

Transportation Demand Management

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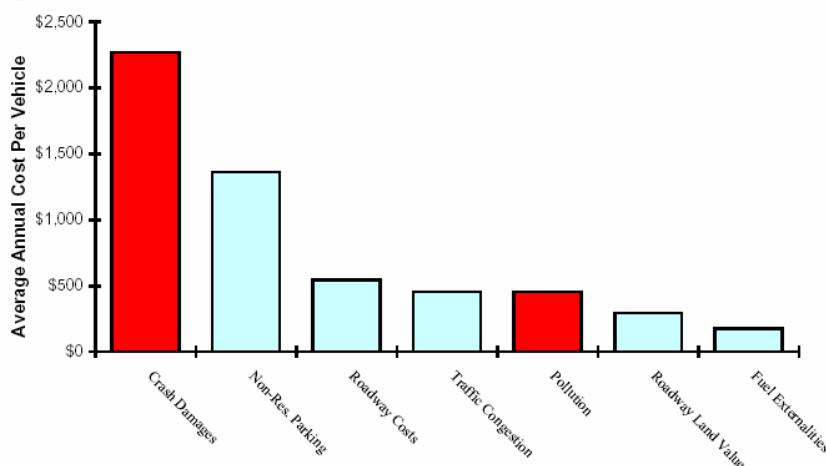
INTRODUCTION

Country	Car	Transit	Cycling	Walking	Other
Austria	39%	13%	9%	31%	8%
Canada	74%	14%	1%	10%	1%
Denmark	42%	14%	20%	21%	3%
France	54%	12%	4%	30%	0%
Germany	52%	11%	10%	27%	0%
Netherlands	44%	8%	27%	19%	1%
Sweden	36%	11%	10%	39%	4%
Switzerland	38%	20%	10%	29%	3%
UK	62%	14%	8%	12%	4%
USA	84%	3%	1%	9%	2%

Mode Split in Urban Areas (Pucher and Lefevre, 1996)

The amount of car use, walking and cycling varies significantly from one country to another. USA and Canada have the highest car use and the lowest transit, cycling and walking use when compared to other countries. Transit use in Switzerland is 7 times higher than in the United States. Bicycle use in the Netherlands is 27 times higher than in the US. The walking rate in Sweden is 4 times higher than the walking rate in the US.

Figure 2 Costs of Motor Vehicle Use in the U.S.¹⁷



This figure illustrates the estimated magnitude of various transportation costs. Crash damages are one of the largest costs, far greater than traffic congestion or pollution costs.

Since the main transportation mode in the United States is motor vehicles, the annual cost per vehicle is a factor that significantly affects people's lives. Higher vehicle use leads to increased annual cost of maintaining a motor vehicle. The highest cost of motor vehicle use in the US results from car crash damages. The second largest factor contributing to vehicle cost is illegal parking fines. Roadway costs take third place and are followed by traffic congestion, pollution, roadway land value and fuel externalities.

Efficient transit service and alternative modes of transportation, reduction of parking construction and maintenance costs, are desirable goals for many universities and cities in the United States. The case studies presented in this paper are a summary of institutions' attempts to establish priorities in their transportation management and growth strategies. Traffic management and parking control allow for efficient use of resources and creation of environmentally friendly campuses and host cities. Ridesharing and other approaches used by these schools improve the campus environment, increase safety and form livable communities inside and around campuses. Solutions that resolve congestion and traffic problems are good examples of working systems that can be reapplied in multiple campus settings and improved in the future. The University of Florida can learn from other campus Transportation Demand Management programs and reuse them, thereby saving valuable resources and reducing traffic, commuter stress and parking hassles.

Providing access for students, faculty and visitors is expensive in terms of land resources, infrastructure costs and program administration. Bicycling, walking and riding the bus are viable alternatives that provide campus access at a more sustainable cost. To successfully encourage these alternate modes, campuses must also provide supporting facilities and programs. These efforts that seek to reduce single-occupant automobile trips are often referred to as Transportation Demand Management.

