

Civil Engineering, University of California, Berkeley + DPR Construction

Mentor: Ralph Romayor, Lillian Magallanes

4. Field Quality Control & Inspection Process

Sulyn analyzed the quality control (QC) steps leading up to an on-site inspection and the inspection process, looking at the way issues get tracked to provide learning opportunities (or a lack thereof).

To view full presentation go to **bit.ly/SulynCDX**

Congratulations Sulyn and enjoy your $2,000 scholarship courtesy of Bluebeam, Inc.

Shared Pains

- ☐ Unreported mistakes
- ☐ Manual entry required to add observations to the rolling completion list
- ☐ Limited learning because rework isn't tracked

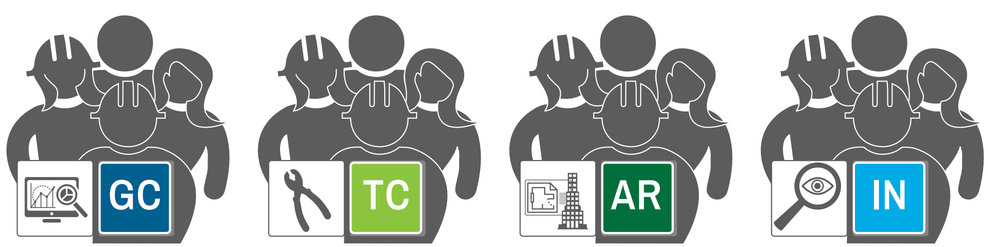
Shared Gains

- ☑ A single form to conduct QC
- ☑ One system to track and manage mistakes
- ☑ Immediate feedback

Stakeholders & Systems

In analyzing the field quality control and inspection process, Sulyn identified four major stakeholders:

- > The general contractor (GC)
- > The subcontractors/trade contractors (TCs)
- > The architect (AR)
- > The inspector (IN)



Shared Gains / Pains Challenge Statement

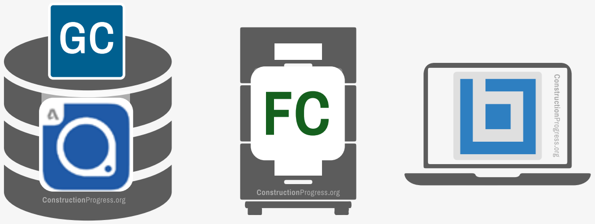
HOW MIGHT WE...
improve the quality control and inspection process

IN WAYS THAT...
teams can systematically track and assess mistakes/defects

SO THAT...
QC/inspection facilitates learning and improvement

She looked at three systems of record:

- Bluebeam
- File Cabinet
- Plan Grid



Sulyn pointed out that as a project nears an inspector visit, communication is often primarily verbal. This means issues aren't tracked and, consequently, stakeholders can't analyze problems to learn from them for the future.

SHARED PAIN

Lack of visibility and tracking leads to missed learning opportunities

When there's a problem with a tradesperson's work, communication usually stays between that individual or team and the foreman. The GC often doesn't get looped into the conversation. Currently, the projects Sulyn looked at have disparate processes for reporting issues.

The GC's QC and inspection prep processes happen in a separate silo. They maintain a rolling completion list (RCL), but a lot of recording starts with verbal communication there, too. For example, the project engineer has to manually collect observations from the architect's site walk and input them into the RCL. What's more, once the inspector is on-site, the recording

