Accessibility: Architecture Beyond Sight

Presented by Christopher Downey, AIA
(September, 2014)

Course Description

AIA Learning Units: 1.50 hours (HSW)

Taught by an architect who lost all sight in 2008, this 90-minute video course provides an overview of the range and types of visual impairments that affect users of the built environment. The course explores the significant role design plays in access for those with visual impairments, reviews the limits of ADA standards for architectural guidelines and California Building Code requirements for those with visual impairments, describes strategies beyond code requirements to increase visual and non-visual accessibility, and discusses sustainability principles for those with visual impairments.

This course qualifies for 1.5 hours of approved AIA continuing education credit (HSW), complies with California licensure requirements regarding accessibility and provides essential information about accessibility requirements applicable in most states.

This course was filmed in 2014 and reflects codes and standards in effect when the course was produced. As codes, standards and interpretations are subject to change, viewers should check current codes and standards with regards to accessibility. These include the California Building Code (CBC), the International Building Code (IBC along with the ICC A117.1) and the 2010 Americans with Disabilities Standards (2010 ADA). Viewers should also discuss specific circumstances with building code officials and with regulatory and other agencies that have jurisdiction over their specific projects.

About The Presenter

Christopher Downey, AIA, is an architect, planner and consultant who lost all sight in 2008. Today, he is dedicated to creating more helpful and enriching environments for the blind and visually impaired.

Chris consults on design for the blind and visually impaired, encompassing specialized centers as well as facilities serving the broader public. His work ranges from a new Department of Veterans Affairs blind rehabilitation center, to renovations of housing for the blind in New York City, and to the new Transbay Transit Center in San Francisco.

As one of the few practicing blind architects in the world, Chris has been featured in local, national and international media stories and speaks regularly about architecture and visual impairment. He also teaches accessibility and universal design at UC Berkeley and serves on the Board of Directors for the Lighthouse for the Blind in San Francisco.

He starts each day rowing with the East Bay Rowing Club on the Oakland Estuary before commuting on public transit to his office in San Francisco.

Learning Objectives

1. Understand the range and types of visual impairments that affect users of the built environment.
2. Understand the significant role design plays in access for those with visual impairments.
3. Understand limits of ADA standards for architectural guidelines for those with visual impairments while understanding the need for other strategies to increase visual and non-visual accessibility.
4. Recognize alignments and challenges of sustainability principles for those with visual impairments.

Note to Transcript Readers:

This transcript is a verbatim reflection of the video narrative and is provided so that those with hearing impairments can follow the video course. As with many verbal presentations, verbatim translations do not always result in the same type of concise language as if the transcript was developed and presented as a technical document.

The information included in this transcript is provided as a general resource. Users of this information should conduct additional research, check their local building codes and verify all information before applying it to their practices or to specific circumstances.
CHAPTER ONE: INTRODUCTION

I’m Chris Downey. The topic is Architecture Beyond Sight: Design Across the Visual Divide. This is what you need to know.

CHAPTER TWO: ARCHITECTURE BEYOND SIGHT

I’d like to talk to you about architecture beyond sight, something we don’t often think about. To do this, the first thing I’d like to do is turn out the lights or perhaps close your eyes. At this point I’d like to take a little journey with your eyes closed.

(Sound of tapping, traffic).

So what did you notice, could you hear the sound of traffic passing by on my left? If you’re blind you can use that to hold a straight line to walk down the street. What else did you hear? Could you hear the tapping sound? If you did, that was the tapping coming from the tip of my cane. If you’re blind you can use that to understand a little bit more of the world around you, you can hear the sound as it bounces off buildings and comes back to you and in particular you can hear the difference if you pass by the corner of a building and all of a sudden the sound doesn’t bounce back or it changes the shape or sound that you hear.

Could you hear the tapping sound, the tapping of my cane? If you’re blind you can use that to understand the architecture around you, you might perceive if you’re beside a building or if you just happen to pass by the corner of the building. It’s very helpful information. In this case could you hear the sound as it sort of got deeper or perhaps the reverberation time took much longer to come back to you? That sound was very different.

That's actually how I found the door to this building the first time I went there, it's very clear, and the door happens to be recessed in the vestibule, an alcove off the sidewalk and it's completely surrounded by hard surfaces. So the sound really focuses, the reverberation time gets longer and it bounces back to me in a different pattern and that helped me know where the door was.

And then passing into the building could you hear how the traffic dissipated behind me and then how the acoustics changed as I entered the lobby? Finally, did you hear the little ding at the very end? That happened to be the elevator when it arrived and there is one sound, a ding, indicating the elevator was going up.

So what I’d like to talk to you about is how we work with architecture without sight, how it is experienced, how you use it and how it's effective for you. But first I'd like to think a little bit about the environmental sensory experience. The visual sense constitutes about 80 percent of the environmental sensory experience, that's pretty overwhelming. The rest of it; acoustics, touch, smell, taste and some other things sort of constitute the remaining 20 percent.

