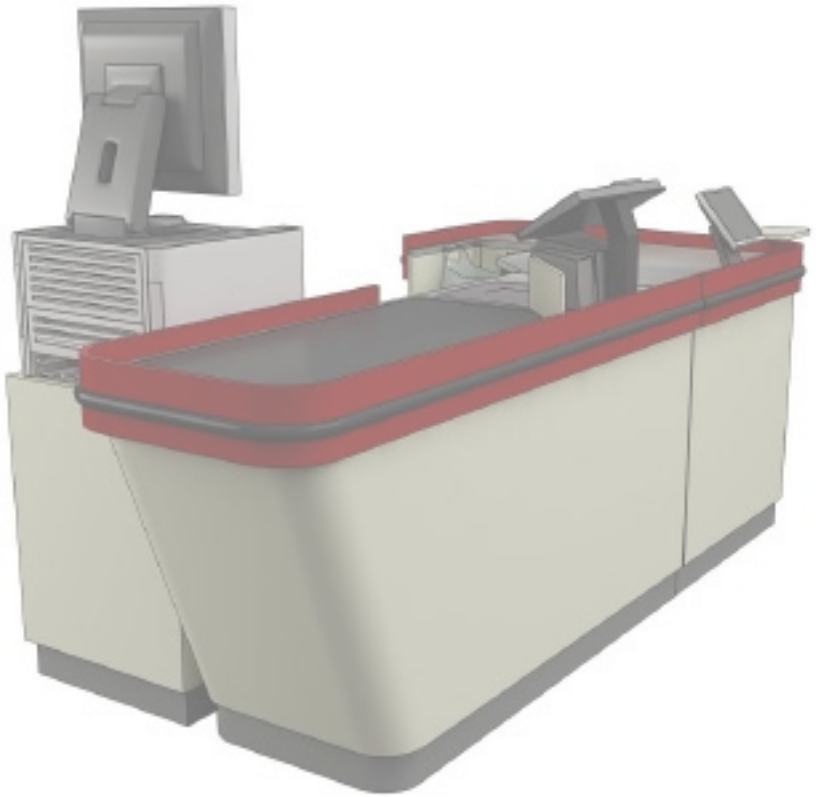
Grocery Checkstand Design

Guidelines & Resources



cdea

Georgia Tech College of Architecture

WORK rerc

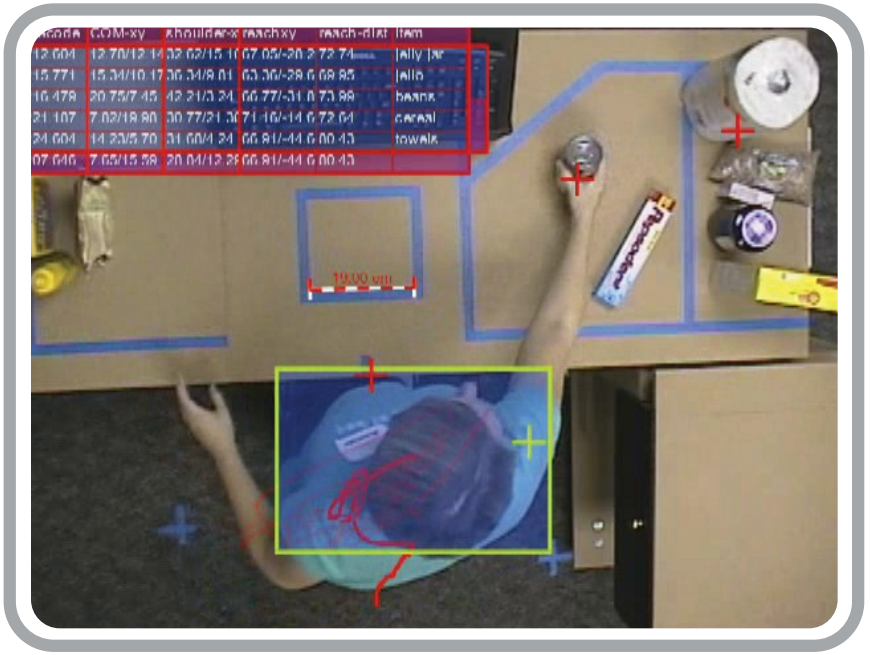
Introduction

Research shows that current grocery retail employees are experiencing difficulties related to long-term use of certain checkstands. Some checkstand designs are so difficult to use that they create a physical barrier to safe, efficient work and for some, employment in this industry.