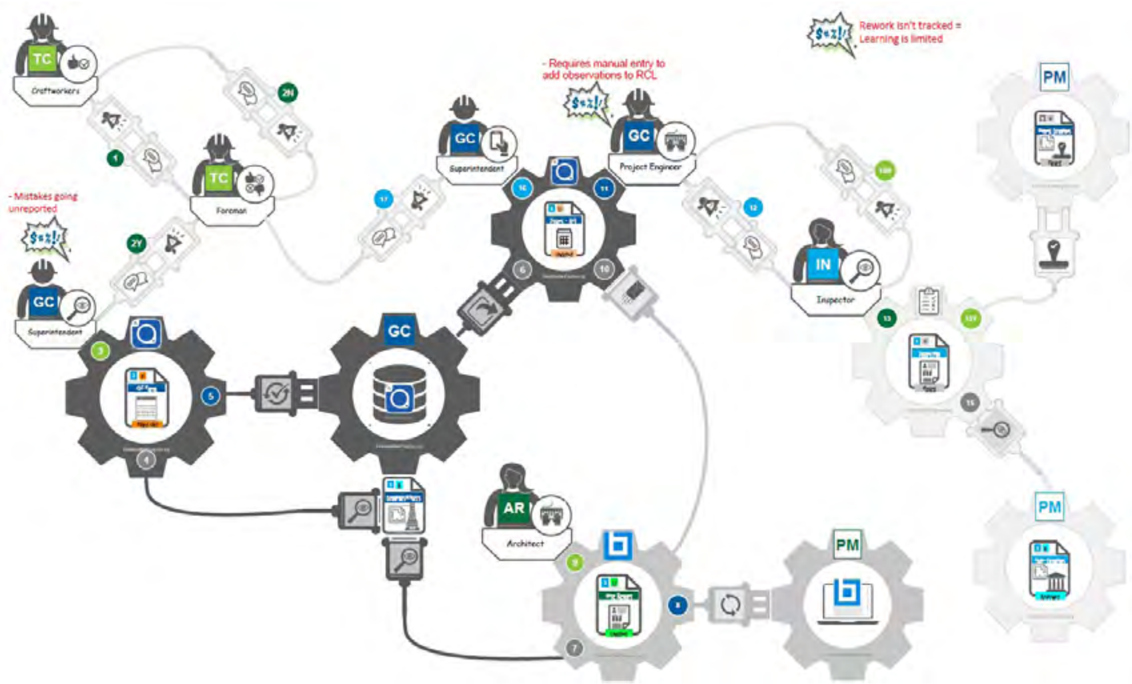


FIGURE 8 Current State: Field Quality Control & Inspection Process

problem continues. If things go wrong in the inspection, there's no specific form to capture that. Instead, they manually input into the RCL and verbally communicate to the foreman.

"In my current state scenario," Sulyn explains, "a lot of the communication that happens in QC inspection is passed down to the other person verbally. That's an issue. We're not learning from what's happening because we're not collecting that data."

In short, she said, "Rework isn't tracked. And just the little rework that is tracked is 5-10% of the total project cost. It's a huge impact and a lot of money."

SHARED GAIN

Get data upstream to the mouth of the river

Sulyn suggested integrating Autodesk Construction Cloud (ACC) into the QC and inspection process, giving all stakeholders a single form that all necessary contributors can use to conduct QC. With one system in place for tracking and reporting, everyone gains visibility. Plus, any issues get recorded to inform continuous improvement. While you can't force the inspector to use the same system, Sulyn suggested having a PE shadow the inspector. If any issues arise, the PE can immediately input them into the system. This way, when things do go as planned, they get tracked. Projects gain the visibility necessary to learn from mistakes.

As Sulyn pointed out, for this to work, the trade contractors have to agree to use the GC's QC software (which can be stipulated in the contract), and all parties must agree on measurable criteria to assess the delivered product. That means this proposed future state also provides agreed-to criteria for success (i.e., what's captured on the QC/inspection form).