But then the question becomes what happens when sight is removed? Is that to say you have an 80 percent sensory deprivation, that you just get less information? Actually no, that's not what happens. What really happens is your mind starts to focus on all the other sensory information around you and it fills the void created by the lack of sight. It's really fascinating; you don't hear any better, contrary to mythology, you don't hear any better but your brain does focus on it more than it otherwise would. The same for other senses.

So when designing or thinking about architecture beyond sight or without sight it's really thinking about multisensory design, it's thinking about what other things are out there, how else can the environment be understood? One thing I discovered in my experience is that without sight, ironically, my experience became much more multi-sensored, I was much more aware of the sounds of the environment around me, the textures of the ground below and other things that I could experience all around, sometimes even just air pressure, but all sorts of sensory experiences that come to me without sight.

But before I go too far I’d like to take a moment to give you a little background. I am an architect, I have two degrees in architecture and had 20 years of experience before unexpectedly losing all sight as a consequence of surgery to remove a brain tumor that had been located directly upon my optic nerves. The surgery was successful but within a few days of the procedure my sight began to fail and within a few days it was completely gone.
Lying there in the hospital, of course all sorts of questions started to rise. How would I survive, how would I get around? I didn't know anybody that was blind and I didn't know where to start. And what about architecture, could I continue to practice architecture without sight? What I didn't realize at the time was that I was really on the cusp of a grand adventure, of all sorts of wonderful new discoveries, just an exciting adventure, rediscovering the world around me, rediscovering the environment, something I knew very well visually as an architect. And things that I would start to re-learn in different forms, through acoustics, through touch, through just experiencing the world in non-visual ways.

CHAPTER THREE: OUTSights

Along the way there are all sorts of discoveries, new things that I learned about the environment, things that I didn't know sighted, things that are new insights or outsights as I now call them, or things that I learned through the benefit of losing sight.

First of all, though, I needed to insert a new operating system, put a non-visual operating system. Unfortunately it's not as easy as downloading the new upgrade, and getting things going. There's a lot of training, a lot of hard work that's required. This training included things like living skills, how to be safe, getting around the house, doing things of normal life.

There's also getting around safely with a cane without sight, for using the cane to safely travel around the community, through the town, getting where you need to go. There's also technology; it's a terrific time now, there's so much wonderful technology out there available that's adaptive technology for the blind, I had to learn all that, including learning to be a touch typist, something I didn't do with sight.

So there's a lot of training that went along with this experience for the recovery from sight loss, but I would always get the question of how? But how can you be an architect without sight? One of the basic tools that I work with is the embossed drawing, and that's a tactile form of architectural drawings, it's based on the same technology that you work with. I take a PDF, send it off to my printer and it prints it in tactile form. It looks the same as every PDF you've ever seen on the screen, but when it comes through the embossing printer it's in tactile form.

You can think of it like a braille drawing, and in fact it can include braille. I would like to point out, however, that reading a tactile drawing is very different than reading a visual drawing. If you're sighted you look at a drawing, you see the whole, you understand the general composition, the general order of things and then you can dive into detail, to discover more things that are embedded within the drawing.

If you read a drawing through touch you discover detail then you work towards the whole, it's a bit of an inverted process. In general it helps to get the general organization of the drawing, the footprint or the profile of the drawing, to understand that first and then dive into greater levels of detail. But that only addresses how I read drawings. How do I draw?

This was a trickier question and there are all sorts of techniques that have been around for a while, but they didn't really help as an architect that was drawing line work, drawing things, designing things relative to existing information, a current design, a site plan, a master plan, whatever else, whatever is going on. For this I needed a different system. I ended up coming up with a system of working with wikki sticks, or wax sticks, that they're very easy to work with, they fold, they bend, they curve, they stick to each other, you can work in three dimensions, two dimensions.

And what's really amazing and fun is that they stick right to paper. So with that I realized that I could work with the embossed drawings to feel what's there and then work with the wikki sticks to draw directly on top of it. And in the end it becomes very much like working with trace overlays where you roll out the trace paper on top of the drawing and you sketch on top of that. It's the same thing, just done in different ways.

The creative process, although we like to think of it as being visual, is actually intellectual. The drawing part, what you see, how we typically work, is the tool so the creative process is really about solving problems, it's about understanding problems, about problem definition and it's about bringing all these different things together to make sense in the architecture, in the space that you're working with.
In my case the creative process was very much intact, what I needed were new tools. Essential to those were the embossed drawings and the ability to use wikki sticks and other techniques to draw within that. But then to get it into the computer is another question. Currently there's no system for me to be able to draw directly into the computer myself, but I can take photographs of these drawings, the wikki stick drawings and send them off to people that I'm working with or share them with others for other people to input into the computer.

