Design Solutions for the Low-Vision Population

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Rehabilitation
The first steps to improve quality of life for a low-vision person are a series of rehabilitation techniques. Since low-vision often worsens over time, many adults may have adapted themselves to their vision loss without seeking the help of a professional who can give them tools and techniques to navigate the visual more safely and satisfactorily. Some of the tenets of vision rehabilitation are:

- **Magnification**
  - Physically bring objects closer.
  - Use optical devices to bring virtual images closer.
  - Use electronic aids to enlarge images.

- **Illumination/Contrast**
  - Improve the contrast of existing images.
  - Colors enhance contrast with different disease processes.
  - Most patients don’t use the right illumination, even if they have the right low vision aids.

- **Training**
  - Visual performance is a learned activity.
  - Understanding the basic concepts of the low vision aid.
  - Physical barriers to success.

- Add eccentric viewing.
- Social and psychological services.
- Rehabilitation services.

Suggested Guidelines:

- **Increase light levels!!!**
  - Provide light levels adequate for the task.

Exteriors:

- Bollards should be a minimum of 1 m high, and color contrasted with the background against which they will be viewed. They should also have a contrasting band near the top.
- Street furniture should be color contrasted with background—and offset from the main pedestrian route where possible.
• Provide contrast at exterior ramps and curbs to denote an elevation hazard and define edges.
• Darker value surfaces reduce glare.

Entrances:
• If there are steps, add a ramp, or signage to the nearest accessible entrance.
• 36” Clearance at doorways.
• Threshold edge ¼” or less or beveled edge ¾” or less.
• Handles – no higher than 48”.
• A min. 3 sec. timer on automatic door closers.
• Highlight glazed doors and side panels with prominent signs, logos or decorative features at eye level.

Carpeting and Mats:
• Max ½” high or less.
• Low pile.
• Tightly woven.
• Secured along edges.

Ramps:
• Slope 1:12 or greater (1:20 is better).
• Longer than 6’ – railings on both sides.
• 36” clearance.
• Non-slip surface.
• No more than 30” rise between landings.
• Landings 5’ long and level.

Route of Travel:
• No stairs.
• Firm, slip-resistance surface.
• 36” wide.
• Protruding objects detectable using a cane must be: within 27” of the ground or above 80”, or protrude less than 4” from the wall
• Objects that protrude beyond the plan of the wall should be of a contrasting color.
• Provide consistent levels of illumination in circulation zones.
• Eliminate extra noise and distracting sounds/echoes.

Emergency Egress:
• Both flashing lights & audible signals.
• Improve light level requirements.

Signage for Goods and Services:
• If above 80” AFF, letters should be 3” high and the information should be repeated at eye level for greater accessibility.
• Must comply with legibility regulations unless temporary or building directory.
• Non-glare finish, egg-shell or matte.
• Signs should be consistent, using prescribed typefaces, colors and graphics.

Vertical Circulation – Stairs:
• Uniform treads and sizes & riser heights.
• Nosing overhangs minimal.
• Handrails on BOTH sides.
• At stairs, increase the contrast between the risers and treads as well as between the handrail and the wall.
• At escalators, contrast the landing leading to the moving stairway. Provide user controls to slow stairway speed.
• Provide 2” wide contrasting nosings on stairs.
• Provide color contrast between stair tread and riser.

Vertical Circulation – Elevators:
• Must be on accessible routes.
• Automatically self leveling.
• Call buttons should be centered 42” AFF, and a min. ¾” diameter.
• Call buttons should be light numerals on dark backgrounds with high contrast.
• Provide adequate lighting, or lit buttons on control panels to enhance visibility. All buttons should be lit at all times. Temporary increase of lighting at control panel.
• Contrast threshold and door jambs to adjacent surfaces.
• Provide distinguishable auditory signals.
• Provide a protective door reopening device.

Glare
• Provide glare control:
  o Shades, drapes, and blinds
  o Changing the type and position of artificial light
  o Shields around monitors
  o Cubicle barriers
  o Focused vs. indirect light
  o Tinted glasses
  o Hats, visors

Daylighting
• Provide shielded sources of illumination.
• Control glare.
• Exterior Sunshades at windows and openings.
• Tinted glass, or light affected tinting/polarized coatings.
• Design to control light.
• Go back to basics:
Building orientation
- Planned fenestration
- Holistic design

- High light levels while avoiding glare.
- Provide artificial light sources with suitable controls to counteract the changing light levels in day lit spaces.

**Artificial Lighting**
- Aim for uniformity of illumination in circulation zones, avoiding strong shadows. This can be done while still providing visual interest.
- Provide sufficient general lighting.
- Provide increased task lighting.
- Provide transition light between spaces (like lights in tunnels on highways).
- Provide multiple lighting combinations and controls to accommodate for changing light needs throughout the day. Especially in transition zones.
- Lighting controls save energy and allow for changing light levels.
- Provide indirect lighting with appropriate light cut-off angles. Or direct-indirect lighting for increased illumination with uniform lighting levels.
- Coordinate fixture placement to avoid direct and reflected glare, and shadows.
- Provide high color rendition light sources.
- Evaluate color temperature of light sources within and environment.

