BRIDGE DESIGN QUALITY ASSURANCE & QUAILTY CONTROL (5-23-2016)

Bridge QC/QA Afternoon Workshop

Ingrid Sandberg, Center for Technology & Training





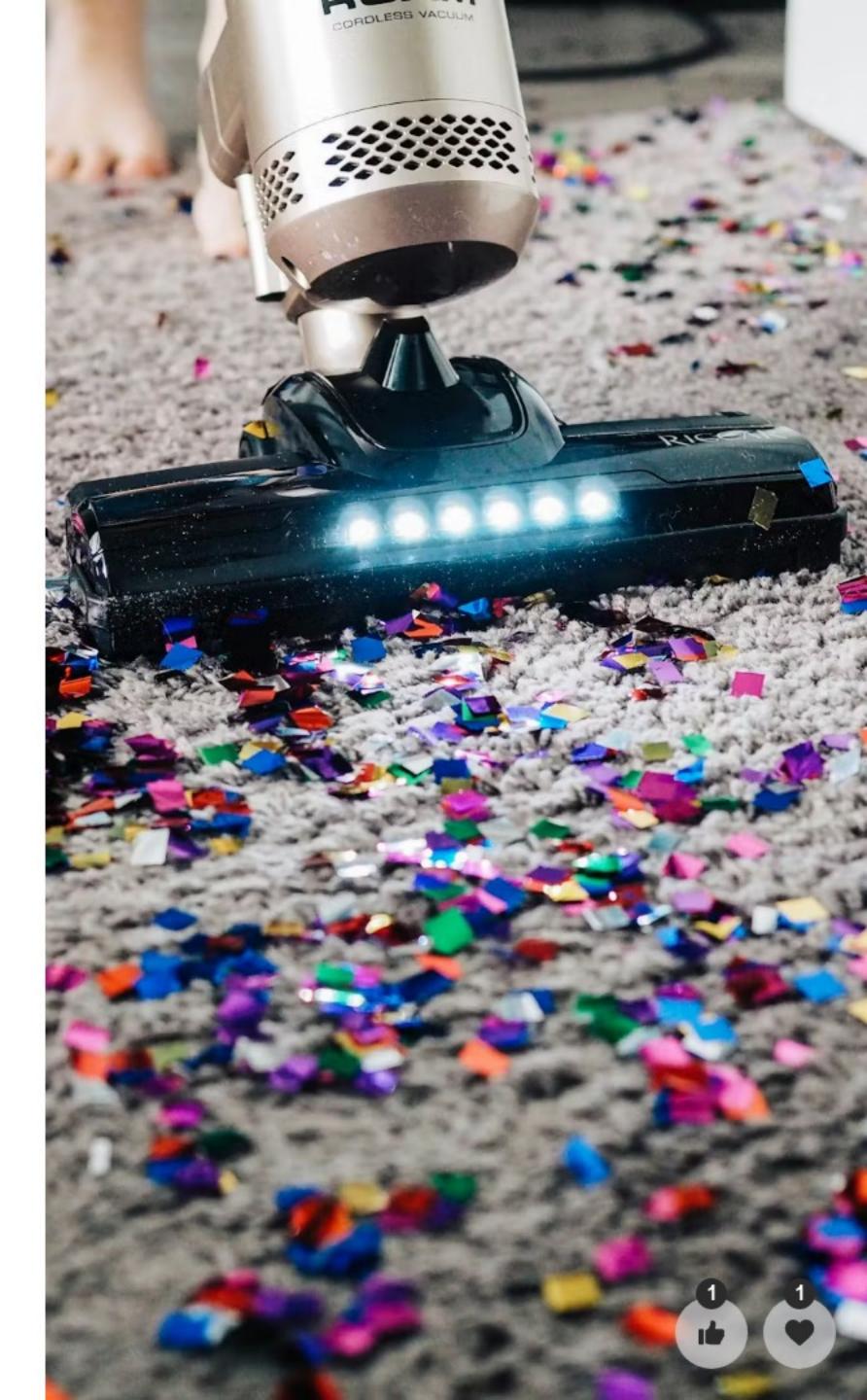
Agenda*

- → *times subject to change
- → QC/QA Basics
- → Break (~10 min)
- Activity/Discussion
- → Break (~15 min)
- Activity/Discussion
- → Closing Thoughts (~5 min)

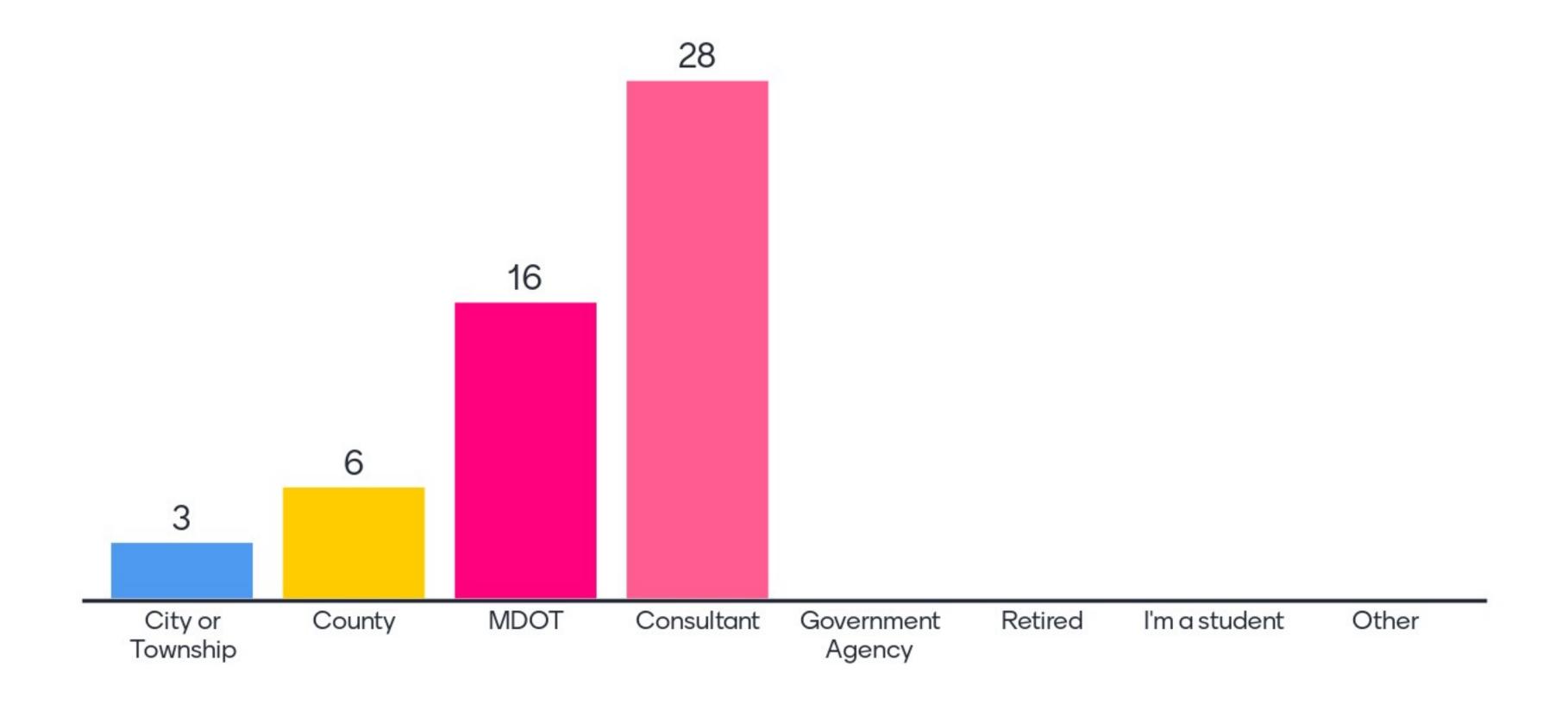


Housekeeping

- → Zoom
 - → Links in chat
 - Direct message your friends!
 - Closed captioning
- Certificate of Attendance
 - → Sign in sheet
 - SurveyMonkey link in Zoom chat
- > Evaluation Vevox
- → Menti
 - Questions (very similar to Vevox)



What kind of organization do you work for?

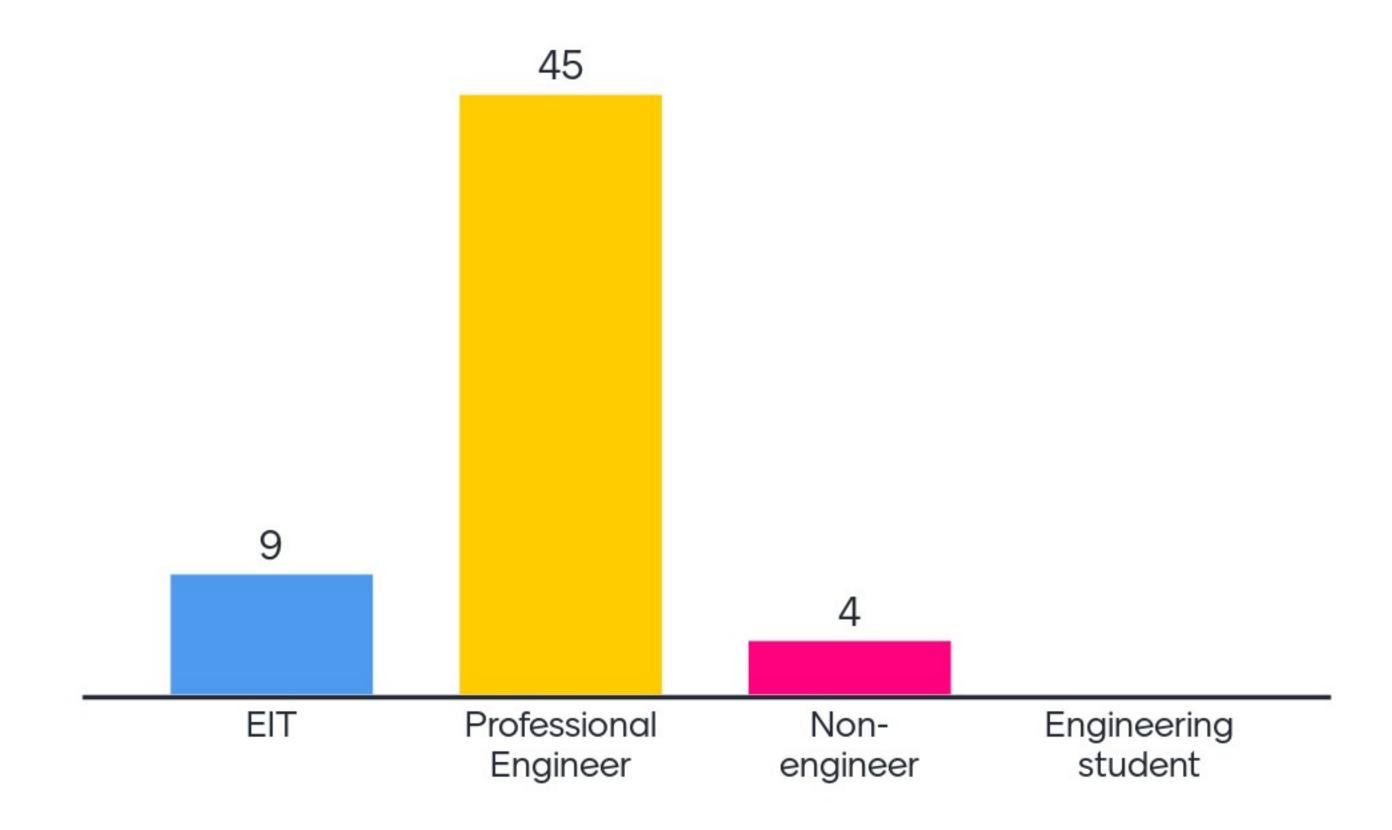








What best describes you?

