

## INTRODUCTION

In the world of travel restrictions, social distancing, and remote work, contractors need creative solutions to adapt and continue construction projects. Vaughn Construction is leveraging virtual inspections, remote training, and remote assistance to manage risk and streamline processes while maintaining project progress. We can execute virtual inspections throughout each phase of the project to ensure work progresses smoothly. We can use virtual inspections for:

- Preparing punch lists and monitoring work progress
- Performing pre-final and final inspections
- Performing commissioning activities with third party commissioning agents remotely
- Ensuring smooth project hand-over.

We currently are deploying virtual inspections on select projects. Virtual inspections are an effective alternative when inspectors are not immediately available or when sites are affected by travel bans or restrictions. We can facilitate various levels of virtual inspections, as necessitated by the situation, organized in a short timeframe, to maintain compliance, ensure quality and maintain the project schedule. Implemented the right way, virtual solutions can make inspections, training, and remote assistance easier, ensure visibility on site, streamline processes, and improve efficiency levels.

## CONCEPT

The virtual inspection is a co-witnessed process that utilizes real-time video streaming. This process provides a form of mixed reality for the remote user. We use video calling, a pre-determined walkthrough plan, and communication protocol, coupled with best practices, to connect remote inspectors to the job site. Additionally, we use a robust, pre-configured checklist software, so inspectors do not have to travel to the site to observe and approve the punch list items. An alternative option is an offline inspection consisting of a pre-recorded inspection paired with video transmittal.

We schedule a pre-inspection meeting to plan a trial run of the walkthrough and ensure equipment and software works. During the execution of the pre-determined walkthrough plan, our camera captain, with the help of a safety escort and punch list recorder, captures the areas of work with mobile equipment, streams the video, and transmits the images directly to the remote inspector. The roles of the virtual inspection site team include:

- **Camera Captain** – navigates the hard hat-mounted or handheld camera device
- **Safety Escort** – maintains safe path for the camera captain and ensures proper lighting and a safe walkthrough
- **Punchlist Recorder** – assists with capturing data and notes

This basic virtual inspection process can be achieved using any typical streaming platform such as WebEx, Microsoft Teams, Zoom Meeting, etc. If required, we can record the entire inspection process by just push of a button.

Virtual inspections, remote trainings and remote assistance can benefit projects in several ways:

- Safety First
- Productivity
- Time Savings
- Support and Learning

## EQUIPMENT SETUP AND REQUIREMENTS

We designed our virtual inspection process to provide the same level of technical expertise and insight as an in-person inspection, in a safe, flexible, and efficient way. We can stream high-quality data with smart-phone cameras and mobile connectivity, which is easily adaptable to the streaming platform most comfortable for the inspector.

Suggested Requirements:

- **Equipment** – Use mobile device (smartphone, iPad, or other tablet) with reliable data service (4G/LTE internet) OR a strong Wi-Fi connection (preferred).
- **Connectivity** – Ensure your inspection location has strong connectivity and your device is always within range of those services during the entire walkthrough. Slower and/or weaker connectivity may not provide the speed and clarity required to complete the inspection.
- **Inspection Preparation** – Plan the walkthrough and conduct a trial run.

## CHALLENGES TO ADDRESS IN TRIAL RUN

A solid plan to mitigate challenges before the virtual inspection should include:

**Connectivity** – Ensure the inspection location has strong connectivity and devices are within range of the data service or strong Wi-Fi connection during the entire walkthrough.

**Camera Stability** – Conduct trial run with both hard-hat mounts and monopods for camera support to select the best video streaming method. Review hard hat mount with safety professional for compliance with safety policies and procedures.

**Lighting Conditions** – Provide and practice with hand lights (lighting stands, if necessary) for adequate lighting during walkthrough.

## THINGS TO REMEMBER

**Define the process** – Specify the purpose and goal of the inspection.

**Start simple** – Choose the technology

**Identify the team** – Select the staff performing the virtual inspection.

**Train** – Schedule remote training for staff executing the virtual inspection.

**Practice** – Plan the walkthrough and trial run.

## NEXT STEPS

Once a project team masters the basic workflow of virtual inspections, consider the following options to enhance the user experience:

- Consider using Dynamics 365 Remote Assist with a Microsoft HoloLens for a more immersive video experience with 3D context, as well as adding telestration capability.
- Consider using 360-degree cameras. Software application like OpenSpace upload 360 photos to cloud data storage and tied to floor plans within 15 minutes. This immediate access allows a remote inspector to conference with the project team and generate inspection issues directly into an issue tracking program such as BIM 360.
- Research the use of platforms such as ScopeAR for developing virtual training applications deployed with a Microsoft HoloLens.
- Incorporate livestream drone video for site and skin inspections.

Virtual and remote solutions in construction are here to stay regardless of the circumstances. The COVID-19 outbreak pushed construction to a new reality where virtual and remote solutions are the go-to strategy wherever possible. We work in an industry that can adapt quickly to the new reality and take the right safety measures in a timely and responsible manner. We are using technology to provide creative solutions to keep construction projects on schedule while staying safe.

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**About Vaughn Construction**

Vaughn Construction is a Texas-based construction company that specializes in new construction, renovations and additions to civic, healthcare, education and research facilities. The privately-held company has offices in Austin, Bryan/College Station, Dallas/Fort Worth, El Paso, Houston, Lubbock, San Antonio, and the Texas Medical Center (Houston). For additional information, visit [www.vaughnconstruction.com](http://www.vaughnconstruction.com).