



Innovation Key
to Ease-of-Use
and Accessibility



Synopsis

A major focus of manufacturers in recent years is developing products that assist this aging population as they transition to the next phase of their lives.

Residents over the age of 50 are the fastest growing segment of the housing market. They are also a wealthier, more active group than past generations. Only five percent of the population over age 65 live in nursing homes, preferring instead to age in place as well as live safely, independently and comfortably regardless of age or agility level. Boomers seek products that help them enjoy their homes and make for easy living. However, the youthful boomers do not want products that appear geared for senior citizens or the elderly.

In 2008, Milgard Windows & Doors submitted its vinyl windows to an independent lab for ease-of-use testing. A favorable review paved the way for the company being recognized by the Arthritis Foundation and Industrial Designers Society of America (IDSA) for the ease-of-use and excellent design of the SmartTouch™ lock. All Milgard products and features are inspired by those who will be using the product – the windows make for easy living, have little to no maintenance and are universally accessible.

This paper highlights key elements in the housing market concerning the aging population and those with arthritis. It also provides steps to meet this growing demand and the role Milgard Windows & Doors' products play in helping builders and architects meet their needs.

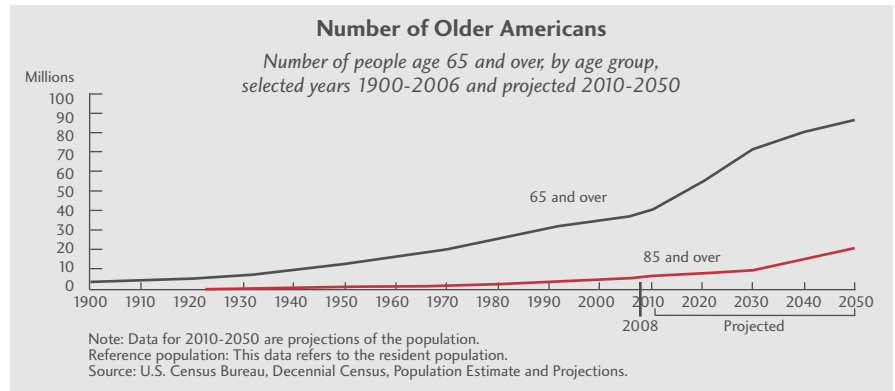
What is universal design?

The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The intent of universal design is to simplify life for everyone by making products more usable by as many people as possible at little or no extra cost, benefitting people of all ages and abilities.

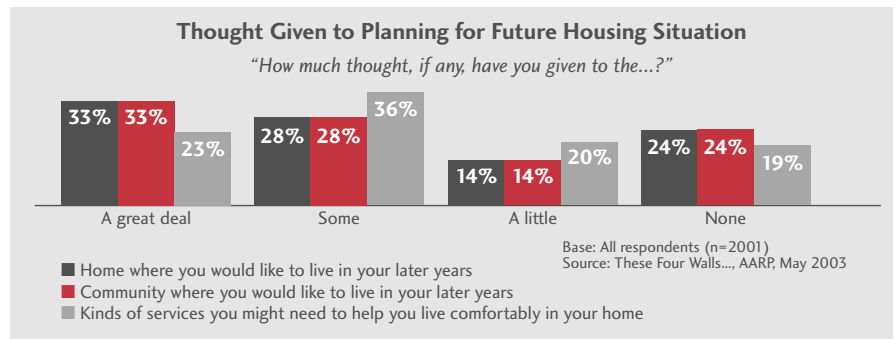
— *The Center for Universal Design at North Carolina University.*