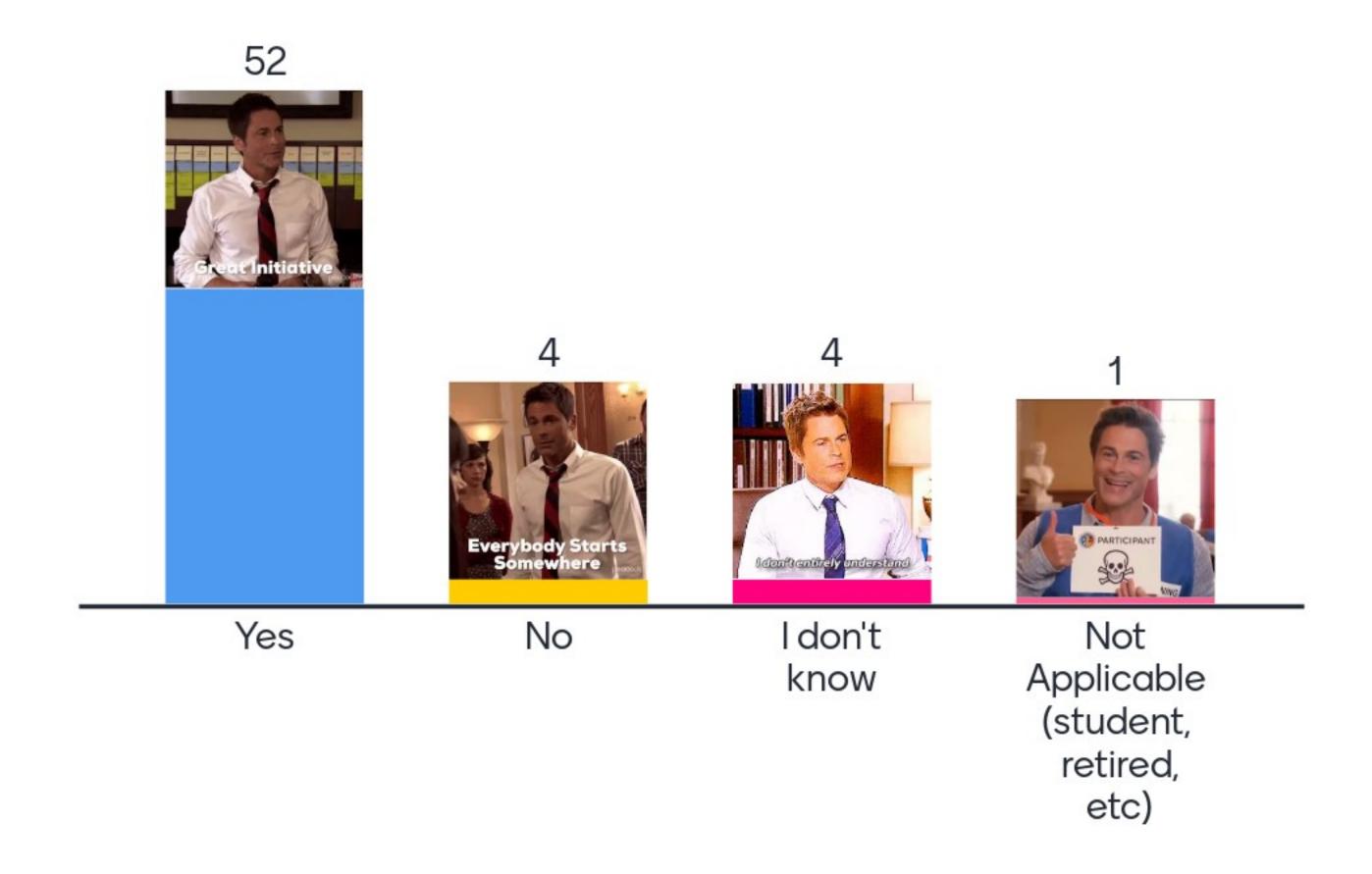








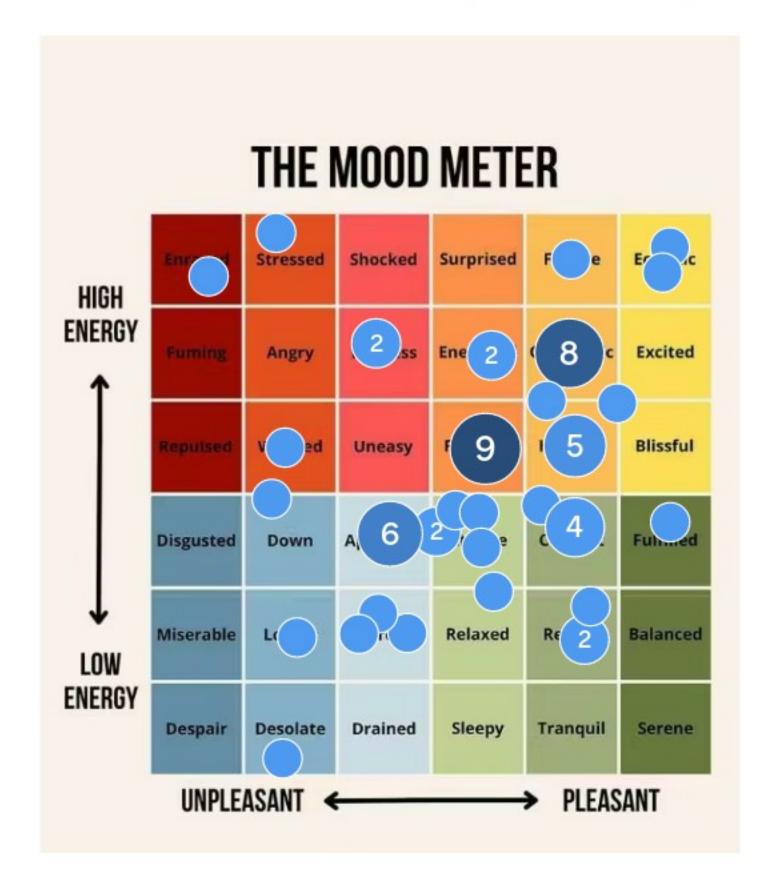
Does your organization have a QC/QA policy?







How do you feel about QC/QA?



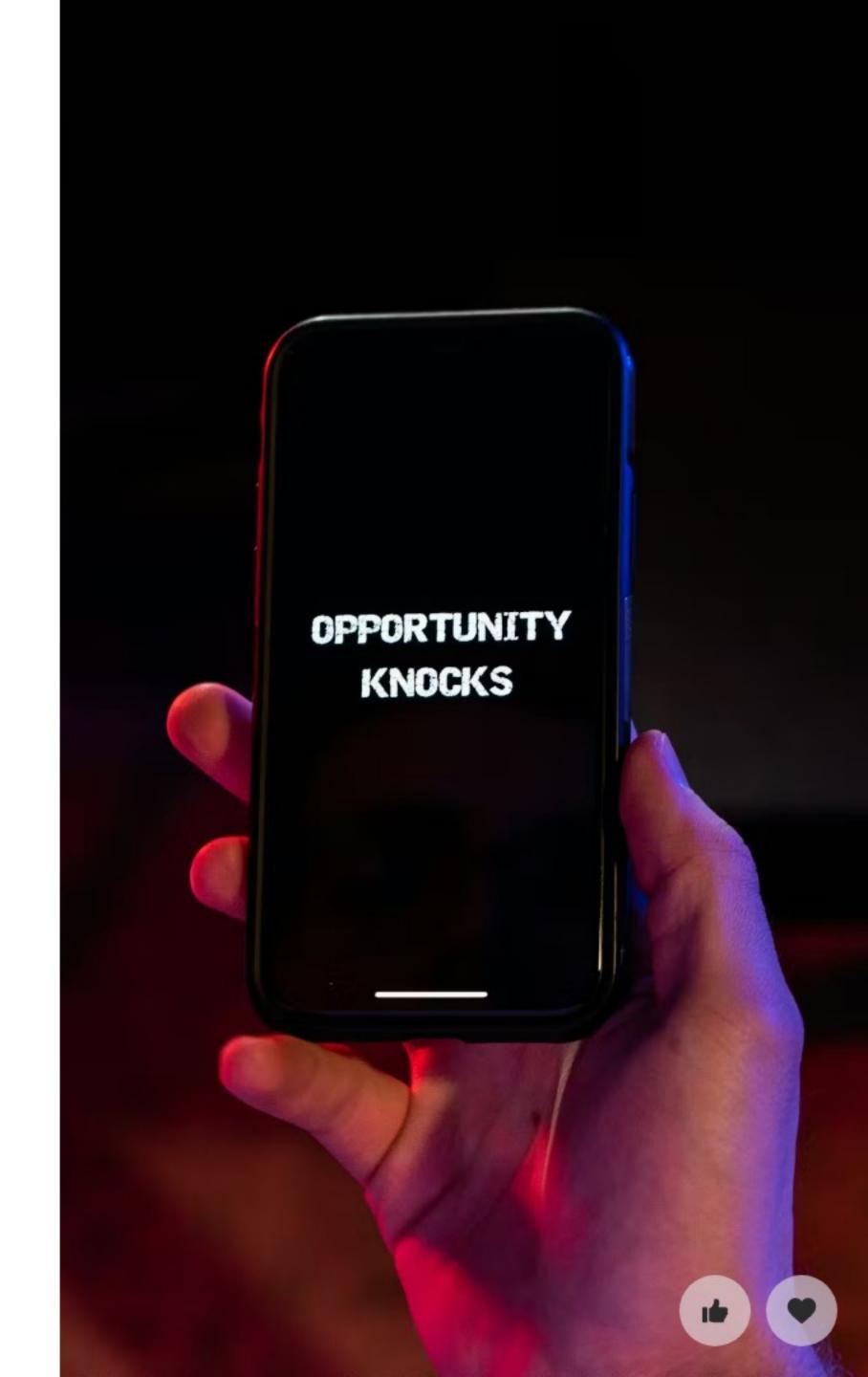






Learn from your differences

- → Workflows
- > Work output
- Levels of experience
- Engineering specialties



correctness is next to Minimize risk Performance Lawyers holiness To protect the publuc for safety The catch errors or to make sure that we aren't cheating omissions







To avoid errors Help being in budget Assuring quality quality To avoid calculation errors Checks and balances to Ensuring accuracy Keep the final plans safe and be able trace why items for the travel public minimize risk have changed during design.







Ensuring our design meet the PROTECT THE PUBLIC... Safety reducing standards required to risk/accountability maintain safety. Provide good quality Safety Deliver product the tax To finding errors and making construction product payer paid for. smoother







To keep the public safe

Because humans are inherently fallible

Ensure a good and consistent product

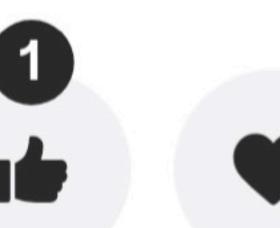
We all make mistakes!
Find them before it's too late.

Good product

Risk in your design process

People are not perfect, so more eyes on a project will yield good results

to insure quALITY







Ensuring our design meet the PROTECT THE PUBLIC... Safety reducing standards required to risk/accountability maintain safety. Provide good quality Safety Deliver product the tax To finding errors and making construction product payer paid for. smoother





