Stephen Gabriel

Design Technology Specialist – Specialized Services



About the speaker

Stephen Gabriel

Stephen heads up the rendering and animation services at MG.aec and has been rendering architectural and manufacturing animations since 2007. In addition, Stephen teaches 3ds Max using standardized and customized curriculum and has taught at a variety of local and national level events including Autodesk University. Stephen holds a Bachelor of Science in Architectural Studies from the University of Wisconsin/Milwaukee and is an Autodesk Certified Instructor Gold Badge.

What is Cinematography?

- Definition The art or technique of motion-picture photography. (<u>www.dictionary.com</u>)
- The art of visual story-telling utilizing motion pictures.
- Cinematography defines a series of tools and techniques to transfer information visually.
- We will discuss the theory and practical application of cinematography to architectural visualization

Architectural Visualization

- Convey design intent in a more understandable format than flat drawings
- Still images are the most common form
- Walkthrough and flyby animations
- Virtual Reality

Specific Failures of the Walkthrough

Walkthrough animations suffer from a number of problems that result in the failure to allow the viewer to adequately understand the design.

- Speed
- Leading
- Framing
- Timing
- The BIG one

Specific Failures: Speed

- Average walking pace is 3' per second
- Too fast doesn't allow adequate time to perceive the image
- Too slow and user loses interest
- When animated on a path, the speed of each segment varies
- Applies only to walking

Specific Failures: Leading

- Camera remains facing along path at corners
- Unnatural and unnerving
- Can induce vertigo/motion sickness when very bad
- Roller coaster effect

Specific Failures: Framing

- Desired feature is not always in best position in view
- Desired features outside safe viewing area
- Poor image composition
- Tendency to ram

Specific Failures: Timing

- Average human ability to maintain interest is 6 seconds
- Too fast (< 1 second) does not allow perception of the image
- Overall length of walkthrough is excessive

What is the single largest failure of the architectural walkthrough?

Who is it for?

The Cinematography Process

The cinematography process defines a film through the use of a storyboard. The storyboard breaks the story into scenes which can be seen as main topic areas, such as an entrance, an atrium, the boardroom, etc. Each scene is further broken into a number of shots. The type of shot is defined by its purpose in the story telling and each shot is defined by the composition of the image, the camera movement, the camera lens settings, lighting, exposure and duration.

Understanding what each of these topics means and how they are used facilitates generating the storyboard. And this is perhaps the single most important step in the process of cinematography with the largest impact on production time and success of the film.

The storyboard is also the single most ignored step in an architectural walkthrough.

The Storyboard

The storyboard defines what aspects of the design we are going to show, to what detail and how, and the order that we are going to show them in to tell the story of our design.

A properly executed storyboard can greatly reduce the time required to move from design data to finished output. It does this by limiting what needs to be modeled out at high detail, by limiting file sizes to only what is within the scene and by reducing rendering times due to smaller scenes and removal of unnecessary lighting.

The storyboard should be crafted and approved by the major stake holders including the designer, the animator and the marketing department if one is present. The person most familiar with the animation process should generate the storyboard based on inputs from the others in order to eliminate excesses and prevent it from becoming just another walk through.

The Storyboard Composition

The traditional storyboard is a series of drawn images that show the composition of the shot along with annotations for camera and lens settings and lighting.

In visualization, the storyboard can range from traditional to a mark up of plans to simple paragraphs detailing what happens and when.

Regardless of the method, the storyboard should be completed before any work is done on refining the model, inserting lights and cameras or setting animation keys. Failure to do this results in changes downstream that cause the animators to constantly backtrack. This wastes a lot of time and resources.

Scenes

The storyboard relates the story of the design through a series of scenes. A scene is best addressed as a major space in the design. Everything you tell about this room is told in this scene through a series of shots. Example scenes would be the building exterior, the building entrance, reception areas and office and executive suites.

The scenes are the first area of definition and all scenes should be defined and placed in order before any shots are defined. This controls the scope of the animation and all stake holders must know and agree that no additional scenes can be added after it is defined. Scope creep is the most insidious of violations to the process and drastically affects the time and resources required to complete an animation.

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Shots

There are four types of shots used in visualizations. Each type relays a specific type of information regarding the design and these are used to break down how a scene will be presented.

- Establishing
- Transition
- Perception
- Detail

The Establishing Shot

The establishing shot is used to inform the viewer of where the next shot is going to be at, to tell them where they are going. It does so by focusing the viewers attention on destination for one or two seconds and is followed by a cut to a camera at that location.

The human mind is trained from a young age to understand the establishing shot and the resulting transition. You see it every day in television shows and movies.

Establishing shots are not used within a scene, only as an entrance or exit. The scene should involve a single space and camera shifts within should be done in such an order that the viewer can follow and understand it is still the same scene.

The Transition Shot

The transition shot details the movement from one space into another. Common examples are entering a lobby from the exterior, moving from a corridor into an atrium or arena or entering the conference center from the reception area.

These shots tend to be short and linear, frequently including the animation of doors opening and closing. It is important that the camera move at a consistent rate throughout the transition shot and as these are typically shot at eye level, the camera should move at three feet per second as though the viewer was walking.

The Perception Shot

The perception communicates the space to the viewer.

The camera in a perception shot is frequently turning or traveling along an arc while its target of focus moves as well. These movements help define the three dimensional nature of the space. The camera can also move along the Z axis in addition to the normal X and Y axes.

The camera should move at an even speed with each transition shot.