Then they can send PDFs back to me, they can print them in the embossing printer, I can read it, make more adjustments and send it back and forth. I can also share these drawings with other people that are blind, I've had the opportunity to work with clients or users for clients that are blind and it's been really fascinating and wonderful to be able to open the design process to people that would typically be left out of the design experience.

But as my training had been coming along and I'd been learning these new techniques with drawing, with the tactile drawings, the economy was shifting, I ended up losing my job. So I started January 2009 unemployed, like thousands of architects all across the country. In my case, however, I was blind and had been blind for less than a year, but I had an idea of one phone call to make of someone who was very well placed, a business coach that I used to work with that works with lots of architects all around the city, all around San Francisco and the Bay Area.

He actually had an idea, he asked for a couple of weeks to make some phone calls himself and he got back to me and turns out he had a client that wanted to interview me. The opportunity turned out to be a new poly-trauma and blind rehabilitation center for the VA in Palo Alto. I was just looking for work, something to do. I was surprised to find that I had a whole new trajectory and in fact my whole disability had been turned upside down.

In this project, a blind rehabilitation center, the fact that I was an architect and was blind had real value, it brought unique insights to the team and a unique offering for the client. There were no other architects that had any experience in blindness, nobody that could really speak to the experience of a veteran that was there for services related to sight loss, for rehabilitation services, the very services that I myself was just completing.

And the fact that I was still new to it was perfect because that's what the center was about. With that I started wondering, well, what other kinds of opportunities might be out there? What other types of buildings might be specifically for the blind and visually impaired? So now for the most part my work focuses on these projects, projects that are specifically for the blind and some that aren't specifically for the blind but are either challenging or uniquely significant for them.

These projects include eye centers, rehabilitation centers, service providers, schools for the blind. These are all buildings specifically for the blind. But otherwise, transportation centers, transportation centers aren't specifically for the blind and visually impaired, but if you're blind you don't drive, you take mass transit, public transit. And if you did everything that was required of ADA, for the California Accessibility codes, you'd actually do very little to deal with the core issues related to how to get around a major transportation facility.

So my work within transportation centers really has to do with things beyond code, things that deal with the multi-sensory aspects or cognitive aspects of where you are, how to get around and how to be effective within a transit center. But wait, before I go too far I have an admission to make. I have absolutely no sight whatsoever and it was news to me that I'm in the minority of the blind crowd.

In fact, only six to eight percent of legally blind have no sight whatsoever. The rest have some sight, it might be functional, it might actually be more trouble than it's worth. There's a lot of difference that happens in blindness, so it's important to keep in mind that when you're designing or thinking about the blind experience you're really not thinking and you're certainly not thinking exclusively of those with no sight whatsoever.

So now I'd like to share with you a few examples of common types of visual impairment and the diseases that cause them. Macular degeneration, glaucoma, cataracts, diabetic retinopathy. There are others but these are some common forms. So what's interesting about this situation of low vision conditions or visual impairment that doesn't have full sight loss, is that it's actually a little bit more difficult to design with or to design for, it's less absolute.
If you have no sight it's very predictable, you know what to do and there are very concrete, very clear non-visual systems to work with, to understand the environment or to design for, to anticipate that. What's a little bit more challenging and, quite frankly, a little bit more interesting, is that if you have visual impairment but some functional sight, if you have some residual sight but visual impairment, you actually become more susceptible to the actual design around you.

In fact, the design, the architectural design, can either increase your visual acuity or decrease it. That's something we typically don't think about as architects, about how we work with the environment, how we deal with lighting contrast and other issues related to that, it can really have a profound effect on the visual acuity of anybody, but especially those with visual impairments.

Taken together, the legally blind do not constitute a large demographic of the United States, however if you were to take them all together into one city it would constitute the third largest city in America, third behind New York and L.A. and just larger than Chicago. Now I'm not suggesting that we do that but I am suggesting that perhaps you think about that. It's certainly worth considering what would a city be like if it was designed to meet the needs of 3.3 million blind residents, how would it be different?

It's interesting not to actually design that city but it's interesting to reverse the tables, to think about blindness or perhaps disability in general, as the norm not the exception. And if you did that, what would be different in the city or what would be different with our buildings?

CHAPTER FOUR: OUTSights – Within the Code

So now I'd like to talk to you about things that are actually in the code that deal with visual impairment. The first of these things are what I consider things related to messaging, and in fact if you're blind that's a critical thing, it's messaging. How do you get information, what are those messages out there? Especially if you can't see it.

This is a little different than what we often think about as accessibility. Typically we rush to think of wheelchairs, wheelchair accessibility, and in fact it is the international symbol of accessibility, it is really significant. And those issues related to physical accessibility of the needs of people in wheelchairs or other physical disabilities, there's actually very significant and concrete issues related to accessibility.