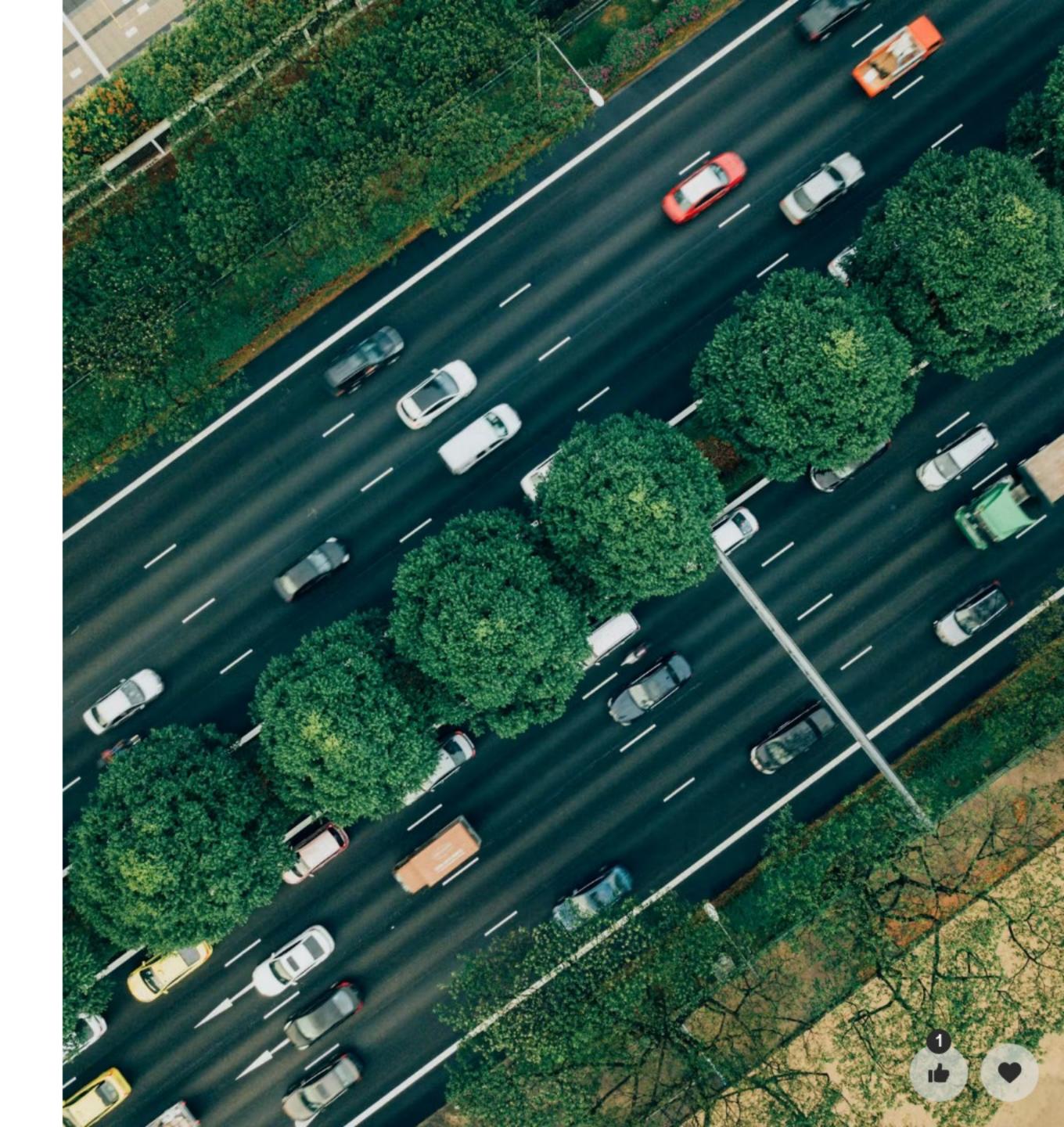




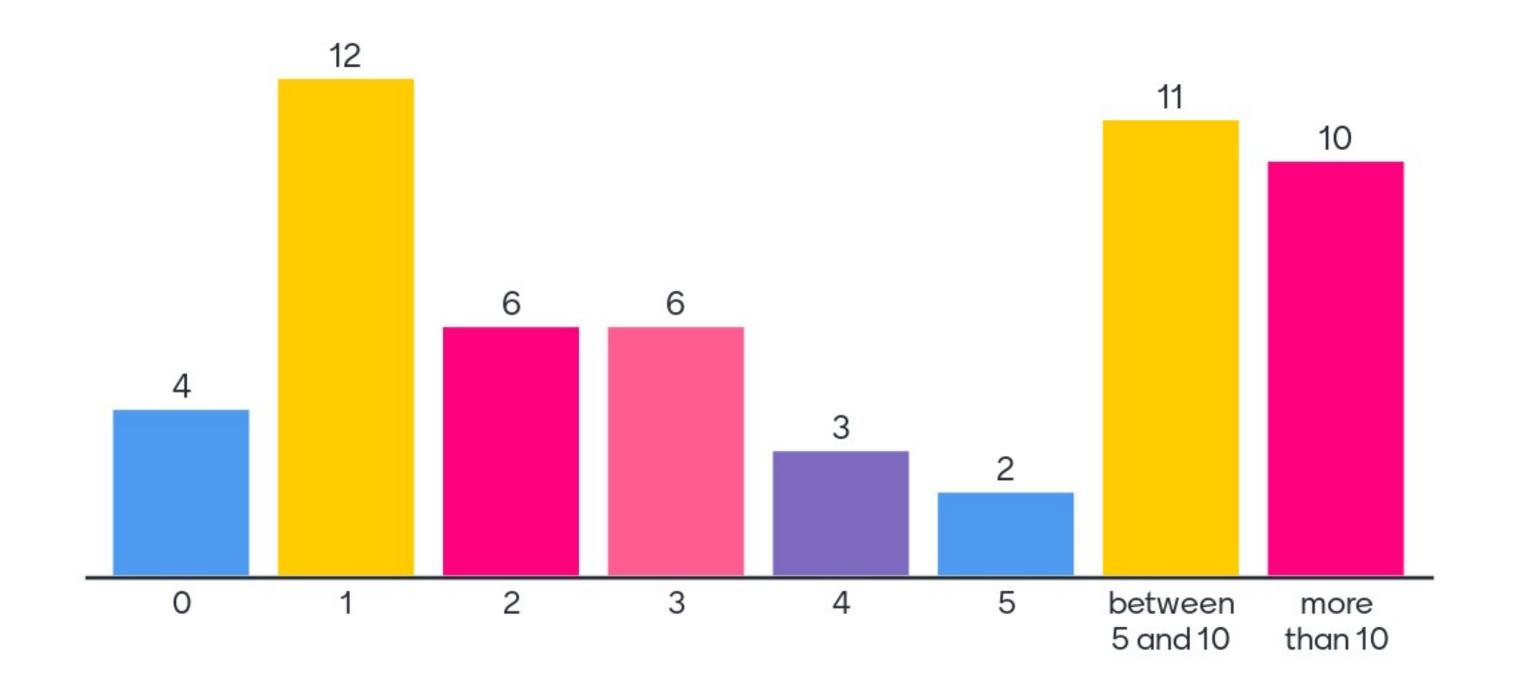
I-35W Bridge Collapse, August 1st, 2007 - Minneapolis, MN

Consider your commute

or similar frequent trip



How many bridges do you travel over during your commute?











Quality Improvement



Formal QC/QA



2.05

BRIDGE DESIGN QUALITY ASSURANCE & QUAILTY CONTROL (5-23-2016)

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What is Quailty Quality Control?



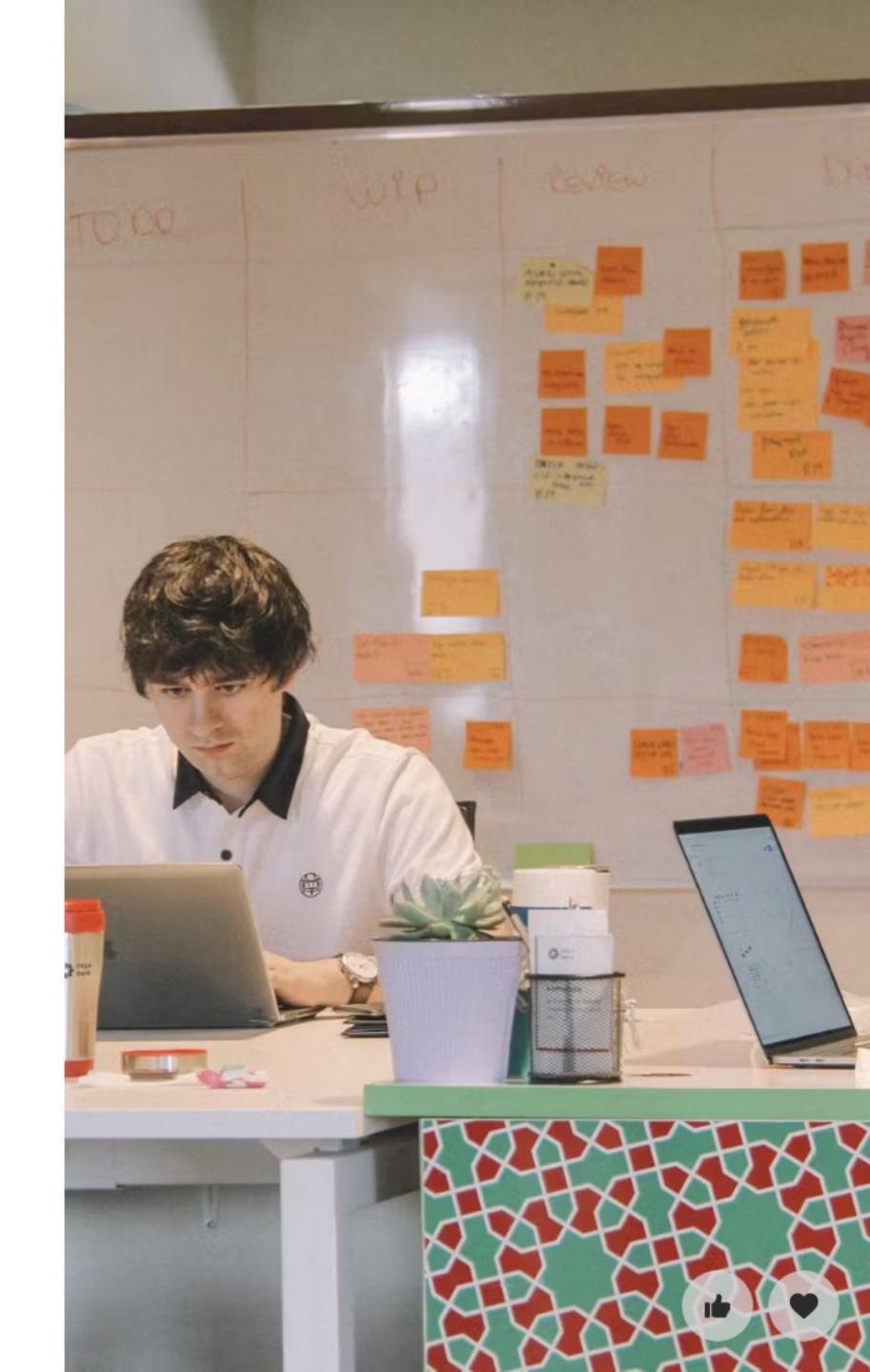


Procedures followed within a unit or working group to check the accuracy of the calculations, drawings, and specifications for the purpose of detecting and correcting design omissions and errors to accomplish the overarching goal of producing complete and error free final plans and specifications. QC occurs continuously throughout the course of a project.





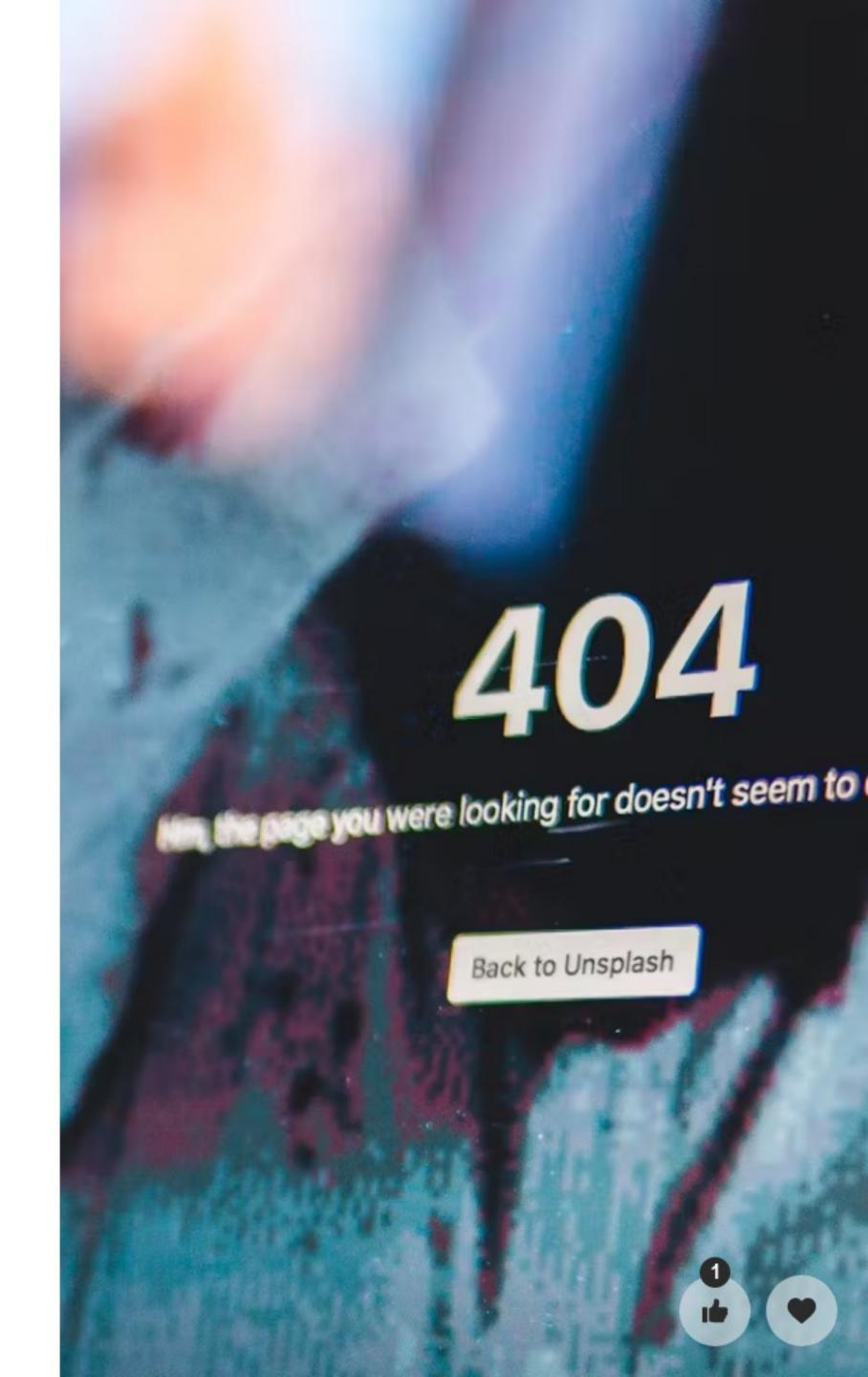
within a unit or working group



- within a unit or working group
- thecks accuracy



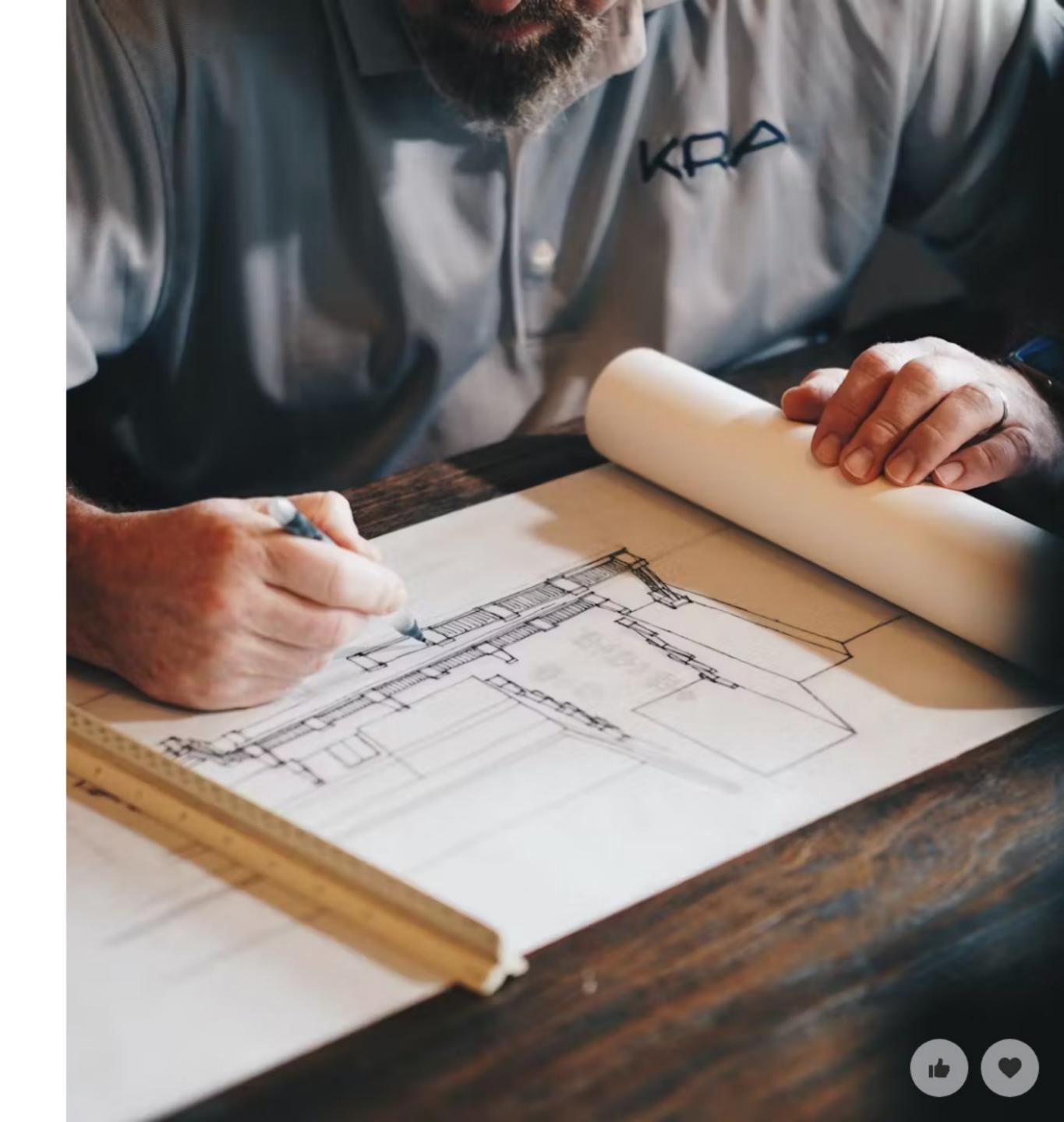
- within a unit or working group
- > checks accuracy
- detects and corrects errors and omissions



- within a unit or working group
- thecks accuracy
- detects and corrects errors and omissions
- occurs continuously



- within a unit or working group
- checks accuracy
- detects and corrects errors and omissions
- occurs continuously
- → Goal = Error free plans and specs



Quality Control shall include at a minimum:

- A supervisor or team leader responsible for determining the technical knowledge and experience of the designer/checker for a specific design.
- A documented program with detailed procedures, standards, and policies for oversight of the bridge design.
- → Design calculations, checked calculations, review comments, and other pertinent documents.
- Bridge plan sheets shall include the name/initials of the designer and checker and the most current revision date.
- Names of the drafter and reviewer should also be added to the plans.
- Bridge design plans shall be signed and sealed by a Licensed Professional Engineer in the State of Michigan.
- Unique special provisions shall be include the author's and reviewer's initials and date authored and checked.