Better design in grocery checkstands has the potential to reduce injury, decrease training time, decrease employee turnover, increase accessibility, increase productivity, increase diversity of possible employees and improve the overall experience for employees and customers.

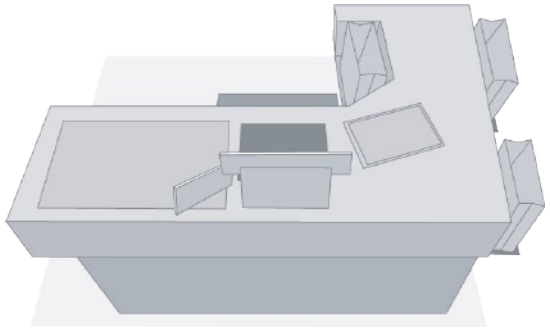
The purpose of this document is to provide information that can be used to design, develop, test, refine and evaluate new universally designed grocery retail checkstands in order to maximize independence and participation of people with disabilities in the workplace.

This guide contains information compiled from comprehensive review of current publications and relevant legislation as well as first-hand data collected by a multi-disciplinary research team comprised of individuals from the fields of industrial design, social science, engineering and occupational therapy.



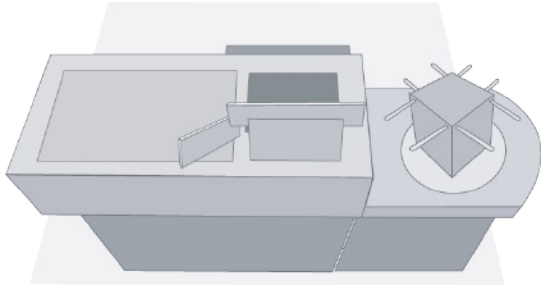
Current Issues in Grocery Retail

Angled Outfeed



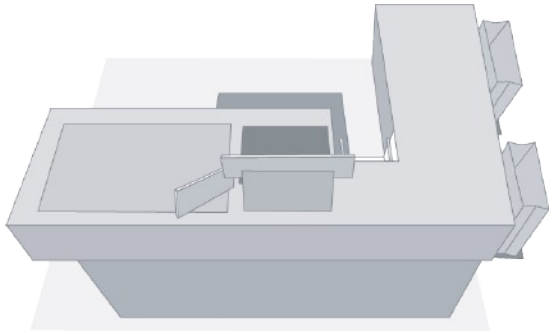
- Minimizes cashier reach after scanning
- Eliminates item build-up near scanner

Carousel Bagging



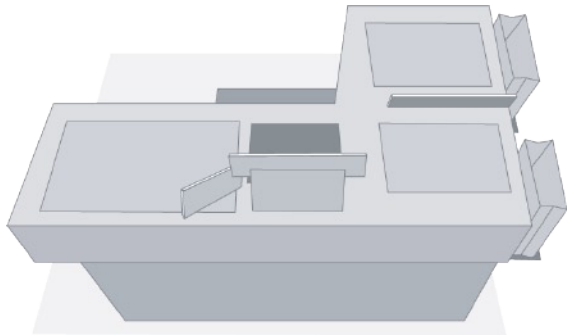
- Multiple bagging areas
- Encourages customer assistance

Scan-Bag-Pass



- Incorporates drop-in bagwell after scanner
- Requires lifting full bags

Multi-Belt Outfeed



- Allows multiple customers
- Encourages self-bagging

Employee Concerns

Cashiers work 7.5 hours per shift at checkstands (average):

-5 hours - scanning & weighing items
-0.5 hours - cleaning scanner window
-2 hours - key pad entry

Cashiers move wrists back & forth up to 600 times per hour.

