

Pedestrian protection at convenience stores

by Barrett C. Miller <http://www.safety-engineer.com>

Each year more than 10,000 pedestrians are killed by automobiles. Pedestrian deaths account for 20 to 30 percent of all motor vehicle fatality statistics.(1) Many happen when cars override the curb and hit customers at convenience stores.

Parking lot accidents are predictable. We know that people do unexpected and destructive things with their cars. A foot can slip off the clutch. Vehicles slip into gear and overshoot parking places, and drivers hit the gas when they expect to hit the brake.

One automobile with a factory defect reportedly jumps into reverse gear unexpectedly.

Convenience stores have special problems because of the large number of customers they serve and their patron mix. Efforts to maximize profits from available space have led to the introduction of many new products and services. Along with food and refreshments, some stores now offer gasoline, video cassettes, and entertainment games on the premises.

School children play video games and drink soft drinks at the same stores that sell beer by the can in "sippin' sacks."* Store designers should consider the special behaviors of children(2) and the anticipated behaviors of adults when they share a facility. Customers require protection at specific traffic points. These points are where vehicles change directions, where pedestrians walk across the vehicle path, and where vehicles park.

We also know many adverse things about the drivers who enter parking lots. A statistically significant portion are drunk, high on drugs, or visually impaired. This is especially true during evening hours. Some drivers suffer from emotional or mental disorders, and some are immature and inexperienced.

Extent of the problem

It is difficult to determine the size of the problem. Anecdotal evidence suggests that convenience store accidents are epidemic. We examined police records in one city with a population of 500,000 people. The search produced two cases where the vehicle jumped the sidewalk and struck

convenience store patrons during one year. In other incident the same year, a car hit a customer standing six feet inside the store.

The building contractor for Jiffy Food Stores provided his chain's history. Before installing protective devices, the 300 stores under his control had three to five *run-ins* per week.(3) Run-ins are incidents in which a vehicle actually crosses the sidewalk and strikes the building. he did not include those cases in which the vehicle jumped the curb but stopped without hitting the building.

The records of a glass company which serves one major chain were examined. They show the replacement of five windows per week caused by automobile damage. The glass company manager estimates that he sees six vehicles each year driven all of the way into the store.

Because accidents are predictable in parking lots, convenience stores should include pedestrian protection in their original design.

Lack of codes

No published code requires pedestrian islands or barriers where large numbers of pedestrians and vehicles interact on private property. Most building codes limit their regulation to the sidewalks that border the street. They do not require barrier protection across the face of the building where the majority of accidents happen. City codes do not require builders to paint the curb yellow to aid depth perception. When no law or code describes the store owner's duty, common law is important.

The courts say that store owners are not the insurers of the health and welfare of their customers.(4) They have an obligation to protect their customers only from those hazards which are foreseeable. Can a storekeeper "reasonably foresee"(5) a runaway vehicle? If so, they must take effective action to protect the customer.

Some corporate managers are responding to parking lot accidents with a maximum commitment. Others are doing very little. one corporation conducted a regional study in 196 convenience stores.(6) It showed that only 38% of all stores had installed wheel bumpers or post barriers for pedestrian protection.

The study provides only a limited perspective. The largest chain had no effective program for pedestrian protection. Little Champ and Jiffy Marts provided the most comprehensive protection. Fifty-three percent of Little

Champ Stores and 51% of Jiffy food stores used vertical protection barriers. Only 5% of another chain of convenience stores provide vertical barrier protection for their customers. The study mentioned earlier did not observe the use of terraced vertical segregation, or other devices found at some stores.(7) In addition, the study did not document the use of barriers in liquor stores. A limited study of barrier protection at liquor stores in the area shows that almost 75% provide some form of pedestrian protection.

Some strategies

There are four protective strategies:(7)

1) *Vertical systems* isolate pedestrians with elevated walkways; 2) *Horizontal systems* provide wide walkways or spaces to allow the pedestrian to escape an oncoming vehicle; 3) *Time* protection plans limit access to an area-cars and pedestrians cannot enter an area at the same time; 4) *Vertical post barriers* put steel or concrete posts at strategic points to create pedestrian islands. Post barriers are being accepted as the only adequate protective device.

Convenience stores tested a number of different vertical protection barriers and placement locations. no single device has been completely accepted. Most stores began experimenting with six-inch steel pipe set in concrete(8) but found they required replacement too often.