Audit	Signed by license pe	checker	doer, checker, confirmer
Leader.	Check plans, calcs, specs	Reviewer.	Double check major items







Find & correct errors Reviewer Reviewer Calculations Reviewer. Checker Do-er and checker Review Reviewer







Designer, Checker CheckerDoer doer, reviewer, QA'er protect the public. Quality manager Doer, checker, reviewer Reviewer Designer, checker,





To ensure things are Check Reviewer Doer, reviewer, assurance, currect oversight checker backchecker Checker A more detailed review evaluation.







Review Check for errors

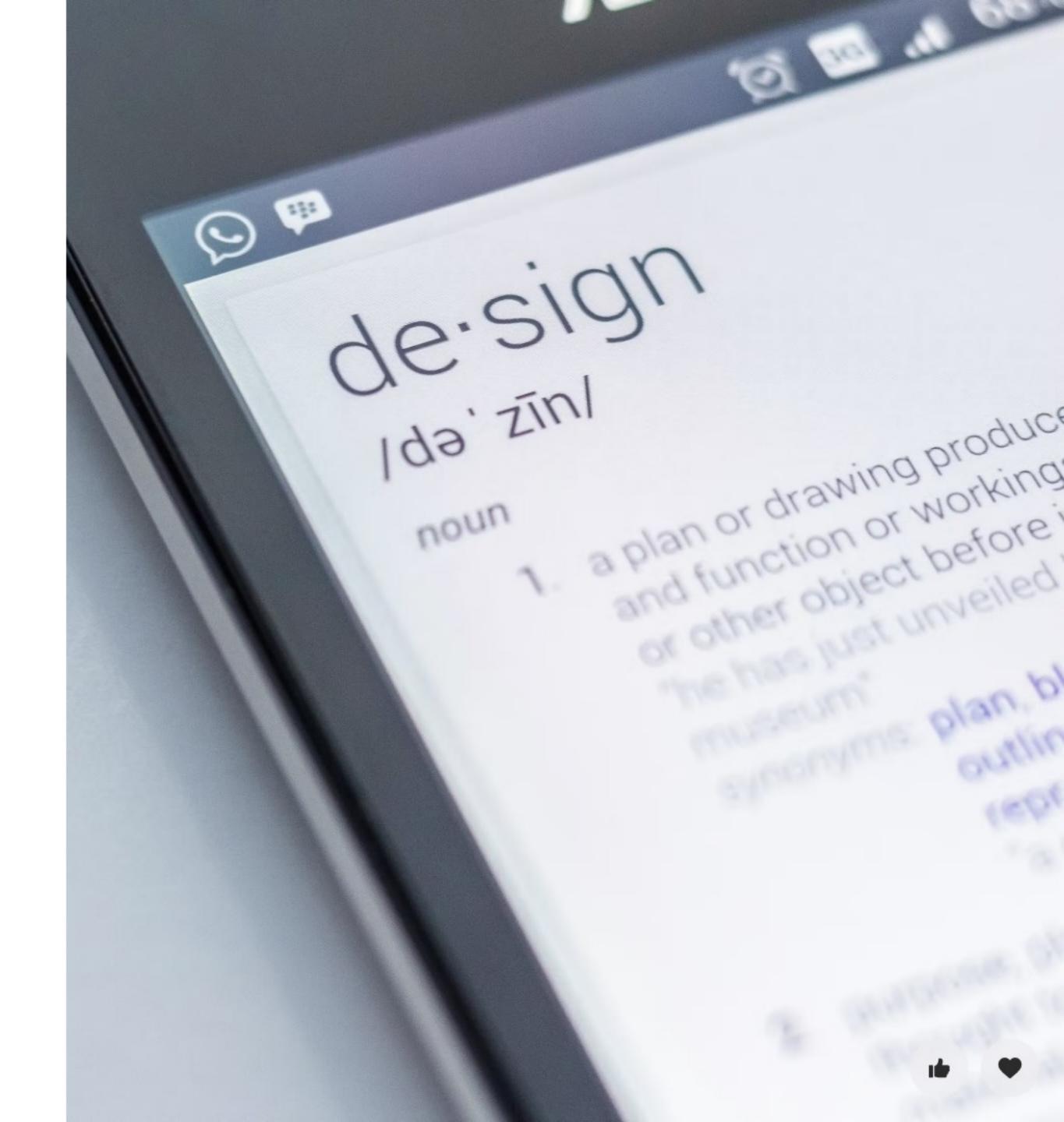






Designer

- Directly responsible for development of:
- Design Calculations
- Drawings
- Specifications
- Review of shop drawings



Designer

Possesses a PE license OR works under supervision of Michigan P.E. who is acting as the Reviewer for the project

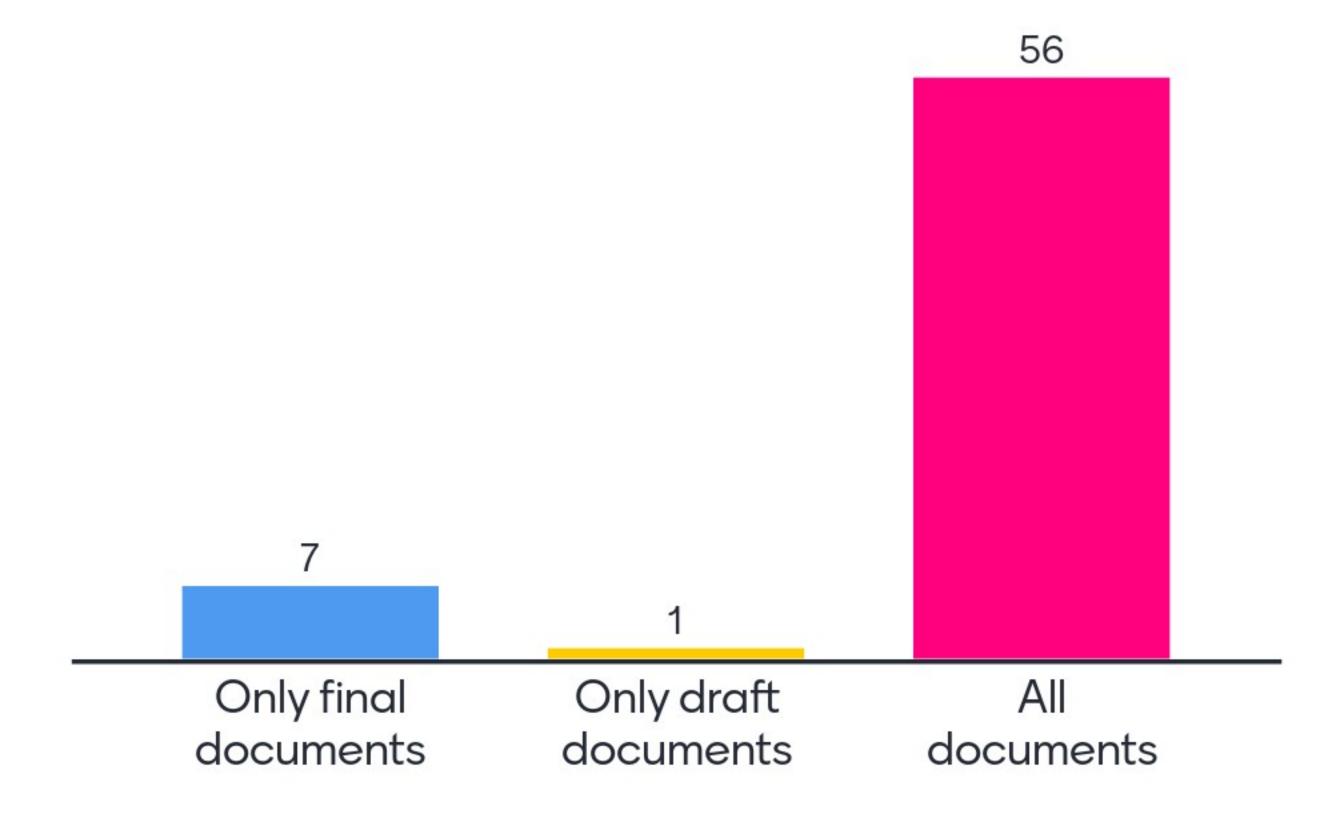


Checker

- Performs technical review of
 - Design calculations
 - Drawings
 - Specifications
- Experience should be equal to or exceed Designer's experience
- Possesses a PE license OR works under supervision of Michigan P.E. who is acting as the Reviewer for the project



What should be QCed?







Is Quality Assurance different from Quality Control?









Quality Assurance (QA)

Review procedures followed by staff outside the unit or working group to ensure the QC procedures were effective in preventing mistakes and promoting consistency in the development of bridge design calculations, drawings, and specifications.





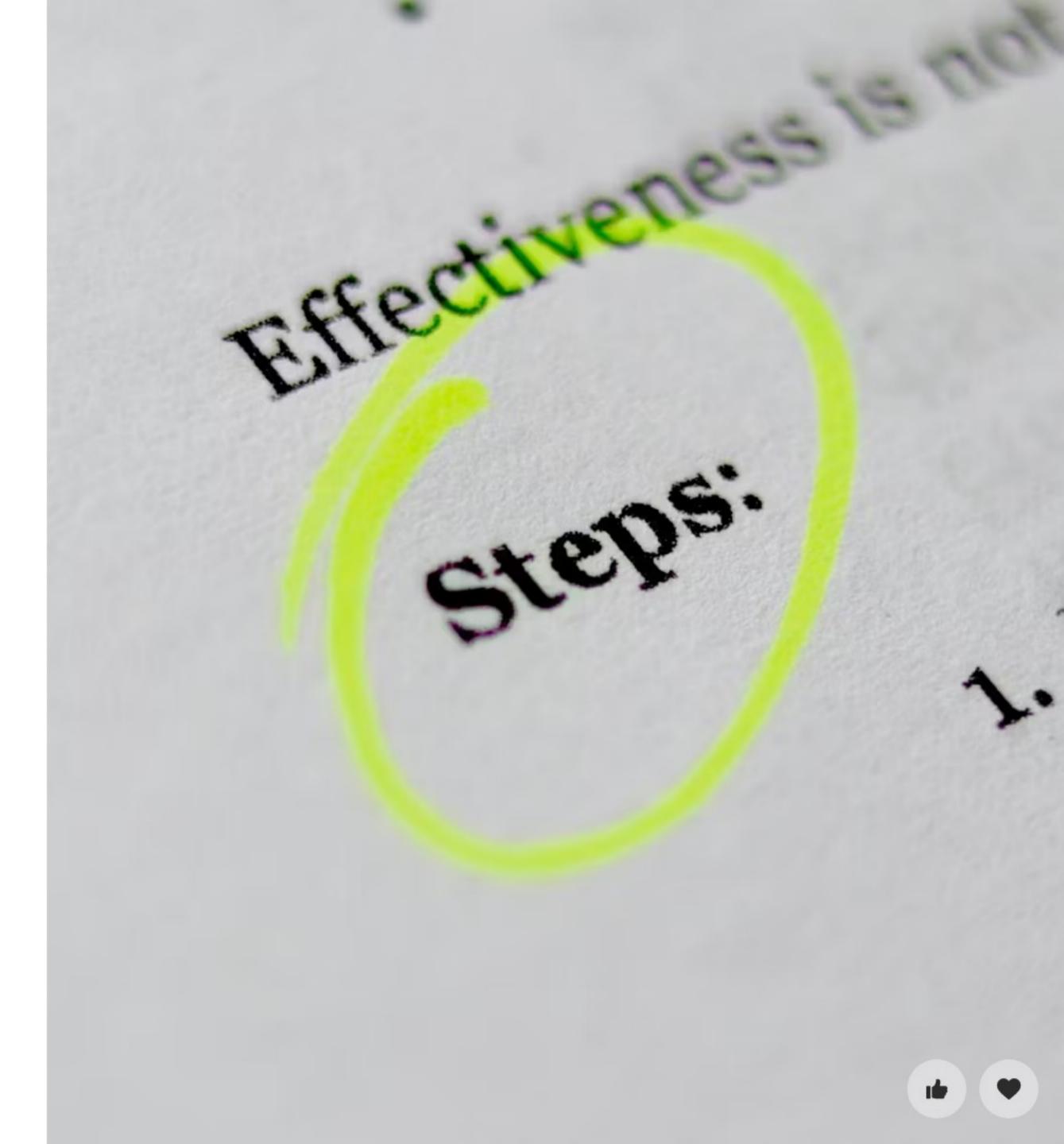
Quality Assurance

 outside the unit or working group



Quality Assurance

- outside the unit or working group
- ensures QCprocedures
 - prevented mistakes
 - promoted consistency



Quality Assurance shall include at a minimum:

- Independent check of design calculations, unique special provisions by a qualified person or consultant other than the designer
- Participation in field engineering reviews during design





Who's responsible for Quality Assurance?