STATUS OF TRANSPORTATION DEMAND MANAGEMENT (TDM)

University of Florida, Gainesville

The University of Florida has implemented a variety of transportation demand management programs. These include universal access for transit, carpool incentives and the provision of bicycle and pedestrian facilities. Each of these efforts has succeeded in reducing the number of single-occupant vehicles that enter the university campus. In general, the cost-benefit of the transportation demand management programs is favorable when compared to the costs and challenges associated with providing parking and access for thousands of motor vehicles.

Over 50 universities (825,000 students and staff) offer transit passes, often called universal access or UPass (Unlimited Local Transit Services Access Pass). The University of Florida has experienced success with its universal transit access program. Bicycle and pedestrian access to campus is also convenient for many students. However, these efforts may need to be expanded, and innovative approaches applied in order to meet future access demands.

Parking Facility Costs

Costs for parking facilities can vary depending on the site configuration. The following parking space values are based on a lot/structure with at least 300-space capacity. Parking space cost can increase if amenities and features, such as brick veneer and landscaping, are added.

- Surface parking- \$2500 per space
- Structured parking- \$8,000-\$9,000 (benchmark value) per space
- Cost of one bicycle rack that will accommodate two bikes is \$ 50 -\$100
- Operating cost of the Regional Transit System (RTS) is \$42.50 an hour. This includes fuel, maintenance and driver expenses.

TDM Program Highlights

- Transit programs and student unlimited access passes reduce parking demand, increase campus access, help to recruit and retain students, and can reduce the cost of attending college if students do not need a car.
- University of Florida administers a \$3 per/credit hour transportation fee per student per year that goes toward provision of unlimited transit access.
- During the first six years of the University of Florida unlimited access program (1995-2001), transit ridership increased 10 times. It grew by 5,698,935 rides.

Other Considerations



New visions for campus transportation are often based on:

- Expanded transit access (routes and pass programs);
- Market incentives to reduce parking demand;
- Better bike and pedestrian networks;
- Housing situated closer to campus and;
- Revenue gains through increased parking charges.

CASE STUDIES: CAMPUS TDM PROGRAMS

University of Colorado, Boulder: Transit Pass Economics

Undergraduate	25,158
Graduate and professional students	5,348
Total	30,983

TDM Program Highlights

- The University of Colorado, Boulder faculty and staff Bus Pass reduces parking demand by 350 spaces. Each existing parking space is estimated at a value of \$1125.
- Cost to add parking is \$2723 per space.
- The University of Colorado has found that it is 3 times more expensive to add a space than to shift one person to transit.

Student Travel Measurable Results

(Source: "Modal Shift in the Boulder Valley", National Research Center, 2001)

Mode of transportation	1990	2000
Vehicular Trips	55%	38%
Transit	2%	12%
Biking	20%	31%
Walking	23%	19%

Ridership Results

- Student transit use increased 200% the first year of the Student Pass program (1992) and continues to increase 2-10 % annually. Since program inception, transit usage has increased 400%.
- Faculty and staff ridership increased 85% the first year of the pass program.

Stanford University, Palo Alto, CA: Clean Air Cash Program

Undergraduate students	6,606
Graduate students	8,243
Total	14,849

TDM Program Highlights

Stanford University created financial incentives to reduce car trips

- The *Clean Air Cash* program awards \$160 to people who carpool, use transit or bike to campus. Approximately 2,500 people have enrolled in the program.
- Parking fees are raised 15% annually
- Since 1991, Stanford University has grown by 2 million square feet of buildings, 20% increase, while automobile commute trips were reduced by 500 per day
- 16 blocks on the university campus are car free during the day. Only pedestrians, cyclists and some buses use the area.
- Other features include a proposed 1.5-mile transit mall, free transit system with timed transfers to regional rail, a bicycle network, and a ridesharing program.