A Market Segment In Need of Easy to Use and Innovative Products

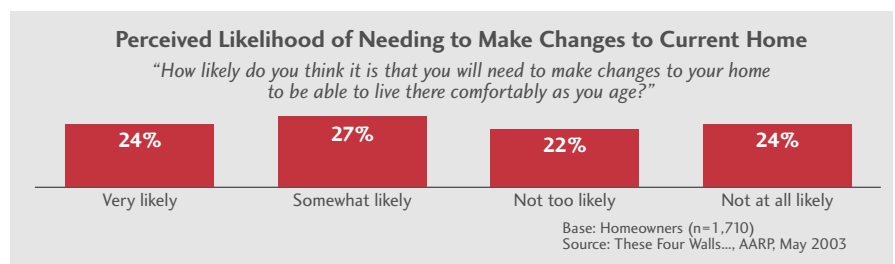
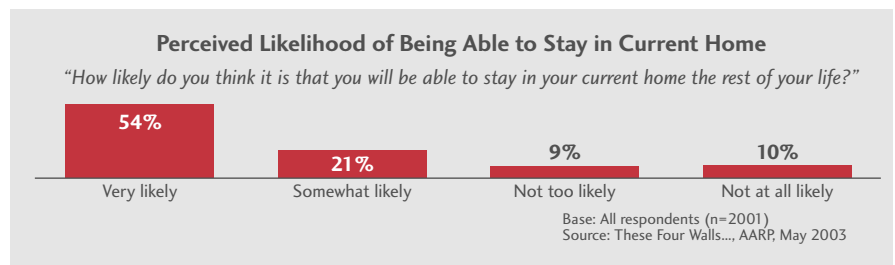
A baby boomer turns 60 every eight seconds, and this generation has a history of setting trends. It's no wonder that residents over the age of 50 are the fastest growing segment in the housing market. They have established themselves as a dominant player in the industry, and are now prepared to make their homes a priority. Boomers prefer to age in place as well as live safely, independently and comfortably regardless of age or agility level.



Research conducted by the AARP, *These Four Walls...Americans 45+ Talk About Home and Community*, shows that six in 10 people over the age of 45 have given a great deal or some thought to the kinds of services they might need to help them live comfortably in their home. Clearly, potential housing needs are on the minds of the 78 million baby boomers entering the next phase of their lives.



75 percent of those aged 45+ think it is at least somewhat likely they will be able to stay in their current homes for the rest of their lives, and over half recognize the need to make changes to live comfortably in their homes as they age.



Enjoying the Home with Universal Design

Sixty-three percent of boomers want time to truly enjoy their homes. In fact, this audience sees its home as a priority above or equal to spending time with grandchildren.* Previously sandwiched between children and aging parents for decades, boomers are ready to put themselves first. Investment in their homes is symbolic of this priority.

About one in three boomers are worried about caring for their home as they age, and are realistic enough to recognize a desire for homes with low upkeep and limited necessity for maintenance services.

As an active generation transitioning into the next phase of life, this group seeks products that make aging in place a reality. Universal design features and products designed to help people age in place are of growing interest to the baby boomer audience.

* Hanley Wood Study, 2007.

The Hanley Wood study established different ways of describing universal design features, and the direct approach hit home. Boomers expressed the most interest in universal design features that were said to:

1. Help them live independently.
2. Make it easier for them to live in their home as they age.

Described in these terms, universal design appealed to more than 75 percent of boomers surveyed.

Research compiled by the Partners for Livable Communities explains that housing options that make the home accessible without carrying the stigma of “elderly” is a necessity. Universal design features are neither difficult to build into new homes, nor do they negatively affect the appearance or curb appeal of a home. Many residents do not recognize the importance of such features until they find themselves physically impaired in some way.

Providing Innovation and Ease-of-Use

1. Easy living – Consumers seek innovation that simplifies products and make for easy living. Innovation is not always technologically savvy.
2. Expand ease-of-use to low or no maintenance – Ease-of-use goes beyond operation. Products should also be designed with low to no maintenance in mind from two standpoints. They should require little repair, if any, and service should be in place to fix any potential mishaps in a timely and efficient manner.
3. Universal product features – Products should be designed to meet the needs of all consumers, not just those with accessibility issues. The aging population, as well as those with physical limitations, is a good benchmark to meet. It is important to provide aesthetically pleasing design for the general population with ease-of-use benefits.

Principles Put Into Action

The demand for ease-of-use solutions is evident, but builders, contractors and architects need a way to differentiate products. In the case of Milgard, products were submitted to an independent testing lab where they received a favorable recommendation.