Reviewer

- responsible for QA procedures
- possesses a PE
- has significant bridge design experience
- very familiar with state of practice in
 MI
- directly supervises any non-licensed
 Designers or Checkers



Calculations QC policies followed Pay items That QC was performed Quantities Quantities Calculations, Assumption measurements





Calcs & specs, Load calcs, quantities Grades, Calculations Critical locations. Quantities Specs, plans, calcs Consistency between plans and calculations.







Possible conflicts/ risk General notes Quantitiies Conclusions QC procedures were Calcs Lengths Critical calculations, followed, reviews quantities, plan sheets documented, review comments addressed and resolved/incorporated





look for errors or information that is missing

Quantities pay items

Pay items, quantities, dimensions, staging

Calcs, quantities, pay items, elevations, grades

Coordination of docs

calcs, elevations

Assumptions

Using correct inputs, code references and assumptions.





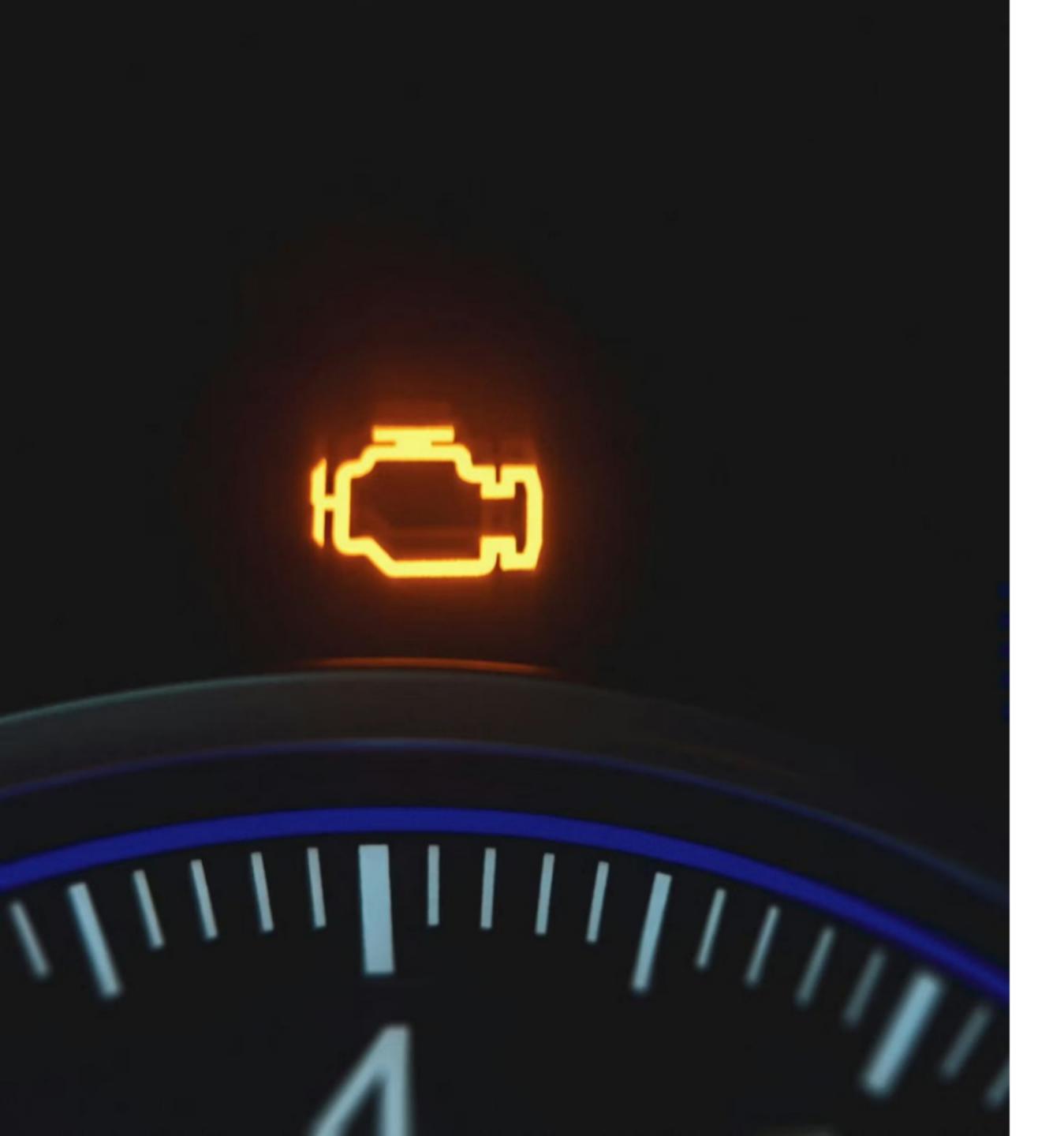


SPECS Quantities, special Grades Specs provisions, design calcs font size... Consistency calcs Stamped









Spot checking

- Tailor to each project
- Focus on elements that have the most impact
- Examine what is different about this project
- Acknowledge past lapses and successes
- Consider design team experience





Why document QC/QA?



Why document QC/QA?



Benefits of documentation



Write it down



Write it down



talk it out	Rock paper scissors	Boss	Flip of coin
Discuss with reviewer	dual	They talk it through	Third Party







Sit down and figure it out	Discuss	PE will resolve it	Seek a third opinion.
QA reviewer	Discuss it	Cage match	Owner







Boss Flip a coin Discussions and looking They have a meeting with up other sources of the QA person. documentation Reach out to technical Go to Manuals Reviewer Discuss it manager for final decision.







Discussion Discuss, second opinion Third senior person go to a more experienced person. Make a recommendation. Stating clear reason for 40-yd dash PROFESSIONALLY AND ADULT MANNER differing views







Whoever is oldest wins PM Qa reviewer Share candy

Solve disputes by arm wrestling









Let's Review!

Quality Control vs Quality Assurance

Quality Control

- Detailed review
- Identifies errors
- Focused on the products
- Verifies the Quality

Quality Assurance

- Spot check review
- Prevents errors
- Focused on the process
- Manages Quality



QC Roles

QA Roles

Designer

- Develops project documents
- Experience working on similar projects
- Very familiar with project scope

Checker

- Reviews project documents
- Experience equal or exceeding Designer
- Very familiar with project scope

Reviewer

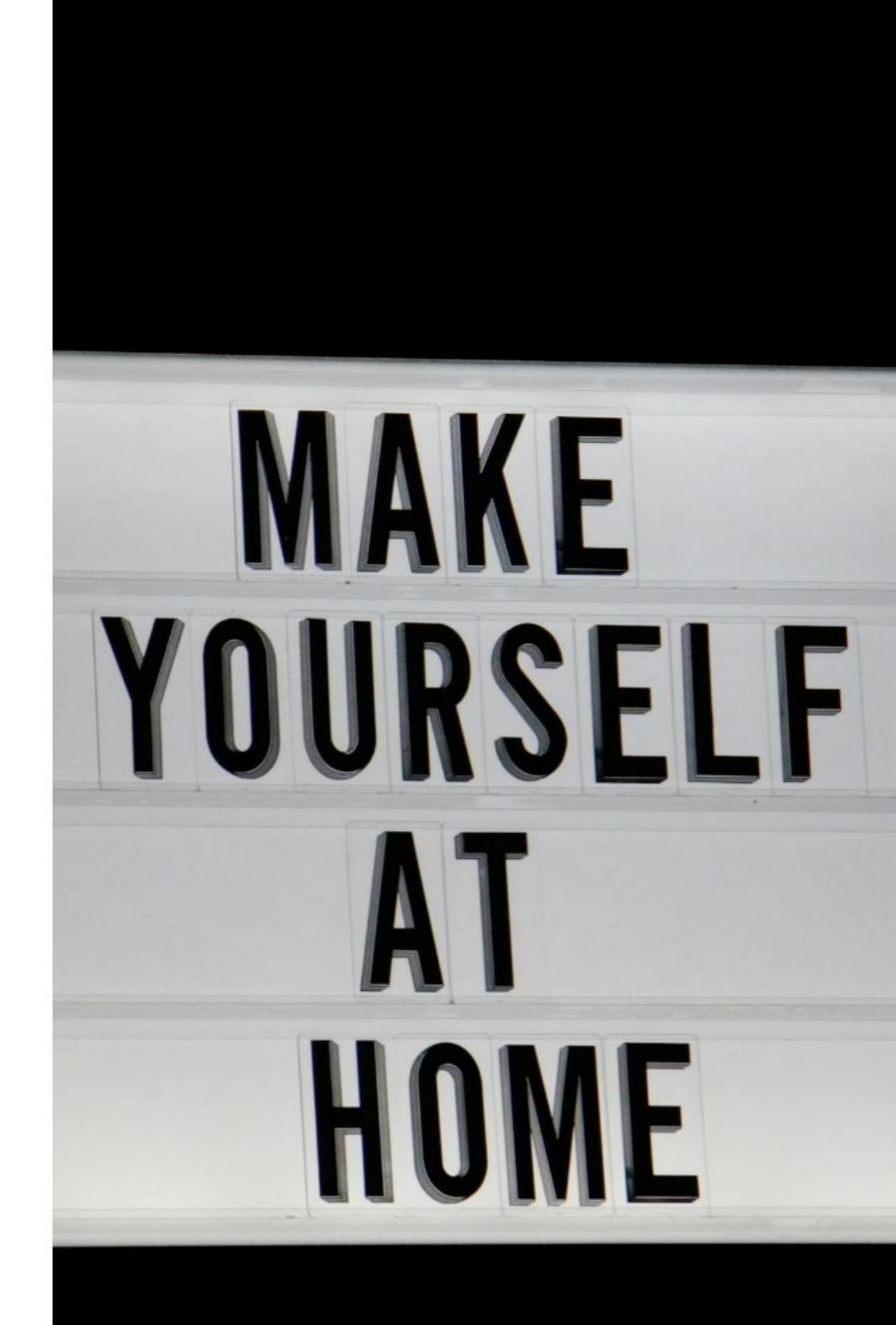
- Spot checks project documents
- Experience exceeds
 Designer and
 Checker
- Very familiar with bridge design procedures





In-person Activity

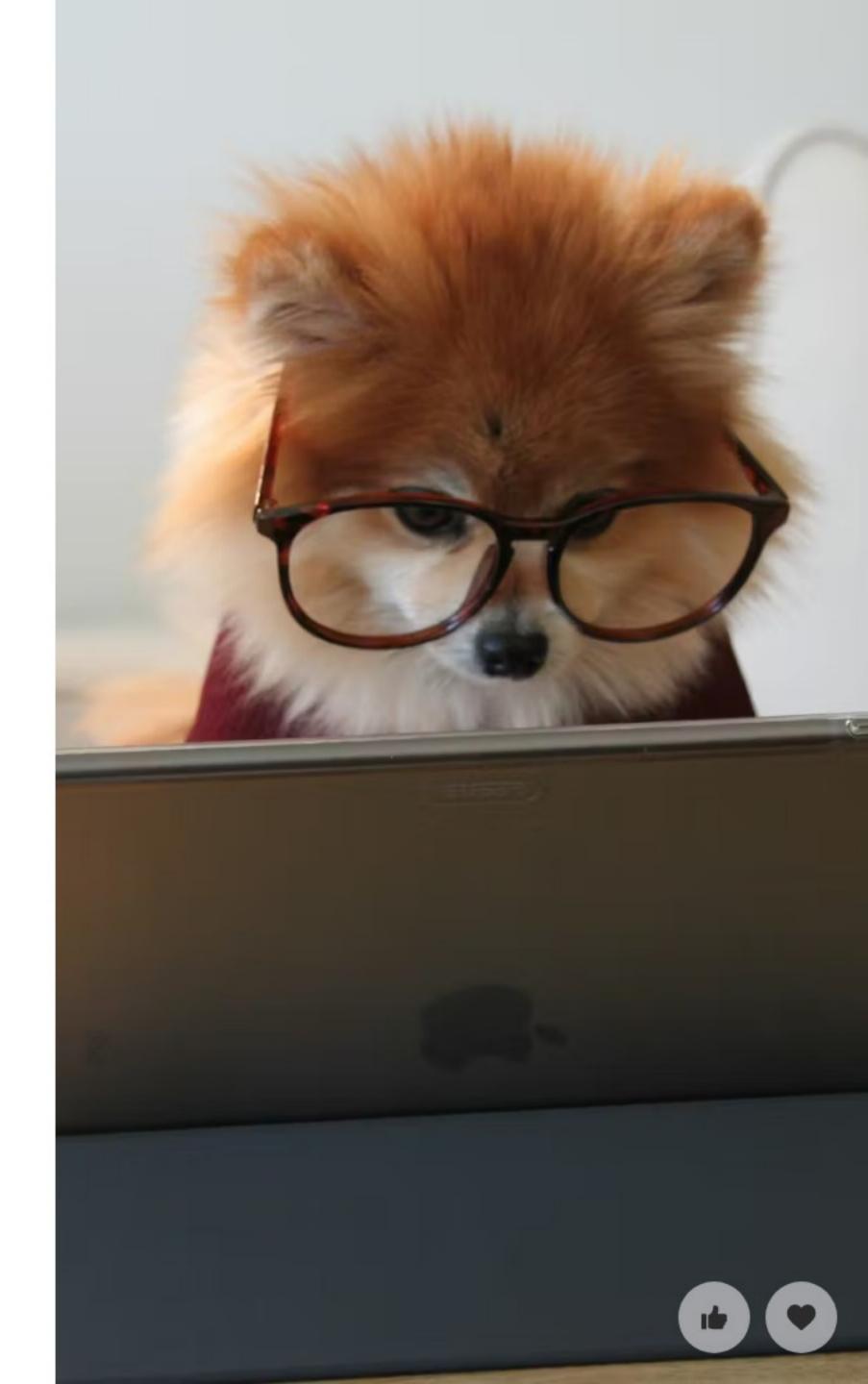
- Worksheets Printed
 - Jet us know if you need a copy
- → Pens/Pencils available
- Sit together in groups of 4-6
- Adjust chairs/tables as needed