You can't shimmy, you can't negotiate, you can't make yourself smaller to fit through a space and there's nothing you can do to magically make your wheelchair hop up a flight of stairs or to grasp something that your hand doesn't fit around. All those things are commonly understood in accessibility and I have found, especially in my own personal experience, that our awareness of accessibility for visual impairment and blindness is much less commonly thought of.

So what is in the code with regards to blindness and visual impairment? Accessible signage. With accessible signage there's a lot that's going on, first there's raised letters and these letters are to be in contrast to the field that it's on, that is the background of a sign, but also the background should be in contrast to the color and value of the wall that it is located on.

This gets a little tricky if you're putting it on glass; how do you have contrast to something that's clear that might be variable or changing behind it? And in fact what happens if there's a bright light source behind the glass? If you do that can you actually see the sign? So even though it's not a requirement in all cases I'd advise that the signage not go on glass, avoid it whenever possible.

Also, the sign is tactile, it is to be touched and there's also braille. Now why is there both tactile letters and braille? The reality is that not everybody that's blind reads braille and you don't instantly know how to read braille. But if you've had sight chances are you can touch and feel the letters that are there so that you can read the sign the old fashioned way, just recognizing the letters you've always known. If you've been blind for a while or blind from birth chances are you know braille and that is a much more efficient and quick way of reading signage, is to read it through braille.

So now let's think about elevators. In the elevator there's a lot that's going on. On the outside it's pretty simple, there are call buttons up and down and then there's the jamb sign, the elevator jamb sign, which tells you which floor you're on and it's in a tactile number and in braille. And the number is in contrast to the background of the sign that it's on and again is in contrast to the material that it's on. In general it's a white field for the sign.
This is exceptionally helpful when the elevator opens up and you can quickly reach out from the elevator, find the sign and confirm that you're at the right floor. My trick is to leave your foot in the path of the door to keep the door open until you know for sure you're at the right floor. Of course there is the option to add the audible features so it can call out the floor if you're there and it also assists those that are deaf blind so that if you can't see or hear you can always reach that and confirm that you're at the right floor.

When the elevator doors do open and you're on the outside there's an interesting and very helpful thing that happens, and this too is an ADA in California accessibility requirements. That's if the elevator is going up there's a single ding, if it's going down there are two, so it's really helpful especially if there's nobody else in the elevator. Inside the elevator there are, of course, all the call buttons to select the various floors that you want to go to, and it's required that these be signed in tactile, raised numbers and in braille and that they be directly adjacent to the button that it's assigned to.

Now if you're sighted and you push the button, that lights up. What happens if you're blind, how do you know? Unfortunately you don't, there's no requirement that it confirm that it has been selected and sometimes you think you've selected it and you might be there for a while, but eventually you give it another try and off you go.

Way finding is an interesting topic, the only requirement for great way finding is really focused on those with low vision, visual impairment where you have some remaining sight and the requirement has to do with how high off the floor it is, and that gives you the requirement for how large the letters should be.

And again, the letters are to be in contrast to the field that it's on, the background of the sign. In this case it no longer needs to be tactile, if it's up at the ceiling you're not going to reach it, you're not going to know that it's there, so it's a visual thing and the size of the letters are a function of how high off the ground the letters are located. It's important to keep in mind the background behind the sign, whether they're bright lights, a skylight, various things that could challenge the reading of the sign.

So whenever possible the background needs to be in contrast to the colors and values behind it and I'm often asked if way finding signage should be tactile, should there be braille? The challenge with way finding signage is that you don't know where it is, there's no real consistency, there's no pattern, there's no requirement of exactly where to find it. It's different than room signage that would always be located at the strike side of the door jamb, the way finding signage, it could be anywhere.

So as I always say, if you wanted to have braille way finding signage you need to have braille signs to lead you to the braille way finding signage. Egress maps are to be located at the exits from the space or the building. They're important to give you an idea of what's going on, and in the case of emergency to know where to go, how to exit the building, the exit route to get out. Of course this is best reviewed in advance of an emergency, as there's a lot of information and, quite frankly, it can be very challenging to read. Reading a tactile drawing, especially for someone not trained in drawings, can be really challenging so you really want to learn that in advance and not when you have flames racing up from behind you.

So is an egress map sufficient right at an exit door from a space? If it says Exit, is that all that you need? No, you should have an exit sign specifically saying Exit or Exit Route directly adjacent to the jamb of the door that's the exit, at the strike side of the door so in the event of an emergency you're not lost trying to read the entire egress map or figure out where the exit is, you merely find the sign or exit route and follow that.

So now I'd like to talk a little bit more about audible signals. As we discussed with the elevator, there's a requirement for the one ding or two dings to designate going up or going down, or the dings as you pass by floors as you move up or down within the elevator. That, oddly enough, is all that is required.