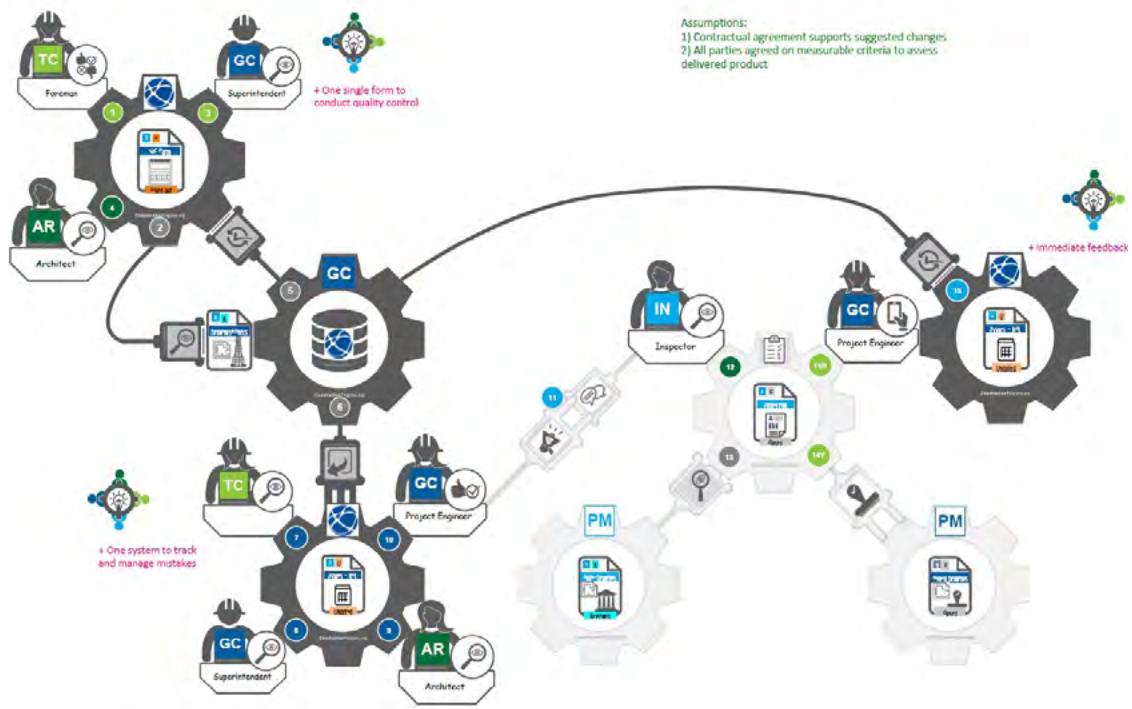


FIGURE 9 Future State: Field Quality Control & Inspection Process

Brayden Kirk

Architecture, North Dakota State University + Mortenson

Mentor: Alison Hart, Taylor Cupp

5. Late-Stage Design Change Management

Brayden dug into design change management, particularly as it happens in the late stages of a project. He specifically assessed document duplications and work replications.

To view full presentation go to **bit.ly/BraydenCDX**

Congratulations Brayden and enjoy your $2,000 scholarship courtesy of Bluebeam, Inc.

Shared Pains

- ☐ Manual handoff
- ☐ Two systems and two owners for the same program
- ☐ Duplication of model information
- ☐ Communication lag
- ☐ Replication of work

Shared Gains

- ☑ Automated handoff with controlled sharing between stakeholders
- ☑ Single files with permission management to facilitate collaboration in editing and updating
- ☑ Automated notifications to eliminate email communication

Stakeholders & Systems

Brayden looked at three stakeholders:

> The general contractor (GC)
> The specialty contractor (SC)
> The architect of record (AR)

SHARED GAINS PAINS Challenge Statement

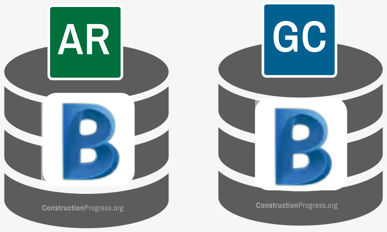
HOW MIGHT WE...
better manage late-stage design changes within the cloud environment and design authoring tools

IN WAYS THAT...
clarify and streamline communication between stakeholders and reduce duplicated efforts by separate personas

SO THAT...
valuable time, energy, and resources can be saved for all involved

And he took into account two main systems of record:

- The GC's BIM 360
- The architect's BIM 360



Brayden looked at the way change management is handled for distributed antenna system (DAS) installations at ASU Arena.