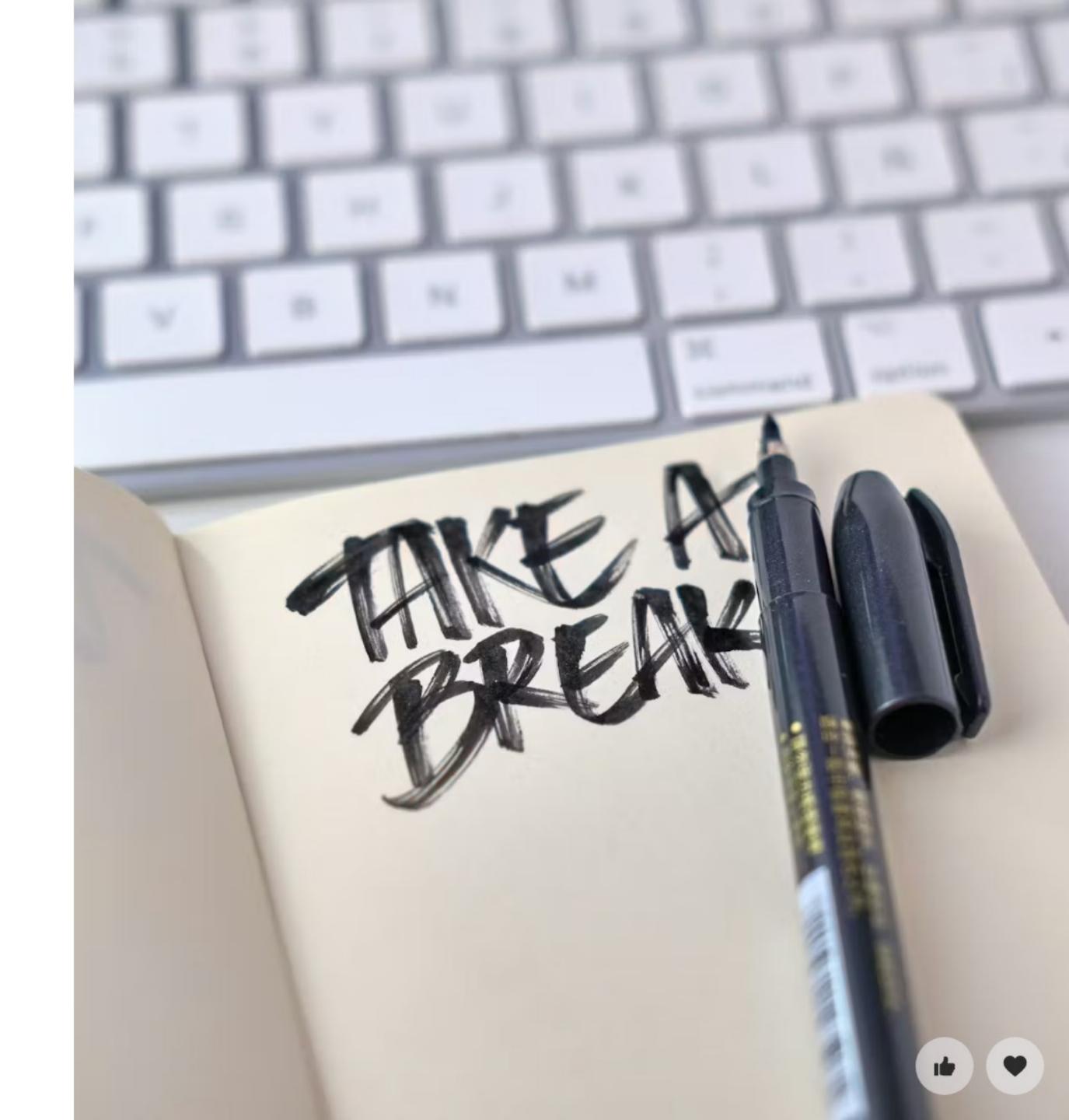


Virtual Activity

- Link to fillable PDF in Zoom Chat
- Breakout Rooms Assigned
- Need a microphone and camera
- Hide "Self View" so you don't stare at yourself



Break time!



What are some rules we should have for the group discussion?

Take turns Respectfully Professional no mean names Open minded Parliamentary Respectfully discuss respect procedures







What are some rules we should have for the group discussion?

Stay on point What happens here stays Listen no physical contact here Polite low expectations:) nice



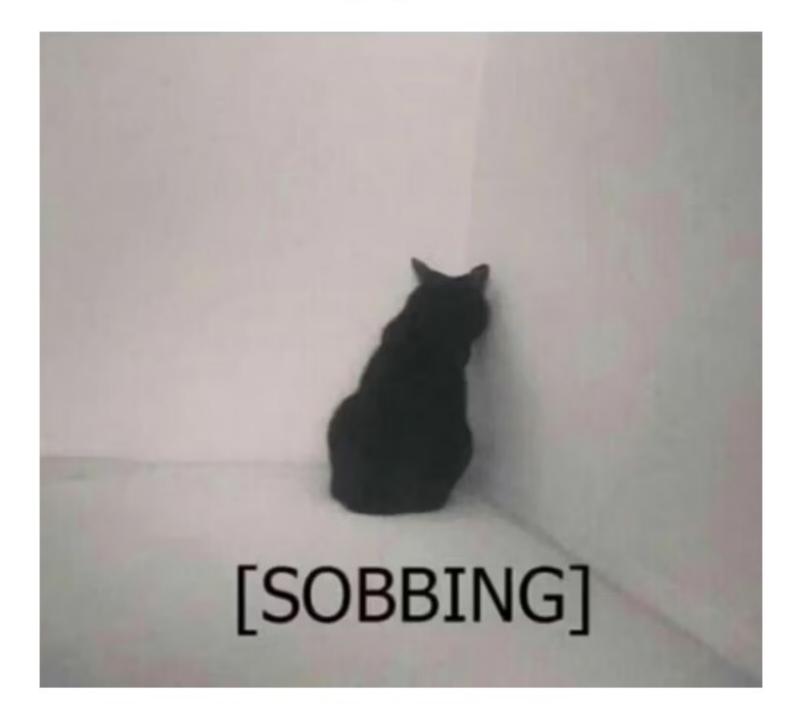




Mindset



Me when I'm not immediately good at a new skill







Fixed Mindset

- → I'm bad at...(art, math, music, sports, language, etc)
 - → This is how it is
 - → This is how it's always been
 - → This is how it will always be
- Devalues incremental improvements





Growth Mindset

- I'm not good at this...yet
- J am capable of improvement
- Jmprovement =/= perfection

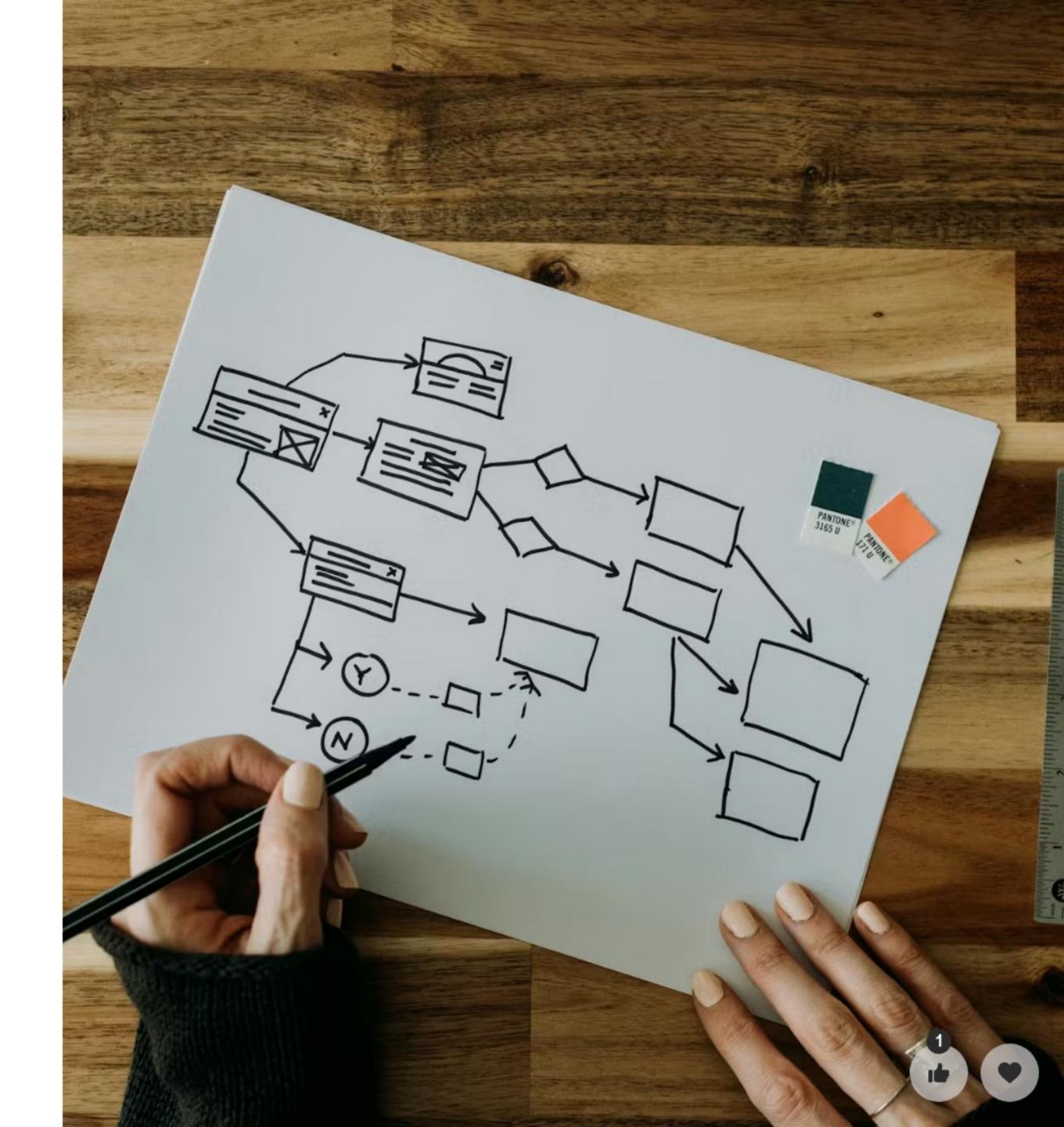


Be curious, not judgmental



What is the current process? What's missing?

Be curious



Rules for discussion

→ Order:

- Virtually in order of the sheet
- In-Person whoever is closest to the podium goes first, then clockwise
- → If you aren't ready, say "Pass" and take your turn at the end
- If someone didn't get to share, let them go first next time

Comments and questions are good!

- Raise your hand
- Allow others to finish their thought

→ Be respectful of the group

- Listen more than you talk
- Stay on topic
- → Be present

Introductions

- → Name
- → Job (...briefly)
- How many bridges you cross on your commute
- → Your favorite QC/QA process/tool/resource

What works well? Why?

Be curious, not judgmental



What are some reasons that a tool or process works well?

Good documentation Documentation Clear communication buy in between different parties. Feedback from others Less work at the end Logical flow Easily accessible







What are some reasons that a tool or process works well?

Creates opportunity for discussion

Standard procedure and training for use of the QA-QC tools

User friendly and easy to learn

Checklists help you catch the most common errors or missing information.

Clarity of WHAT was reviewed

It is actually being used, and not in a drawer.

Consistency

Force







What are some reasons that a tool or process works well?

Explaining an issue to another is beneficial for both the speaker and listener

collaboration

Multiple discipline review meeting

Stamping with different color code for checker, backpacker.

Efficiency

Blue Beam Reviews and collaborations

Every deliverable has set quality reviews. Beginning of each project everyone is trained on the quality process expected

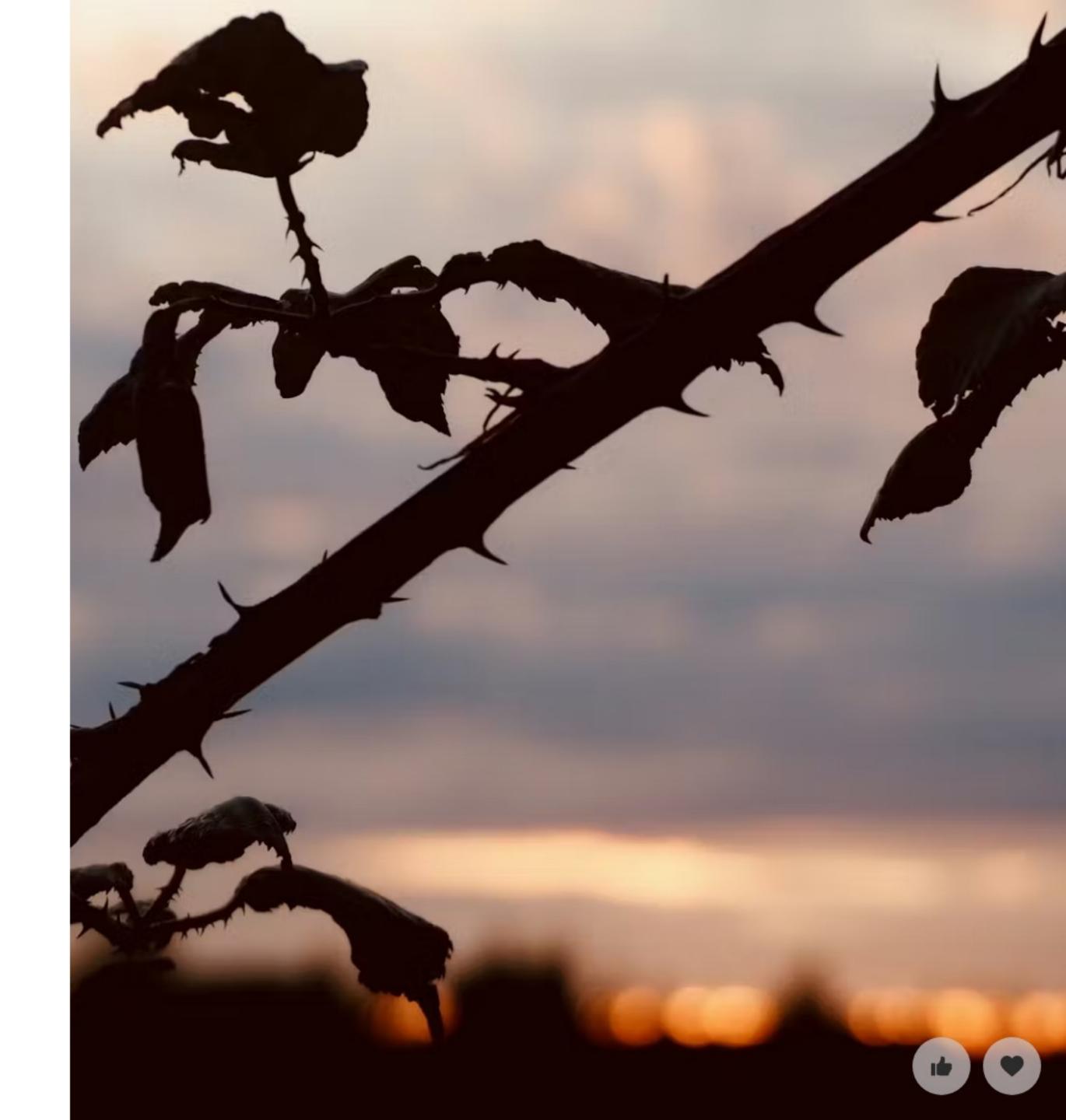






What doesn't work? Why not?