So what else could there be? In this case, how about the automated people mover? When you get to the end of the moving walkway, how do know when it's ended? Sometimes you might find it the hard way, when it stops and suddenly the ground is still. You can find that with a cane. But at some point you have to be pretty careful and really pay attention to it. And sometimes, you're in a rush.

So now you have the option of adding an audible signal at the end of the walkway, and I highly recommend this. It's good not only for the blind and visually impaired, but also those that happen to temporarily blinded by virtue of the distraction of dealing with the smartphone, catching up on text, on emails, or whatever as they walk down the automated people mover. This is helpful for everyone.

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A lot of people think that smartphones will solve everything and in fact they do a lot. There's no requirement for location services to help guide your way around the airports or other buildings, at least not yet, and in fact the GPS systems don't work within interior spaces. There are plenty of companies that are trying to solve that and develop systems that offer GPS navigational systems within built architecture, but we're not there quite yet.

So another form of messaging happens to be the hazardous warning strips. That's really just another form of message; if you can't see that you're passing from a safe area to a hazardous area the hazardous warning strips mark that delineation. When curb ramps were first installed it could be very confusing when you went from the sidewalk into the street, especially if it was a smooth transition. If it happens to be a steep ramp, a steeper ramp, it becomes more clear, chances are you could feel the difference between concrete and asphalt with the touch of a cane, but that's not always the case and sometimes it's the same material—it could be concrete along the walkway or if they're brick sidewalks you might have a brick crosswalk across the intersection.

The hazardous warning strip is a very significant tool for alerting people to the change from a safe environment to hazardous environment. The challenging thing to the hazardous warning strips at the curb ramp, however, is what's good for the blind and visually impaired actually causes some challenges for others and in particular in this case people in wheelchairs.

When rolling across truncated domes severe vibrations and jolts are sent through the wheelchair, it could be very painful in the spines, in the backs of people with spinal injuries. They can also be a tripping hazard for others, so the code attempts to balance these conflicting interests and concerns and in this case it's very important that we have the hazardous warning strips to alert the blind and visually impaired to the transition from the safe to the hazardous area.

I'd also like to talk a little bit more about the actual character of the truncated domes or the hazardous warning strips, they're rather exaggerated, perhaps more than necessary. You can feel that easily with a cane, in fact you can also hear it, it's very distinct when you hit it with a cane, it's unmistakable, you know what you're hitting, it's very clear. They're exaggerated to the extent that if you're a dog user, a guide dog user, you can feel it underfoot, you don't have the benefit of a cane to feel the truncated domes, to feel the hazardous warning strip, so it needs to be a little bit larger so that you can feel it through your shoe.

Also, the domes are yellow, that's a color that is more predictably visible to those with visual impairment. It's best, however, that that be within a contrasting field of concrete so that the yellow contrasts to the concrete that it's on. In the city of San Francisco there's a requirement that the concrete be a dark grey behind the yellow truncated domes and that dark grey is in contrast to the general concrete in the area around it. This is really effective in setting up the clear difference, the visual clarity, of where the truncated dome, the entrance to the crosswalk is.

The other thing that's helpful about that is it's a predictable sign for where the crosswalk starts, so it's very helpful to find that, to know where the crosswalk is. There's also the question of what to do when you have a blended transition, walking out of the building, in this case a fast food restaurant, and a parking lot. They didn't have a curb here, but instead they installed truncated domes or hazardous warning strips around the entire perimeter of the restaurant, otherwise there was no way to know when you step from the safe sidewalk area or a safe walking zone along the building and the actual driveway area.

This is a tricky subject and in fact it's a bit controversial, but it's not required by code. If you're an inspector, a certified access specialist, you may require it, you might suggest it but it's not a requirement. It is a helpful thing, though, to designate the line between a safe zone around a building and when you're entering into a parking lot. Another place where the hazardous warning strip is required is at the platform edge for mass transit. This is helpful so you can follow that along the edge and be a safe distance back from where the trains or buses move.

It's also helpful to keep people a safe distance back from the train or the platform edge. There's also a requirement to mark the location of the doors with a contrasting strip. There's also the requirement for a tactile tile that designates the location of a door. These tiles are more directional in their profile and they're in contrasting color; black to the general yellow hazardous warning strip, and they also protrude out further than the thickness of the hazardous warning strip. These will help you predict where the doors to the train or bus would be located.
So now I'd like to move beyond messaging and perhaps into a zone where it's the problem of no message whatsoever, it's the surprise and what often ends up being the "head smack." This is a fairly simple requirement, it's head clearance, it's a required clear area between the floor and any overhead projection. It could be a stair landing or any low lying structure or anything.