Some chains use railroad ties for barriers; others use sections from old telephone poles. A five-inch rectangular steel pipe filled with concrete is used as a barrier at some new stores. These barriers sit four and a half feet apart.

Some chains are attempting other innovations. Jiffy is introducing protected handicapped parking and Little Champ is testing sculptured concrete barriers to provide complete pedestrian islands.

The United States Department of Transportation studies the installation of pedestrian protection devices. Their studies show the most efficient time to install pedestrian protection devices is during the construction of new facilities.(8)

Jiffy Food Stores began installing railroad ties across the face of store sidewalks in 1981. While their efforts initially focused on new construction, older stores are now being retrofitted. No vehicle has penetrated the

pedestrian zone in any Jiffy Food Store with vertical barriers, but some older stores without barriers continue to have problems.

Conclusion

Parking lots at convenience stores create special safety problems for pedestrians. This is because of the high number of pedestrians and vehicles present, and the known adverse behavior of drivers. the highest risk area for pedestrians lies across the front of the store where cars park.

No published standard exists. However, we documented an industry practice in the southeastern United States. This practice consists of the installation of vertical traffic barriers across the face of stores.

It is imperative that convenience stores upgrade their pedestrian protection systems. Barriers have already reduced property loss and personal injury, but 62% of all stores still do not provide protection.

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EDUCATION

University of North Florida,. MEd 1986.

University of Colorado, B.A., August 1968.

Florida Fire College (Life Safety Code)

OSHA Training Academy (Certified) (general, construction, & maritime)

American Institute of Architects,

National Board of Boating Law Administrators 2002.

Radiation exposure monitoring (USAF 1961)

CETA Police Science training

SPECIALIZED SAFETY STUDY

I can demonstrate more than one thousand classroom hours in the safety field

a) General Industry: Fall Accidents-OSHA Codes and Standards-Life Safety Code-Proprietary Security and Safety Devices-Industrial Hygiene-Building Code enforcement-Auto Accident Reconstruction-CRASH computerized vehicle simulation-Metallurgy and Accidents-Boating safety-Environmental protection.

b) Human Behavior and limitations in accident investigation, including vision and memory.

EMPLOYMENT

Barrett Miller is president and executive officer of the *Southeast Advocacy Center for Persons with Disabilities Incorporated*.

His work as a safety consultant is separate from that organization. Consulting business opened in 1981. At this time, it specializes in the analysis of product and situational incidents that have resulted in death, injury, or property damage. Business provides paid lectures on safety topics to public and private groups. (see addendum)

National Safety Council Instructor, Machine Guarding, Accident investigation, Defensive Driving, Forklift Safety (compliance), Professional Straight Truck Driver Training, Mature Driver, ADI..

Indiana University, Consultant on Risk Control 1987-88.

Florida Department of Transportation 1984-87

Evaluation of fire protection and security systems 1977 & 1980.

Evaluation and Sales of computerized management systems. 1979

Deputy Sheriff, 1972-1973.

Custodial Supervisor/Building Management; 1968-72.

PROFESSIONAL CERTIFICATIONS AND ACCREDITATION

Board Certified Health, Environmental, and Safety Technologist. . ABIH/BCSP Certificate No. 1653. Certified by *Accreditation Board for Engineering and Technology, Inc and the National Skills Standards Board.*

OSHA Codes And Standards Outreach Instructor, Voluntary Outreach Program, United States Department of Labor, November 1989. (Recertification, Sept 1992) (Fla D.O.E., OSHA 7 Equivalent) Update Instructor Certification

M.Ed. and supporting courses represent completion of state requirements for instructors in Safety Engineering Technology (postsecondary). Florida ID# ETI 0720, Fla CPI IN15.060800 Industrial, Effective July 1985 (Rev 88).

Lecture Florida Bar Accreditation

Boating Certification: Georgia, Florida, Oregon. US Power Squadron, *Inland Navigation Rules*

Transactional Analysis Counselor. *Licensed by Florida Dept of Motor Vehicles 1986-92*

Ombudsman, Occupational Safety and Health, US Small Bus Administration, 1997.

Duval Occupational License #A040452*: Safety Engineer, Bidders List, 1986-

American Society for Testing and Materials 2005-pereset

Member: Human Factors and Ergonomics Society, Safety Technical Group 2003

National Safety Council: .1986-90

Federal Safety & Health Council 1985-1996.