Be curious, not judgmental



Rose & Thorn Discussion

- Share EITHER a success OR a challenge with your group
 - Share if it applies to everyone and every project
 - Share why you think it works or doesn't work



Common Challenges

- → Time
- Organization/Procedures
- Staffing
- -> Culture



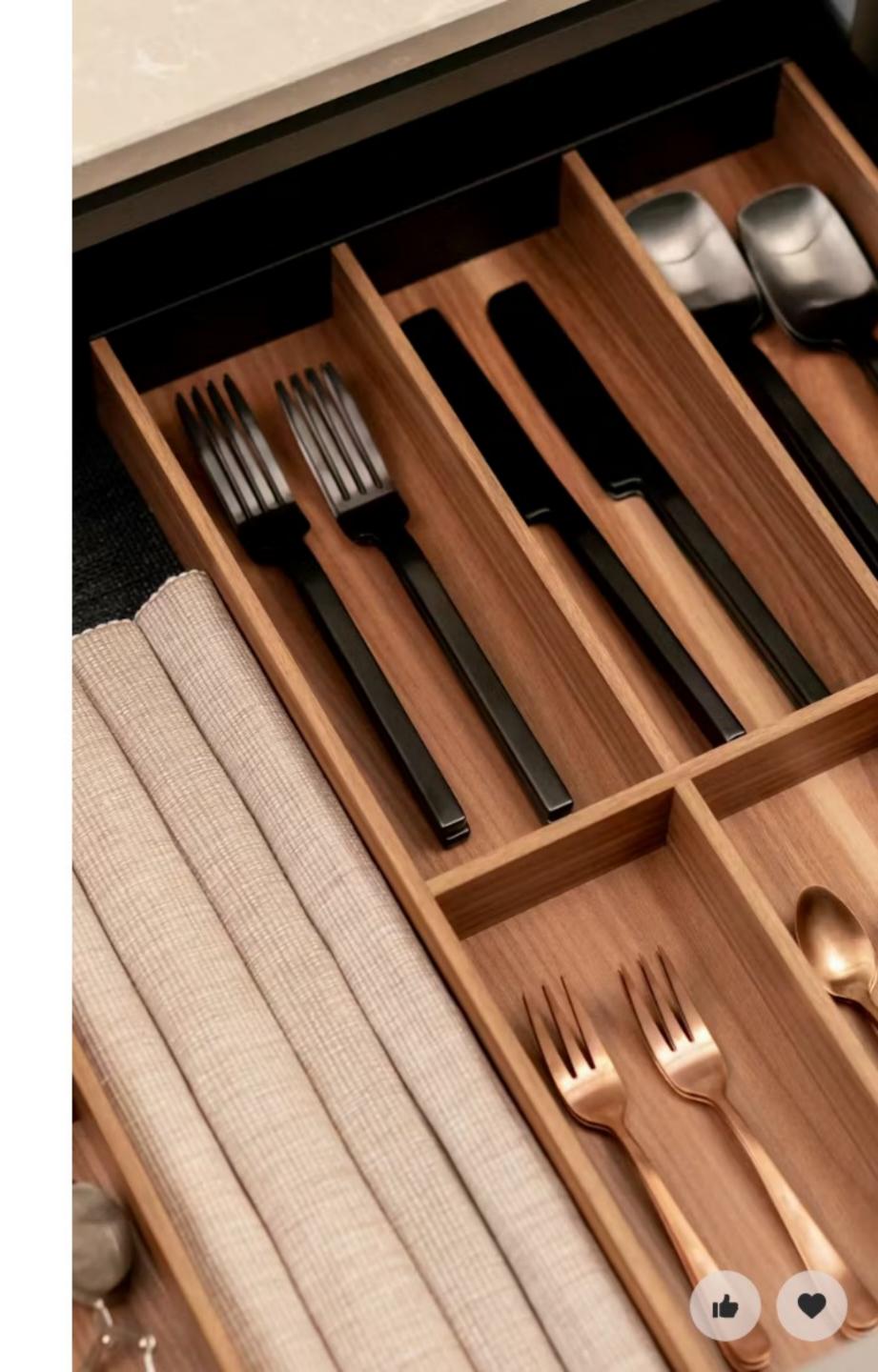
Time management strategies

- Account for QC/QA time in schedule
- Schedule regular QC/QA check-ins
- Make it fun!



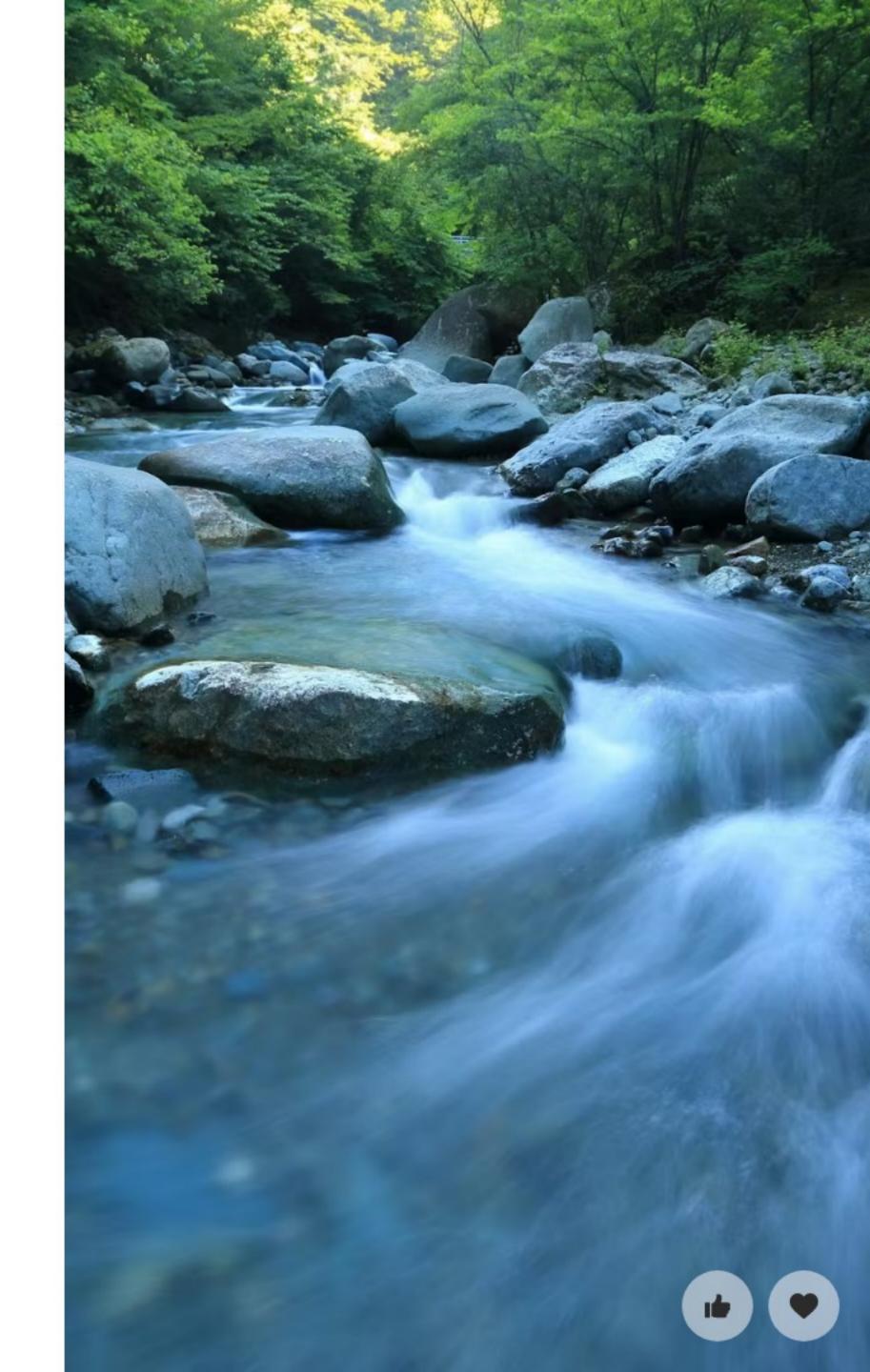
Procedure strategies

- → Training!
 - Get on the same page
- → Streamline
 - repetitive tasks
 - → file locations
- → Reduce inertia
 - → routine
 - → uniform



Overcoming Inertia

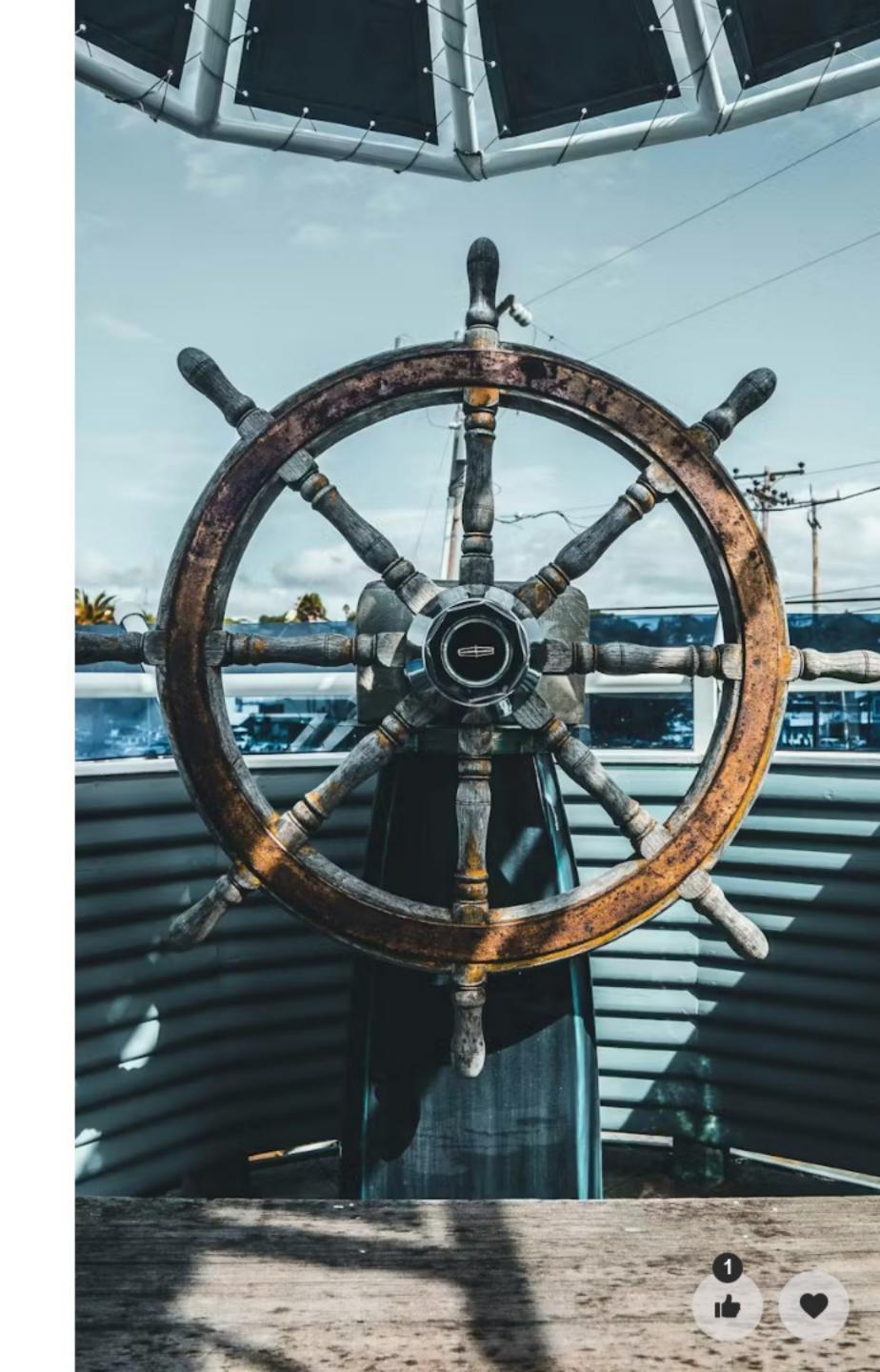
- Fillable form versus a printed copy
- > Check box/dropdown versus written out
- Prompts versus open ended
- Have an Example/Sample



Staffing



Who's in charge?



Gather best practices from across the land



Audits

- Accountability
- → Scheduled
- Review & adjust
- Non-punitive
- → Gamify it!