SHARED PAIN

Siloed systems and manual processes create communication lags and work replication

Brayden's process starts when the architect reviews and releases certain info from their BIM 360 cloud system. After approval, the GC has to manually transfer those Revit files to their own BIM 360 system. This means that while both stakeholders are using the same program, the process requires all of the work to maintain two separate systems under two owners.

Then, the GC's BIM manager creates a linked Revit model that includes architect and trade information. The subcontractor's designer then uses that information to model in the appropriate radio boxes, antennae, cable networks, etc. That gets emailed to the GC. To edit it and manage coordination, the GC has to make a duplicate, leading to two separate models, potentially with different information, existing at once.

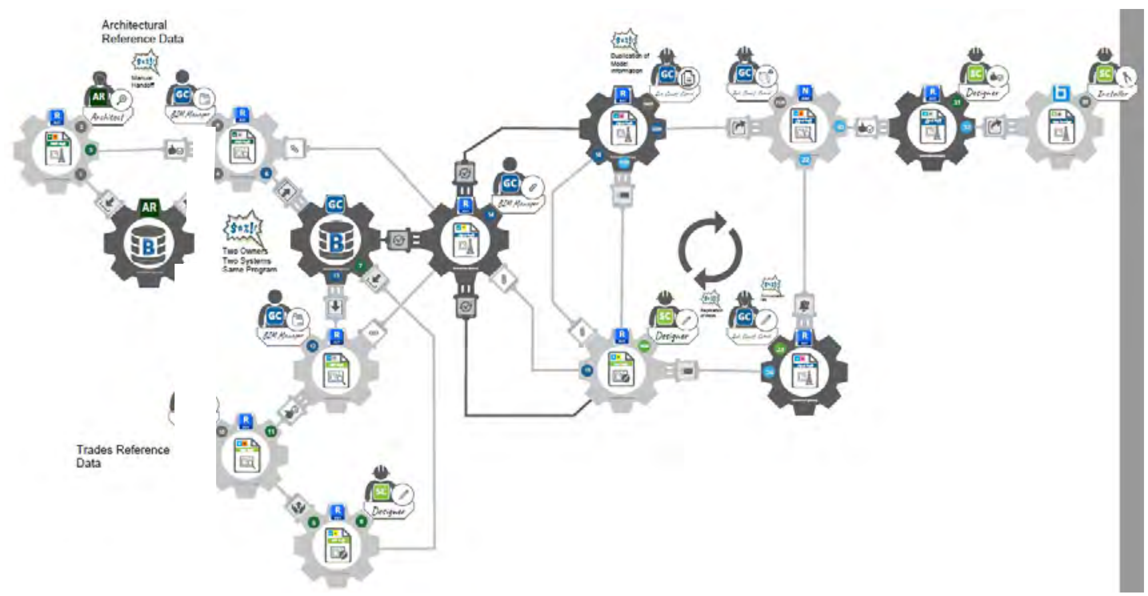


FIGURE 10 Current State: Late-Stage Design Change Management

That leads to the Navisworks coordination effort to make sure everything fits together nicely. The GC makes the appropriate edits and suggestions to the design, then notifies the subcontractor via email to update their linked file and prepare for approval of any changes. This opens up communication lag and replication of work pain points.

Only upon another round of approval from both the GC and the subcontractor do these models get converted into shop drawings for DAS installation in the field.

SHARED GAIN

A software-supported, streamlined process eliminates redundancies and makes work faster and easier

Like many of his peers, Brayden recommended making the switch to Autodesk Construction Cloud (ACC). He specifically suggested implementing the ACC Bridge feature to connect the architect and the GC's Revit files. This would essentially automate the handoff between stakeholders while protecting what information is shared and allowing both stakeholders to maintain their own systems and the contained workflows.

