

## 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:
  - Shades, drapes, and blinds
  - Changing the type and position of artificial light
  - Shields around monitors
  - Cubicle barriers
  - Focused vs. indirect light
  - Tinted glasses
  - 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 use 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:
  - Create direct access to reception/information desk.
  - 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:

- Building Sight: A handbook of building and interior design solutions to include the needs of visually impaired people. JMU Publication. 1995
- ANSI RP-28-07 Standard developed for Senior Living.

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