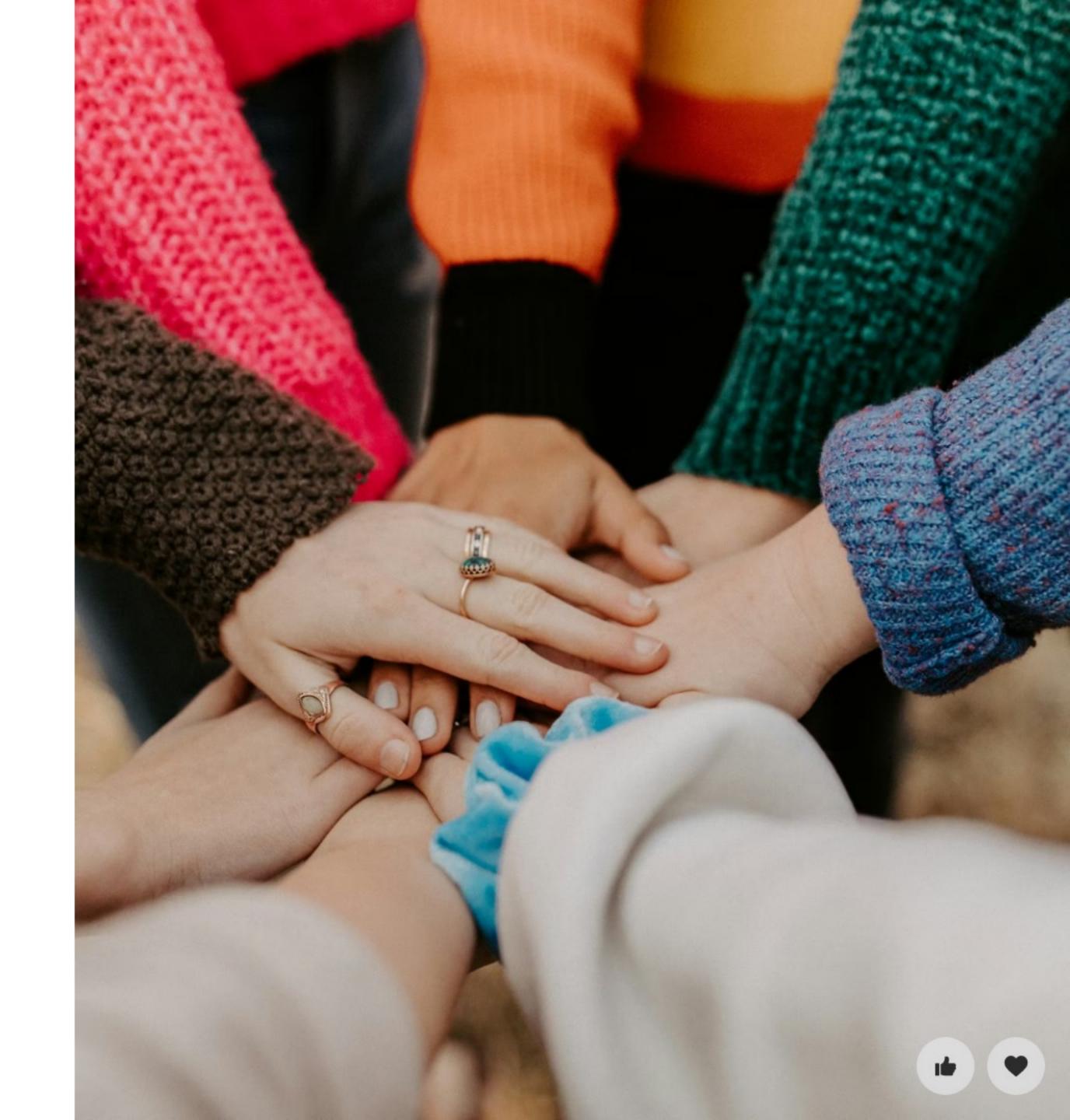


Project QC/QA

- Assign at the start of a project
- -> Routine check-ins
- QC deadline ahead
 of due date



Culture



Go Team!

- Resistant to change
- Naysayers
- Apathy
- Lack of support from above







Over! Under! Around! Through!

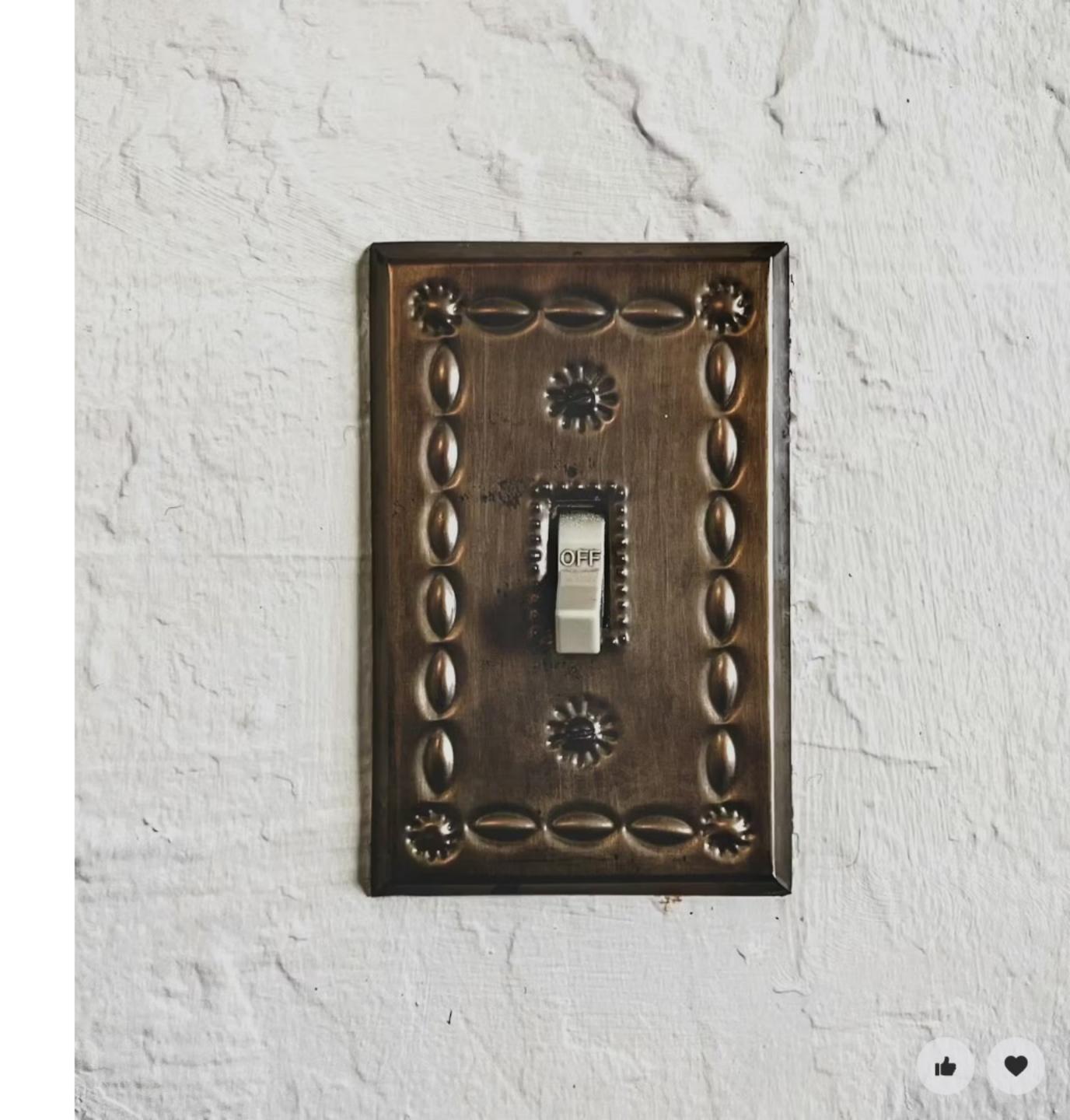
- Talk about the importance!
- Make the change and enjoy the benefits
- Hard to argue with success
- A streamline process is an easy process





Routine

The good and the bad



Habits and Routines

Worksheets



Habits and Routines Discussion

- Share a good habit or bad habit
- After everyone has shared a habit...
- Share a suggestion for encouraging/discouraging habits







What is preventing people from using existing tool, resources, procedures, etc?

Worksheet: Improving Your QC/QA Process

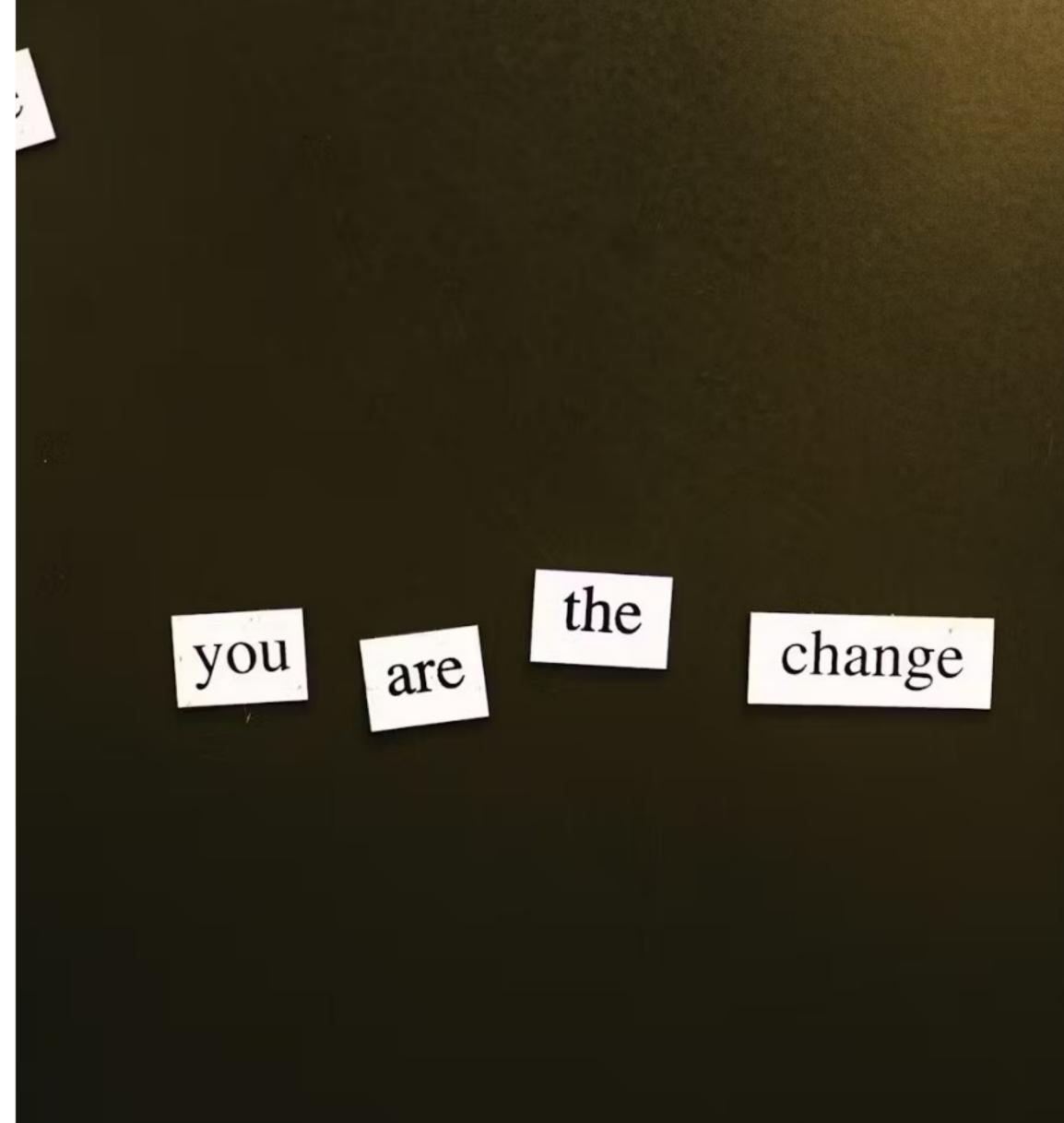






Improving Your QC/QA Process Discussion

- Share a process/tool/or resource that you wish existed
- Share what it would do/how it would improve the existing workflow



vauy





How can you improve existing procedures, tools, resources?

Spreading knowledge of Providing training Get in the project Establish consistency schedule from project to project how to use it training sessions Streamline Examples of good items examples







How can you improve existing procedures, tools, resources?

streamline forms so its easy follow thru with Time management Training to use and only has what's procedures needed - no fluff Designated responsibility Document Clarify everyone's roles. Training and accountability





How can you improve existing procedures, tools, resources?

Provide Budget-Accounting Task for QC/QA Lessons learned

Time management

Encourage knowledge transfers and feedbacks

Document discussions

Implement procedures.







Implementing New QC/QA Ideas

Worksheet



Implementing Ideas Discussion

- Share a new idea you want to implement
 - Share why it is an improvement
 - Share how you can make it part of a routine



Overcoming Obstacles

Worksheet



Obstacles Discussion

- Share what you think is your biggest obstacle
 - Share a strategy to combat that obstacle
 - Share what you would say to a naysayer



Goals - Working Discussion

- Write down and share your goals
- Last discussion for the day
 - Share contact info



What goals are you going to set for yourself regarding QC/QA going forward?

Document better

Become more aware...

Communicate early

Record keeping and documentation

Use technology (Bluebeam) to better document Develop a training program

Establish QAQC in schedule & budget

Make the document accessible to all





What goals are you going to set for yourself regarding QC/QA going forward?

Communication

Educating peripheral staff who need to be part of the process

Setting up reminders

implement training for staff

Document and share

More training

plan more time into schedule and budget to correctly address reviews, form filling, tracking, and truly customizing the QMP for each project - updating thruout project start early, make it easier to complete documentation







What goals are you going to set for yourself regarding QC/QA going forward?

communication is key!

Better documentation

Learn more

Sharing knowledge transfers and feedbacks

growing when we learn





Final thoughts

- Snap photos of your worksheets
- SurveyMonkey Link
- Vevox Evaluation
 - → Share your thoughts!
- → THANK YOU!!!