Frequently, multiple perception shots will be combined together from different points in the space to more fully describe the space. A quick trick to keeping these understandable is to have the next camera be at the target of focus shown at the end of the last shot.

The Detail Shot

The detail shot is used to focus the viewers attention on a specific aspect of a design. Typical details may be hardware, reception desks, reception area layouts, sculpture, fixtures or other architectural details.

Detail shots typically utilize minimal camera movement and are typically shorter in duration and there may be many detail shots in a given scene.

Composition is key in detail shots due to limited camera motion. Observe the rule of thirds and avoid "ramming" whenever possible.

A series of rapid (~1 second duration) can create a very dynamic display of the details of a space.

Camera Movement

Each shot will detail the specific camera movement used to execute the shot. Some shots may use a stationary camera that is referred to as a "fixed camera". There are six basic movements that can be defined for the camera and knowing what they are helps you quickly set the shot up in a way that everyone understands. The camera movements are:

- Pan
- Tilt
- Dolly
- Truck
- Crane
- Orbit

Camera Movement: Pan

The camera pan turns the camera about its own center of rotation, allowing the viewer to look left or right.

Camera pans are frequently combined with other movements for perception shots.

Camera Movement: Tilt

The camera tilt turns the camera vertically about its own center of rotation, allowing the user to look up or down.

Camera tilts are frequently combined with other movements for perception shots.

Camera Movement: Dolly

The camera dolly moves the camera forward or backwards along the viewing direction, allowing the viewer to move towards or away from the target of focus.

The camera dolly is used heavily in transition shots, allowing the viewer to enter and move through doorways. It is not unusual to combine the dolly with a pan or tilt at the end of the motion.

It is important to control the speed and keep the movement at a constant rate for believability and viewer comfort.

Camera Movement: Truck

The camera truck moves the camera to the left or right of the viewing direction, allowing the camera to move sideways down the length of a wall.

The camera truck is used heavily in perception shots, especially when viewing exterior facades.

The speed of movement using a truck is not as controlled as a camera dolly as the viewer is not perceived to be walking.

Camera Movement: Crane

The camera crane moves the camera up and down like riding in an elevator.

The camera crane is used heavily in perception shots and frequently combined with pan and tilt.

Camera Movement: Orbit

The camera orbit moves the camera in an arc around a center point in the scene.

The camera orbit allows the viewer to sweep around an object or space and view it from multiple angles.

Camera orbits are used extensively in exterior and interior perception shots and occasionally in detail shots.

Care must be exercised to keep from orbiting too fast and causing viewer disorientation.

Camera Framing

Camera framing defines how the camera is looking at a specific object or space. Camera farming involves three key areas of composition, one involving the camera and two involving the camera lens. Proper use of these leads to more compelling images on the screen and a more understandable and pleasing view.

- Camera Angle
- Field of View
- Depth of Field

Camera Framing: Camera Angle

The camera angle defines the position of the camera with respect to its target of focus. Camera angle encompasses the visual composition of the view and is frequently established using the rule of thirds..

Using the rule of thirds, you divide the viewport into thirds and position the camera such that the target of focus is at one of the intersections of the lines or that a linear feature aligns with one of the lines. This applies to fixed cameras but not as much to moving cameras.

It is important to keep all areas of interest in moving cameras within the motion safe frame of the camera. The motion safe frame is roughly 10% smaller than the full view.

Camera Framing: Field of View

The field of view determines the angle of view captured by the lens. A narrow angle zooms the target of focus in on an object while a wide angle pulls the view back out. While this may seem the same as trucking the camera forward and backward, it is in fact distinctly different.

Narrowing the field of view affects the depth of field and can result in blurring of object in front of or behind the target of focus.

Widening of the field has the opposite effect and at very large values, can introduce spherical distortion to the image.

Zooming in on a target, narrowing the field of view, is a good way to draw attention to a place in an establishing shot.

Camera Framing: Depth of Field

The depth of field, also called distance blur, focuses the viewer's attention by blurring objects closer than, farther from or both from the target of focus.

Use depth of field to highlight specific features or elements. Depth of field is used almost exclusively for detail shots.

Lighting

Lighting is as essential in animation as it is in real life. Without it, we can't see anything. But more importantly, lighting can establish a mood or set an emotion to our space.

In architectural visualization, we predominantly use practical lighting to illuminate our scenes. Simply put, we use the lighting that we build into the design, as well as any daylight, to light the scene in a realistic and natural way.

There are two areas of lighting that we need to be aware of that will influence the final appearance of our film: exposure and color temperature.

Lighting: Exposure

Exposure determines how much light is allowed into the camera to create the resulting image.

Too much light and the image is overexposed and burned out.

Too little light and the image is underexposed and dark.

A properly exposed image will have a good contrast from light to dark without any burnout and few fully black shadows.

Lighting: Color Temperature

Every light source emits light at a different temperature and this determines the distribution of color in the spectrum of the light. Lower color temperatures are redder while higher temperatures are bluer. Skylight has a higher color temperature than an incandescent bulb and appears far bluer than the bulb. If the color temperature of the lights is not properly accounted for in the camera settings then the image color can be off.

Cinematography

Cinematography, the art of visual story telling, provides us with a technique to tell the story of our design by defining our goals and methods before we begin working.

The key to cinematography is the creation of an effective storyboard detailing the scenes that will be used to tell our story.

The scenes are organized by shots that relay specific types of information in the story as defined by the camera movement and framing.

Understanding and implementing the concepts and techniques of cinematography allows you to create more compelling animations while controlling the time and resources needed to achieve them.



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