In general you need 80 inches of clearance from floor to any overhead element. In the past in California, it was required to be 84 inches. This is significant because if you're blind you don't know if there's an object in front of you until it's too late. There are those that use echolocation, a technique of making a noise with your mouth or perhaps even with the tip of your cane, and you can pick up on elements directly in front of you. This is most effective when using your mouth to make a clicking noise and you can hear a sound that comes right back to you, right at your face, when it's bounced off the surface in front of you. This, however, isn't used by everyone and it's a fairly difficult skill to master.

Also, guide dogs are trained to know their master's height. In those cases the guide dog will stop or guide you around the low lying element. If you're a cane user, however, if your cane is on the ground, it's great at finding objects and hazardous elements down low but it's not very good at finding things up above and people generally don't like it if you're walking around waving your cane in the air. So it's a fairly simple code and very simple requirement, however the significance of it is often misunderstood or minimized.

This is a stair landing that I found the hard way, it's actually in a building that I used to work in, and there are two passage underneath the stair landing. Many people like to just add potted plants or a bench but if it can be moved, they have a new janitorial staff, new operational staff, it'll get moved and once back from lunch and came in the alternate lobby from where I used to go and I walked straight forward to expect to find the stairs right in front of me.

What I found instead was the steel stringer for the landing right at head level. This, quite obviously, can be rather painful, rather surprising. You can break teeth, you can break a nose, you can cut your forehead, you might just bang your chest on it. Regardless, there's a requirement for a head clearance and clearly this does not meet that requirement, so what do you do?

Well, you need to have a cane rail underneath it or some other element that's permanent and fixed that prevents passage underneath the stair landing. Many people like to just add potted plants or a bench but if it can be moved, rest assured that it will. As soon as they have a new janitorial staff, new operational staff, it'll get moved and once again you have a head clearance issue, so it's important that those elements be fixed, solidly secured in position.

There's also a requirement that it not be too high itself. The cane rail or the detectable surface needs to be below 27 inches, this ensures it'll be found by the cane and found before you find it with your upper body or your face. This is a similar thing but it has to do with protruding objects off the wall. I spent a lot of time looking at this diagram before I lost my sight and in fact there are times when I feel like I've become this guy inside this diagram. And the interesting thing about it is it's a fairly innocent looking diagram but it's incredibly significant, it's very similar to the head clearance issue, in fact it's really the same thing.

In this case you're allowed to have a protruding object that extends no more than four inches off the wall if above 27 inches off the ground or below 80 inches. Anything beyond that envelope is a protruding object and again, it can be found with your body, with your arm, with your face, and chances are it'll at least be a surprise, if not a very painful encounter. Even a tree limb can be a protruding object if it's in the public way. Many suggest that you add a cane rail around the tree wells to protect these areas.

If you do this, however, and keep it low like many like to do, the problem is it creates a tripping hazard for everyone else. If you're blind and use a cane you'll find it but it's the others that will trip on it and fall. The cane rail should be located as close to the 27 inches as possible and certainly no more than 27 inches. Of course you do have the option of cutting off the tree limb, sometimes, however, the tree just leans into the space, which could require replacing the tree.

This is perhaps one of my favorite ones. I never suspected that once I lost my sight I would need to be on the lookout for giraffes sticking their heads out of stores. This is actually a problem, the diagonal, however, is an interesting challenge. Is it a head clearance issue or is it a protruding object? Actually, it's a little bit of both. If you think about the protruding object diagram the vertical is where the protruding object is gauged four inches off the vertical.

The information included in this transcript is provided as a general resource. Users of this information should conduct additional research, check their local building codes and verify all information before applying it to their practices or to specific circumstances.
If your diagonal sticks out beyond that zone outside of the safe zone so that it's not a protruding object, if it does that, it's a protruding object. If at any point along the floor you measure up and you have less than the 80 or 84 inches of head clearance, it's non-compliant with the head clearance requirement. This is an example of a fairly new building in which diagonal bracing was a significant structural element for the building, the problem is it created all sorts of head clearance or protruding object challenges throughout the building, there are lots of these.

Clearly they added some things later to deal with this problem. The challenge is, at best it only works in two dimensions on the drawing. If you approach it directly on, perhaps it would work; some of them do, some of them don't, there are lots of different strategies they came up with for providing a cane rail.

Most of them, however, exceed the 27 inches that's required off the floor, it's actually a maximum height of 27 inches. Virtually all of these exceed 27 inches so they don't comply. In other cases if you approach on an oblique you might find the structure before you find the cane rail, it could actually be further beyond so that you find the structure before the cane rail. The fact that they don't go to the ground decreases the chances that your cane would find it. I think they got a little creative trying to find a fun, interesting solution, but in fact they sort of missed the point.