Testing process

Product samples of Milgard vinyl windows, which specifically featured the SmartTouch™ lock, were submitted to the nonprofit Accessibility Evaluation Facility at the Georgia Tech Research Institute for testing. The purpose was to determine the accessibility and ease-of-use of the windows for people with arthritis, the greatest contributor to mobility and dexterity limitations, as well as the largest category of functional limitations. Evaluations featured two types of activities: a checklist evaluation of items that lend themselves to inspection, observation or direct testing, and a second evaluation consisting of a user study with participants who suffer from varying degrees of functional ability and arthritis.

Checklist evaluation

A Human Factors Expert inspected the product and performed a checklist evaluation to assess compliance with ease-of-use guidelines tailored for individuals with arthritis. All Milgard windows received a pass rating on the nine items on the checklist evaluation, with the exception of one window on guideline one.

Guidelines

1. Verify that at least one mode of operation that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided.
2. Inspect each aspect of the device and verify that key instructions for product assembly and use are provided directly on the device.
3. Inspect the product to ensure that the product is easy to grip and control. The shape of the control should be easy to hold, so that it fits the hand. There should also be a texture to the control so that it can be gripped and held onto.
4. Verify that users are not required to maintain a certain position or hold down a control for a long period of time.
5. Verify that interaction with the product does not require simultaneous actions such as pulling and rotating.
6. Verify that the requirement for constant, uninterrupted actions is minimized by investigating the required actions for each control.
7. Offer redundant modes of operation utilizing the next larger set of motor movements (finger to hand, hand to arm, arm to foot). For example, design a door lever to turn with one's arm if it can't be turned using the hand. And if one's arm can't open it, design it so one can use one's hip. Offer different ways to accomplish the same task using increasingly larger motor movements.
8. Verify presence of definitive feedback cues (control positions should 'snap' into position).
9. Verify that operation of the product does not violate standard conventions (clockwise for on or increase, counterclockwise for off or decrease, up for on or increase, down for off or decrease).

Pre-User Study

Prior to user study testing, each participant performed a series of tasks designed to measure hand strength. The windows were tested on technical aspects including the grip strength, pinch force and static force necessary to open the window. Grip strength and pinch force data were collected using standardized instruments commonly used in rehab or medical settings. The measurements provided an idea about the functional capacity of participants. Since arthritis is asymmetrical and highly variable, the lab collected functional abilities data prior to every product evaluation.

The static force measures were specific to the products tested for Milgard. Researchers wanted to know how much force participants could apply to the windows (both opening and closing actions) without experiencing pain irrespective of the actual forces required to open or close the windows. The static measurements provided an estimate of each participant's pain threshold.

An operating force assessment was also performed using a specialized gauge, where windows were unlocked, opened and closed. The average force required to unlock the SmartTouch™ lock on all four windows was low — less than 3.5 pounds of force.

User Study

The second part of the study included a group of participants with differing levels of arthritis conditions. During task analysis, the following activities were performed based on the window model:

- Slide bottom sash all the way down to fully close and lock window.
- Slide bottom sash halfway down.
- Slide bottom sash up to fully open window.
- Slide bottom sash up to open window halfway.
- Slide sash to the left to open window halfway.
- Slide sash to the left to fully open window.
- Slide sash to the right to close window halfway.
- Slide sash all the way to the right to fully close and lock window.
- Unlock window.

Of the windows tested, the overall ease-of-use averaged above four out of five.

Evaluation

In order to receive a favorable recommendation from the Georgia Tech Research Institute the product must pass the following criteria:

- Receive a “pass” rating on all of the checklist evaluations.
- 60 percent of the users must be able to perform the tasks associated with product use with little or no difficulty.
- No more than 10 percent of the users should experience great difficulty while performing the tasks associated with the product use.

Testing indicated the products meet and exceed the needs of most of those with arthritis. Users asked to participate in the evaluation of the windows were satisfied with their ability to interact with the product, indicating the SmartTouch™ lock was a significant improvement over other window locks they used in the past. The majority of arthritic users in the targeted demographic will be able to successfully use the windows. Common observations regarding product interaction include:

- “The SmartTouch lock is very easy to use.”
- Users “prefer the SmartTouch lock over other window locks they had used in the past.”
- Users liked “how windows automatically locked when they were fully closed.”