American Society of Safety Engineers 1986-2003.

National Association of Applied Psychology, Member # 50606

Kappa Delta Pi; *An Honor Society in Education.*

PUBLIC SERVICE

Evaluator: "Safety Criteria for Slip Resistant Floors". Belgian Federal Office for Scientific, Technical and Cultural Affairs, Brussels, Belgium 2002. (US Representative)

Active Consensus Standard Committee Member

UL 410, Committee, "Slip Resistance of Floor Surface Materials",

ASTM F-13 Committee on "Safe Walking Surfaces".

ASTM F-12 Committee on "Safety and Security Devices"

Select subcommittee 12:10 on "Barriers and Bollards"

VOSI V50.7 Committee on bath and swimming pool safety

Community Service Recognition Award, Northeast Florida Mental Health Association 2002.

Invited Speaker: Human Factors Issues in Slip and Fall Litigation, 12th Annual Local Government Law In Florida Seminar. (Lecture certified by; The Florida Bar) Ponte Vedra, FL, March 1989.

Invited Speaker: Investigating Slip and Fall Accidents, 10th Annual, National Telecommunications Safety Development Conference, (Sponsored by Atlantic Bell) U.S Naval Academy, Annapolis, Md September 1988.

Invited Conference Moderator: Electromagnetic Fields In Schools. 1991 National Safety Congress, The National Safety Council, Las Vegas Nevada, 1990.

Invited Speaker: Modification of Deviant Driving Behavior, for U.S. Navy Commanders Conference, Cecil Field, Florida. July 1987.

Invited Speaker: Seat Belt Use and Its Effect on Accident Statistics. for Northeast Florida Regional Planning Council, May 1988.

Lecture: The Effect Of Alcohol on Driving Behavior. for U.S. Coast Guard (stand down lecture), Mayport Coast Guard Station Aug 1987.

Invited Commentary: Hazardous Material Standard (29 1910.1200) revision: OSHA Docket H022G, 1990.

Consultation on Educational Films: "Electrical Safety in the Workplace", "Lockout-Tagout", and "Trenching and Shoring".

Consultation for Jacksonville General Council 1987, Jacksonville Public Defender 1988, OSHA, Creative Media, Nordic Exercise, US Attorney, Aetna, Florida Div. of Motor Veh., General Accident, Moore Insurance Group, W/D Stores, Silver Springs Resorts, The Hartford, Zurich, INA, Liberty Mutual, USF&G, Timberline Prop, State Farm, ITT/Sheraton, National Safety Council, Anchor Hocking Glass, Cincinnati Insurance Group, Hampton Hotels, Belgian Government, Chubb Insurance Group.

Consultant on Safety and Fire Protection, Duval County School Board. 1986-1987.

Elected Board Member: Child Development Research Center, University Of North Florida 1987-92, (F.R.S. 240.531(2)).

Chairman: The Boulder County Community Forum, Boulder, Colorado, December 1969.

Constitutionally Elected Precinct Committeeman, (Republican) Boulder County, Colorado, 1964 & 1966.

PUBLICATION

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SPECIALIZED RESEARCH REPORTS

Risk Mgt in Recycling business, Warning Use and Adequacy of safeguards on High Speed Grinders (1998)-Drive Through Windows at Fast Food Restaurants (1996)-Comparison OF Slip Resistance Measurement Systems (1999)-Pedestrian Protection at Convenience Stores (1986 and 2000)-Adequacy of Instructions on Articulated Ladders (2000) Common Patterns in Fork Lift Accidents (1989)-Common Ladder Accident Patterns (1996)-Ring Avulsion Injuries (1994)-Revamping School Security System (1986) Examination of Ergonomic issues in computer use.

RELATED INTERESTS AND ABILITIES

Qualified to operate: Rockwell hardness test machine, Magnaflux particle inspection devices, ultrasonic inspection devices, Tinius Olson Tensile Test, microscope, dye test.

Addendum

*Business Opened in 1981. Fictitious name, Professional Insurance Brokers, was registered with the Florida Department of Insurance during that year. Business specialized in the sale of high risk life and health insurance policies. In 1984, technical investigations replaced insurance as principal function of business. Detailed educational references are available.

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