Cashiers may handle more than 6000 pounds of groceries (8 hrs).

25% of new hires quit in first month.

1/2 of new hires leave in first 97 days.

Less than 30% employees stayed for over one year.

Average cost to replace a grocery store employee making $7/hr:
$3,000 - $4,000

Universal Design

Universal Design Guidelines serve as an effective general framework for optimizing checkstand design. Given the varied physical and experiential characteristics of employees and customers, it's important to think about making checkstands universally usable. Specific techniques for implementing these guidelines will be illustrated in the following section.

- Principle One: Equitable Use The design is useful and marketable to people with diverse abilities.
- Principle Two: Flexible Use The design accommodates a wide range of individual preferences and abilities.
- Principle Three: Simple and Intuitive Use The design is easy to use and understand, regardless of the user's experience, knowledge, or current concentration level.
- Principle Four: Perceptible Information The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Principle Five: Tolerance for Error The design minimizes hazards and adverse consequences of accidental or unintended actions.
- Principle Six: Low Physical Effort The design can be used efficiently and comfortably and with a minimum of fatigue.
- Principle Seven: Size and Space for Approach and Use Appropriate size and space is provided for approach and manipulation regardless of the user's body size, posture or mobility.

ADA and OSHA Guidelines

The Occupational Safety & Health Administration (OSHA) issued an ergonomics guideline for the retail grocery store industry on May 28, 2004. It provided general information on workstation considerations that can reduce employee injury risk factors. A few example guidelines from OSHA are:

Use a "sweeper" to move items on the conveyor within the checker's reach"

Place cash register displays at or slightly below eye level

Keep reaches within the preferred work zones.

The Americans with Disabilities Act of 1990 (ADA) protects the rights of people with disabilities. The ADA Accessibility Guidelines (ADAAG) serves as the basis of standards issued by the departments of Justice and Transportation to enforce the law. A few example guidelines from ADAAG are:

Section 4.2.5: The maximum high forward reach allowed shall be 48 in (1220 mm). The minimum low forward reach is 15 in (380 mm).

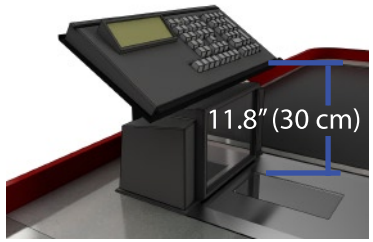
Section 4.2.6: The maximum high side reach allowed shall be 54 in and the low side reach shall be no less than 9 in above the floor.

Section 4.4.1: Objects projecting from walls with their leading edges between 27 in and 80 in (685 mm and 2030 mm) above the finished floor shall protrude no more than 4 in (100 mm) into walks, halls, corridors, passageways, or aisles.

Objectives

Reduction of Cashier Injury 1

- Minimize twisting & heavy lifting
- Optimize work surface heights
- Deliver items to safe work-zone

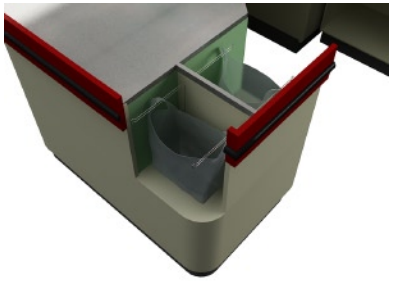


Increased Accessibility 2

- Integrate clear knee & floor space
- Incorporate height adjustment
- Provide multiple modes of input

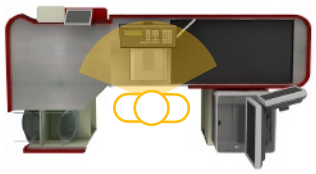
Improvement of Interactions 3

- Encourage customers to participate
- Create a team-oriented environment
- Leave space for co-worker assistance



Maintain Efficiency 4

- Minimize keypad entry
- Improve payment processing
- Facilitate accurate code look-up
- Reduce bagging accumulation