He also recommended Revit workset management improvements. With appropriate permission management within the workset interface, separate stakeholders could work in the same file, allowing editing and updating as needed. Instead, the stakeholders can all reference the same document when providing the necessary approvals. It would also allow for automated notifications, eliminating emails, speeding response times, and reducing the need for duplicate files linked to one another.

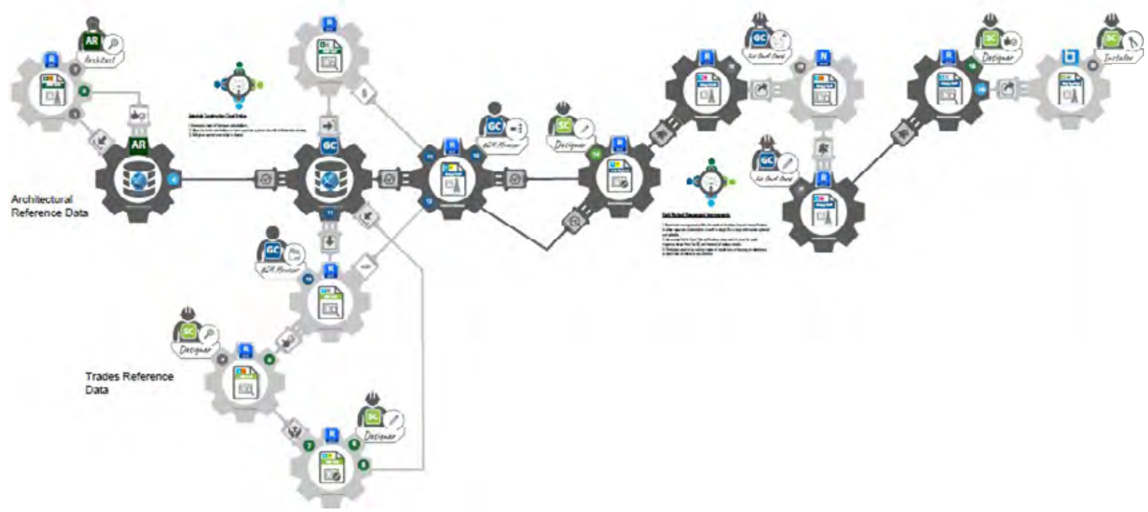


FIGURE 11 Future State: Late-Stage Design Change Management

CDX Glossary

> **Stakeholder (n):** - A businesses or government entity with vested interest in one or more pieces of information involved with the CDX scenario.

> **Document of Record (DoR) (n):** The contractually-required package of project-sensitive information that is exchanged from one stakeholder to another.

> **Stage (adj):** the progression of a DoR from one status to the next.

> **Boundary (n):** The formal documentation of a risk or responsibility transfer from one Stakeholder to another.

> **Activity (v)** - a contractually significant action that produces information to be shared with multiple project stakeholders.

> **Application (n):** The hardware and software tools (gears) that are conditionally provisioned or manually maintained to generate, certify, retain, or exchange information.

> **Persona (n):** an individual role or named person that is identified by the stakeholder they are employed by, their name and role/title on the project, and the action they perform in the designated DoR stage

> **System of Record (SoR) (n):** A project information retention source that may or may not include integrated applications. Each stakeholder will maintain at least one SoR at the enterprise level.

> **Point of Exchange (PoE) (n):** the documented transaction of information between multiple containers (DoR or SoR). A PoE (plug) is shown in the vertical direction when information is transferred internally (within the Stakeholder environment). If the plug is horizontal, information is being transmitted externally (to other Stakeholders within the Project environment).

> **Metadata (n):** specified pieces of information that are contained within a DoR or SoR. The exchange of metadata between stakeholders can occur via open-standard file sharing, or API connectors.

constructionprogress.org

ConstructionProgress.org ConstructionProgressCoalition