And how about leaning walls? Are they protruding objects, do they limit your head clearance? Absolutely. If you walk towards this wall what do you find it with? Do you find it with your cane or do you find it with your head? If you're walking along it at some point you might find your head just rubbing up against the leaning wall, but if you're walking directly towards it you could find it with your forehead and depending on how fast you're moving that could be a pretty significant blow.
CHAPTER FIVE: OUTSights – Beyond the Code

So these are some issues that go beyond code, but I'll start with a diagram that you're probably familiar with, and that's the cane walking technique. And the significance of this is he's going pretty straight. The real challenge is how do you go straight? It's easy to do if you're sighted, it's not as easy if you're blind. If you're sighted you see the point across in the distance and you work towards it, it's fairly simple.

There are other systems that you use if you're blind. This became an issue in one of the first projects I worked on after I lose my sight, and in this case you needed to be able to walk from one side of the lobby to the other or to walk to the middle of the lobby to find the bottom of the stairs. This is an important circulation zone in a big space, it is very hard to know where to go. It's obvious if you're sighted, not so obvious if you're blind. This is another example but in this case it's for a bus platform and it has to do with how do you walk the length of this long bus platform to get from one side to the other to find your bus?

There's no solid surface to work with, no edge, no straight line to work with and in fact you can't really rely on sound, like the moving traffic to work with, since the buses are going in all directions around you. What we did is we found a place where there was a line that went straight up and down the length of the bus platform and a line that we could put in the ground, in this case an integrated tactile surface that you can find. It's not a hazardous warning strip, that would be confusing, it's something you can find with your cane, perhaps with your foot, but it's subtle, it's integrated and you can use it to walk the length of the platform.

Another issue is that if you're blind you actually tend to walk the edge, not the center of space, especially if you're new to sight loss. Again, back to the cane walking technique, it's very simple, just walk straight. But we need something to work with to do that. The technique we use is called shorelining, that's where you sweep your cane to a surface, an edge along the side of the walkway. It could be a curb, it could be the base of the building, it could be a change of surfaces in the paving pattern in front of you or it could be the edge of the sidewalk.

In this case, this is a building that's specifically for people getting surfaces rehabilitation training for sight loss, so all their students will be using this shorelining technique and will be walking the edge of the hallways, not the center. But in the initial design there was a structural system that had columns all along this corridor every 20 feet, so as you moved down the corridor shorelining, you would hit the column, go around it, get back to the wall, go down a little bit further, hit another column, go around it, get back to the wall.

That repeated throughout down this hallway. Not a particularly good thing to do for a building design for people that are blind and visually impaired and are learning to move around with the benefit of a cane without sight. In this case we were able to work with the structural engineers to reduce the size of the structure so that the columns could be more easily embedded within the thickness of the wall to create a straight line down the side of the corridor so you could move directly down the edge.

Interestingly enough, it's not just an issue for those that are blind and visually impaired, in this case it's for an assisted living center and there's a walkway along the side that provides a handrail for people that need a little bit more stability, they might have balance issues, agility issues and they can use the handrail to get safely down the walkway.

But then there was a column that interrupted that walkway, so it actually turns out that in this case it's not appropriate to have a column that interrupts the handrail along the perimeter, and perhaps a different structural system should have been used or the handrail could have been moved to go around the column. In this section called Find the Needle it really has to do with how you find things and in particular the front door. This actually happens to be the building that I was approaching in that first audio clip for this training session.

Walking down the street I could hear the sound change as the tapping sound went deeper and deeper to get to the front door and surrounded by this hard vestibule. This is very effective. In working with this building for an eye center we proposed to accentuate this. Looking at this section we proposed to add a canopy over the door that would extend and accentuate that acoustic difference.
We also proposed to integrate a tactile change in the surface of the sidewalk, so as a brick sidewalk you could have a stone paver that extends out from the door so that if you didn't notice the sounds or didn't pick up on them or if you have a hearing impairment you could feel the difference underfoot or through the touch of the cane. That stone paver was also to offer a visual contrast to the remaining field of the sidewalk around it. Also the canopy would accentuate the acoustic difference as you passed underneath the canopy.

CHAPTER SIX: SEE WHAT?

So now I'd like to shift gears a little bit, moving away from design for those with no sight or no functional sight, towards design for those with some residual sight or modest visual impairment or low vision conditions. In this case I call this section See What? This issue of can you actually see what's there?

You have some sight but is the sight effective in the environment with which you're in? In this section there will not be a lot of visuals, but after we go through a number of issues and topics there will be a few examples of some things that start to demonstrate the issues we're talking about and as we go through these things I'd like you to think about your designs, the projects you're working on now, and think about how your designs might be increasing or decreasing the visual acuity of people with visual impairments.