**Contrast Sensitivity**
- Increase “visibility” with high contrast.
- Reduce camouflage and visual clutter.
- Use contrasting colors at edges of doors and cased openings to distinguish them from the surrounding walls.
- Contrast toilet seat to remainder of toilet or surrounding materials. Large flush handle contrasted to toilet.
- In a shower room or bathroom, contrast the handrails to the wall and floor materials. Contrast accessories as well.
- Contrast handles at doors to door color.
- Light switches should be color contrasted to background.
- Use value contrast where vertical and horizontal surfaces meet.
- Use contrast to make furniture “visible” in an open space.
- Color contrasting wayfinding in finish materials can help direct circulation.
- High contrast accents on equipment like stovetops can help low-vision users safely use the equipment independently.

**Fixtures/Finishes**
- Use tactile/visual surfaces for flooring.
- Signage:
- Consistently placing signage in large print and Braille.
- Reverse contrast is best for signage (white on black).
- Provide signage that is solid at floor level, not post supported or tied to ropes.
- Provide adequate lighting at signage so that it is not shaded when someone leans in to see it.
- Consider supplementary auditory signage.
- Use colors to identify different areas of the building plan and coordinate with signage.
- Keep signage within the cone of vision, repeat overhead signage at a lower elevation where a user can approach it closely to read.

- Use matte surfaces or polarized coatings to prevent reflections.
- Use light colors on walls and ceilings to increase the light reflectance value.
- Use tonal or decorative features at corners to identify them.
- Use floor patterns to complement the circulation path.
- Use tactile surfaces for flooring to help identify changes in the circulation path.
- Provide a material or color change at worksurfaces edges.
- Contrast furnishings with floor materials, or us pattern to enhance the shape of furniture.
- Avoid over-furnishing public spaces.
- When using glass doors, countertops, and free standing display cases be sure that they are well defined and don’t have “invisible” edges.
- Lower cabinets so stored items are closer to the visual field.
- Provide single handled faucets plus a separate hot-water tap for safe usage.

**Building Layout and Design**

- Environments that optimize the use of vision all users to:
  - Travel safely and efficiently through and environment.
  - To perceive the spatial layout of key features in the environment.
  - To keep track of one’s location in the layout.
- Use environmental organization to promote wayfinding:
  - Corridors that line up, and flooring changes at circulation nodes.
  - Use logical, consistent layouts in building design.
  - Keep floor plan organization constant from floor to floor.
  - Organize essential building elements such as elevators, restrooms, and egress stairs together and position at central locations for easy navigation.
- Create circulation areas without curves or non-right angles.
- Keep busy waiting areas separate from circulation areas.
- Increase safety:
  - Steps, stairs, drop-offs
  - Changes in surface elevation
  - Transitions in surface texture
- Alternative signage can be part of an overall solution.
- Make the entrance easily identifiable.
• Provide a place to sit and rest near the building directory.
• Avoid visual business in the lobby:
  o Create direct access to reception/information desk.
  o Avoid large or busy patterns in flooring.
• Avoid corridors with alternating dark and light areas.
• Use color and architectural features to create “landmarks” and promote spatial orientation.
• Eliminate extra/distracting sounds or echoes.

There are a number of other guides and resources for designing for low-vision accessible spaces that could be utilized as a springboard this committee’s discussions. A few of the suggested references are:
  o Building Sight: A handbook of building and interior design solutions to include the needs of visually impaired people. JMU Publication. 1995
  o ANSI RP-28-07 Standard developed for Senior Living.

Contributing workshop members include: Suleiman Alibhai, OD; Debra Babcock, PMP; John Brabyn, PhD; Robert Dupuy, LC, IALD; Mairana Figueiro, PhD; Vijay Gupta, PE Fellow ASHRAE; Jeanne Halloin, IES; Mary Ann Hay, IALD, LEEP AP; Earle Kennett, AIA; Kurt Knight, PE; Greg Knoop, AIA; Dr. Fredrick Krimgold; Robert Dale Lynch, FAIA; Robert Massof, PhD; Mark Mazz, AIA; Marsha Mazz; David Munson, IALDAFF; Eunice Noell-Waggoner, IES, LC; Roberta Null; Priscilla Rogers; Tom Sachs, AIA; Erin Schambureck, IIDA, LEEP AP; George Sexton, III, IES, IAID; Dennis Siemsen, OD; John Sporidis, PE; Cheri Wiggs, PE; Tom Williams; James Woods, PhD, PE, Fellow ASHRAE.