Decrease Training 5

- Reduce complexity of operations
- Provide clear task guidance

Easy to Install and Upgrade 6

- Develop modular systems
- Provide access to internal components
- Allow easy technology upgrades

Employee Side

1 Reduction of Cashier Injury
2 Increased Accessibility
3 Improvement of Interactions
Maintain Efficiency 4
Decrease Training 5
Easy to Install and Upgrade 6

Height of Peripherals

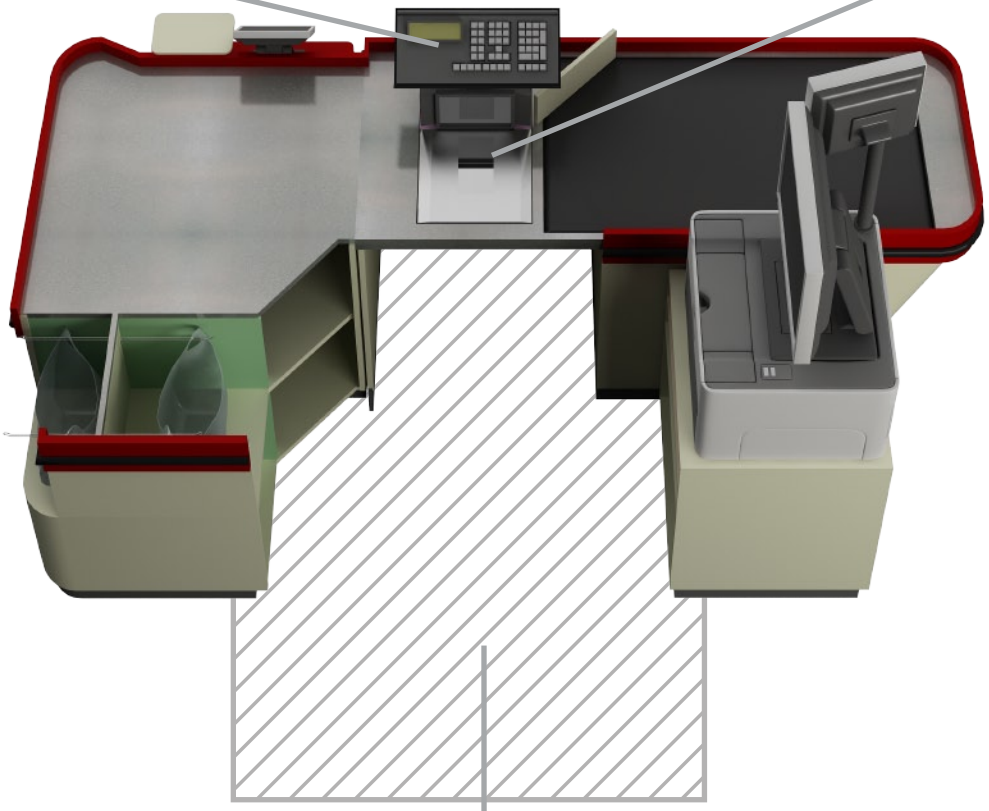
2 3 4

- Maximum: 11.8" (30 cm) from work surface.

Work Surface height

1 2 4

- Lowest: 10.5" for 5th percentile seated user
- Highest: 45.3" for 97.5th percentile standing user.



Adjustable height bag stand

1 2 4

- Bag tops should be just below the conveyor height

Viewing Angle of Displays

1 2 4

- Maximum: 30 degrees above user line of sight
- Minimum: 30 degrees below user line of sight

Seated Clearance and Access

2 3 4

- Floor space: 30" wide x 48" deep.
- Knee space: 27" high.
- Toe footrest space: 10" high x 6" deep

Minimum Turning Space

2 3 4

- 60" (152.5 cm) wide with knee and toe clearance.