Both the checklist evaluation and user testing indicated the products will be easy to use for most individuals with arthritis – earning the Arthritis Foundation Ease-of-Use Commendation.*

* Less common large size single hung windows may not be easy to operate for a certain percentage of the population with arthritis even with the assistance of the SmartTouch lock due to the weight of the larger window. Ask your Milgard Sales Rep for more information.

“Performing even the most simple tasks, like securing a window, can be extremely difficult when someone has arthritis,” said Scott Walters, group vice president for corporate relations with the Arthritis Foundation. “By awarding the Ease-of-Use Commendation for innovative designs, we hope to encourage manufacturers to think universally when developing products. If a product is easy to use for people with arthritis and other physical challenges, it will be easier for all consumers.”

Putting Innovation into Action for Consumers

Milgard takes pride in its customer-first approach to innovation. All Milgard products and features are inspired by those who will be using the product. With innovation like the SmartTouch™ lock, Milgard continues to move forward, responding to consumer needs for products that are easy to operate and require little to no maintenance. With a focus on ease-of-use, Milgard has been recognized by the Arthritis Foundation and the Industrial Designers Society of America.

Milgard vinyl windows were tested to meet Arthritis Foundation Ease-of-Use Commendation standards in an effort to provide windows that are universally accessible. Although easy to use products are in great demand by the aging population, it is equally important to design products that are aesthetically pleasing and provide peace of mind for the general population.

Not only is the lock easy to use, but it makes for stress-free living. Milgard windows can easily be opened and closed with a single touch, and have a history of little to no repair. If issues do occur, Milgard has regional manufacturing plants to provide replacements with limited lead time directly from the plant without going through a dealer.

While Milgard is excited to have met the Commendation benchmark, it is equally pleased that their windows are accessible by most people with functional limitations. Features of some Milgard products that meet the Americans with Disabilities Act accessibility guidelines developed by the Department of Justice include:

- Door and window handles are easy to grasp with one hand and do not require tight grasping, tight pinching, or twisting of the wrist, requiring less than five pounds of force to operate.



- Hardware required for accessible door passage can be mounted below 48 inches from finished floor.
- 32 inch door openings at 90 degrees, measured between the face of the door and the opposite stop.
- Optional electronic operators on casements, awnings and skylights.

In addition, the lock is tested to ASTM Standard E-588, passing a Grade 20 – exceeding the modified Grade 10 California forced-entry requirements by 25 percent, which are known to be among the most rigorous codes in the nation.

Milgard also received a 2008 Bronze International Design Excellence Award (IDEA) from the Industrial Designers Society of America. The SmartTouch lock was recognized for its innovative design and having a positive impact on quality of life – a great example of innovation for ease-of-use.

About Milgard

Milgard Windows & Doors, a Masco company based in Tacoma, Wash., offers a full line of aluminum, vinyl and fiberglass windows and patio doors for builders, dealers and homeowners. The company has been recognized for manufacturing the nation's highest quality vinyl windows six times in a yearly survey sponsored by Hanley Wood Inc., publishers of Builder magazine. Milgard employs approximately 3,500 people nationwide. For more information, visit milgard.com or call 1.800.MILGARD.

Resources

AARP, *These Four Walls . . . Americans 45+ Talk About Home and Community*. Washington, D.C., 2003.

Hanley Wood Marketing. *Every Eight Seconds: American Housing As Boomers Turn 60*. Minneapolis, MN, 2007.

National Association of Home Builders. *Certified Age-in-Place Specialists*. www.nahb.org.

Partners for Livable Communities and National Association of Area Agencies on Aging. *A Blueprint for Action: Developing A Livable Community For All Ages*. Washington, D.C., 2007.

The Center for Universal Design: North Carolina State University. *Environments and Products for All People*. www.design.ncsu.edu.

SmartTouch™ is a trademark of Milgard Manufacturing, Inc.



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