The first grouping of issues have to do with things on the floor, shadows, black spots, patterns, carpet patterns, floor patterns, stone patterns, wood patterns, glare either from light bulbs themselves or perhaps from widows or glare off the floor, a shiny floor, contrasting nosing strips. Another thing to think about are color schemes. When designing for people with low vision conditions I like to think of high contrast environments. It's basically taking the idea of high contrast for signage and taking it to an architectural scale.

What do you want to see, what do you need to see, can you find the door in the wall or find where the wall meets the floor, baseboard, doors in frames, other critical elements, critical edges? And then lighting, lighting is actually incredibly important for people with low vision conditions, the lighting should be indirect and it should be a high level of illumination and where appropriate it should be able to be personalized with task lighting. It could also be personalized with dimmers, window treatments.

And then there are transitions. This is perhaps a little trickier but it has to do with people that take more time for their eyes to adjust to different light levels, so rather than jumping from high levels of light to low, perhaps there can be transitions. Think about those matinees when you leave the theater and step outside, it takes time for your eyes to adjust. For people with visual impairments that can take much, much longer so providing a transitional zone can be very helpful.
So these images come from a project, a research project, that has to do with designing visual accessible spaces and what's interesting is it starts to illustrate a few of these topics that we just discussed. In particular this shows a concrete bench within a concrete plaza, we do that all the time. How many of you have done this? The challenge is that sometimes it's visible and sometimes it's not, it depends a lot on the character of the lighting at the moment. In bright sunlight it works just fine, the bright sunlight creates shadows and tone that accentuates the side vertical surfaces of the concrete bench form.

In lower, in hazy light conditions at dusk or on a cloudy day or on a foggy day, those edges become less clear, you can't see the vertical planes and the concrete lump, the bench, sort of hides in the concrete field. So rather than relying on light, on direct light or on sunshine to see this bench, how else could you provide contrast? What happens if you used a different color for the concrete or a different material?

Can you make the contrast predictable, reliable and permanent based on your design? This example is of a stair within a building that has time lapse photography to show the effect of the changing levels of light throughout the course of the day and at different times of the year. In this case it's showing it with clear vision, 20/20 vision. This is the same stairwell in the same building in the same times but simulating levels of visual impairment so that you can see the difference of high contrast or the lack of contrast for the architectural form, or perhaps shadows, shadows that all of a sudden seem fairly scary or ambiguous or not quite clear what they are.

This environment goes from being very predictable with sight to be very confusing and very inaccessible for those with low vision conditions. So as you look at this I'd like you to think about your projects, the work you're doing right now, the work you'll do in the future. How can what you design address these issues, how can you design for better light control, better glare control, better contrast? How can you make those stairs more visible in this space in better controlled glare?

Target practice, this happens to be one of my favorite subjects. In all the development that has gone into accessible bathrooms I happen to be the one that slipped through the cracks. I'm 6'4" and I'm blind. When coming up with accessible urinal design I don't think they had any idea that I would come around. For the accessible urinal design they tend to be smaller and lower to the ground. If you're 6'4" and blind and a guy, that's not what you want, so how do you find the urinal if you're blind?

Well, you can use your cane to find the base of the urinal or perhaps the partition between the urinals. Then you have to home in a little closer, where is it on the wall? You can't use your cane for that anymore, now you've got to use your hands. And you can start high and find the plumbing, the valves that come out the top and work your way down, that's generally pretty safe. The lower it goes, though, the more information you need to know and the more treacherous it gets to be.

If you're adventurous you might go for it anyway but then the only way to know if you're on target is the acoustics; are you hitting water, are you hitting the wall, are you hitting your shoe? So in general I'm in favor of big urinals, the biggest ones you can get, get them high on the wall. You do need to provide at least one, based on the code requirement, require a few for the accessible height, but the others could be larger, so bigger is better. Otherwise, keep me in mind the next time you lay out the urinals in your bathrooms.
CHAPTER SEVEN: CONCLUSION

So in conclusion design can make a difference between disability and handicap. The significance of that is that a disability is something you can deal with, you have the ability to get around, to function, to have an active, normal life. Design, however, can make that impossible, it can create barriers, it can exclude, it can create situations that you can't get past if you have a disability. So in that case your disability actually becomes a handicap.

And secondly, the tendency is to design and then check the codes later. That typically doesn't work; it's important to know your accessibility requirements as you design, before you design, to integrate it into the way you think, the way you design as you approach the projects. It's also important to think differently about people with disabilities. We like to think about us versus them or for people with disabilities as being separate from us, but in fact it's actually normal, disability is a normal part of the human condition so why separate it?

One day I was out riding a bike in the Oakland hills, two days later I had surgery and a couple days later I was blind. So same person, just a few days later. This could happen to anybody, in fact I've heard it said in the disability community there are really only two types of people: there are those with disabilities and those that haven't found theirs yet, and in that regard we should just drop the delineation. It's not us versus them, it's simply us.

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