Maximum Required Reach

2 3 4

- Front: 14.3" at 90 degrees
- Side: 9.14" at 90 degrees

Customer Side

1 Reduction of Cashier Injury
2 Increased Accessibility
3 Improvement of Interactions
4 Maintain Efficiency
5 Decrease Training
6 Easy to Install and Upgrade

Information Accessibility

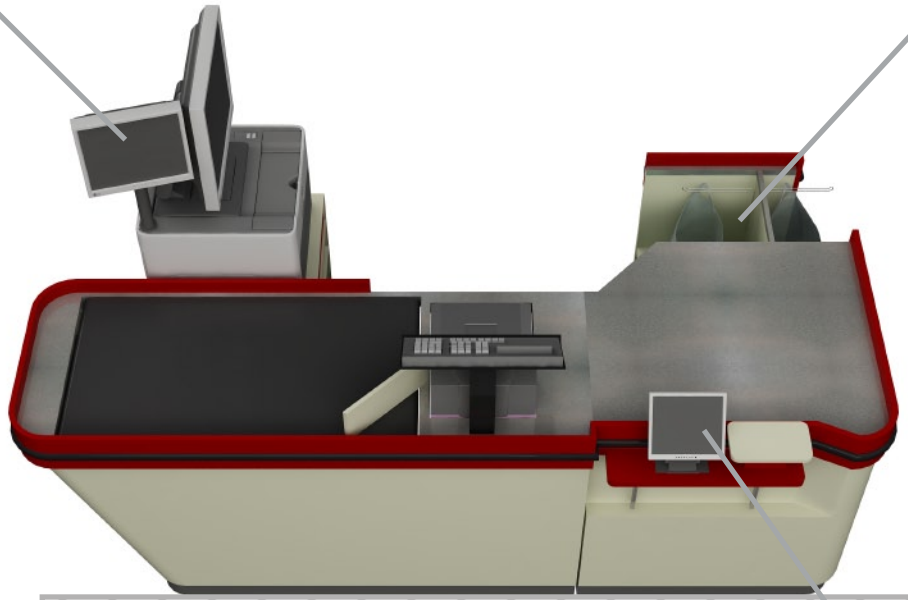
2 3 4

- Provide a second display for customers or place primary screen so that it can be viewed by customer and cashier

Customer Bagging Area

2 3 4

- Bag dispenser for customers
- Height adjustable if possible



Customer Floor Space

2 3 4

- 36" wide clear floor space for side approach

Customer Area Adjustability

2 3 4

- Pin pad and check writing surface height adjustable if possible
- Avoid protrusions more than 4"

References & Resources

Occupational Safety and Health Administration (OSHA), 2004. Ergonomics for the Prevention of Musculoskeletal Disorders, Guidelines for Retail Grocery Stores
http://www.osha.gov/ergonomics/guidelines/retailgrocery/retailgrocery.html
PDF file (Document #3192): http://www.osha.gov/Publications/osha3192.pdf

United States Access Board, 2005. Americans with Disabilities Act (1990), Architectural Barriers Act of (1968). ADA and ABA Accessibility Guidelines for Buildings and Facilities.
http://www.access-board.gov/ada-aba/final.htm

The Center for Universal Design, NC State University, 2006. About UD: Universal Design Principles. http://www.design.ncsu.edu/cud/about_ud/udprinciples.htm.

Johnson, Walter E. and Dan M. Tratensek, Employee Turnover.
www.trax-usa.com/research/turnover_cost.pdf

Dreyfuss Associates. (2002) The Measure of Man and Woman. Wiley and Sons. NY: 19

Ringholz, D. (2005). Functional Characteristics of Users in Tasks Associated with Grocery Retail Checkout:
A Literature Review. 2005 HFES Conference Annual Proceedings.

This is a publication of the RERC on Workplace Accommodations, which is supported by Grant H133E020720 of the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education. The opinions contained in this publication are those of the grantee and do not necessarily reflect those of the U.S. Department of Education.

Center for Assistive Technology
& Environmental Access
490 10th Street
Atlanta, GA 30318
Phone: 404-894-4960 (v/tty)
Fax: 404-894 -9320
catea@coa.gatech.edu