University of California, Davis: Bicycle Commuting

Undergraduate	22, 079
Graduate	3, 406
Total	28, 236

Bicycle Traffic Circle, UC Davis CA

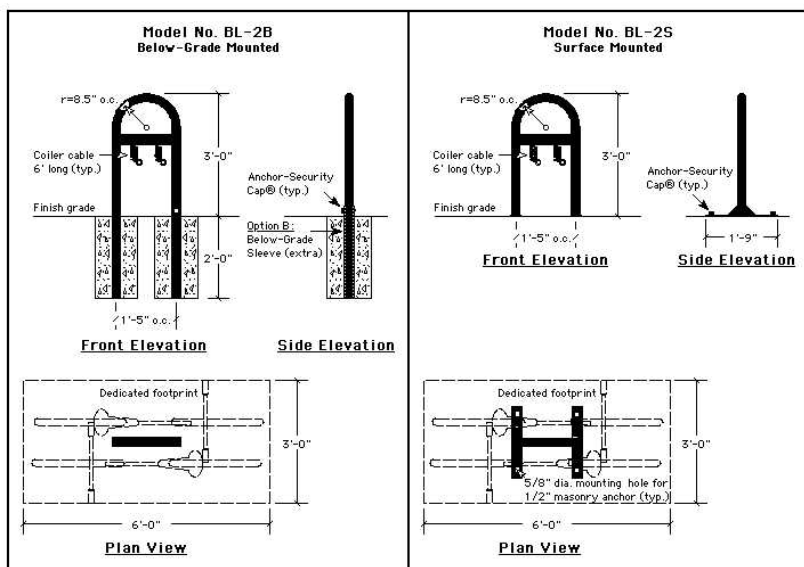


High-Security Bike Racks



The University landscape is a generally flat land area. About 15,000 bicycles use campus daily. The 832-acre campus has 14 miles of bicycle paths and 12 miles of shared roadways

TDM Program Highlights



High-Security Bike Rack

- UC Davis supports bicycle signal heads, bicycle traffic circles and carpooling
- 60% of student trips to campus are bike or moped related
- The school provides a lunchtime downtown shuttle and long term parking permits (\$200-\$500)
- The campus provides high-security bike racks, allowing to lock both wheels and the bike frame with a 6' cable that is included
- Bike lockers for intercity commuters are available for rent

Transportation and Parking Services provides the Transit Pool service to faculty, staff and students wishing to use transit to access campus.

Benefits of the service to the members are: Up to 40% off the price of monthly, quarterly and half-quarter passes (up to \$18). Right to use the Emergency Ride Home program. One free daily parking carpool permit per every month of Transit Pool membership. Participation in Pretax/Payroll deduction program for eligible employees.

University Shuttles- UC Davis Shuttle provides services to UC Davis Medical Center in Sacramento (\$1 each way, 20-mile distance) and to UC Berkeley (\$ 5.50 each way, 75-mile distance).

Rideboat- This program provides help to find another student that needs or wants to share a ride.

University of Illinois, Urbana-Champaign: Integrated Urban Design

Undergraduate	27, 889
Graduate and professional	8,849
Total	36, 738



Rendering of proposed pedestrian improvements to Green Street near the University of Illinois Campus



Present day conditions of Green Street near the University of Illinois Campus

TDM Program Highlights

- Modify street lane configurations.
Campus streets are narrowed where possible to allow for a wider pedestrian zone
 - Crossing street widths are minimized to provide better visibility and to promote safety
 - Maintenance of one-way campus streets as a safer pedestrian alternative to two-way traffic
- Lower speed limits
- Introduce ride sharing programs
- Closure of main artery to through vehicular traffic
- Create a safer and more defined pedestrian environment
- Establish on-street bike lanes
- Dedicate two-way transit lanes on major thoroughfare on campus
- Raise meter and parking permit rates
- Find strategies to reduce parking demand close to the heart of campus
- Faster approval of the most needed parking structures
- Free MTD bus student and faculty pass (Mass Transit District)

University of Minnesota, Twin cities: U-Pass

Undergraduate	27, 699
Graduate and professional	10, 298
Total	46, 734

TDM Program Highlights

- Campus shuttle service
- School Raider (provides service between campuses or to different destinations in the city on weekends, holidays and breaks)
- U-Pass/Metropass

Students can purchase a U-Pass for \$50 a semester. U-Pass is sponsored for two years by a federal Congestion Mitigation Air Quality grant received by Parking and Transportation Services. The goal is to reduce pollution, single-occupancy trips and to increase by 40% the bus ridership.

- Guaranteed ride home program (through Metro Commuter Services)

The program is instituted at no cost for U-Pass holders that sign up for the service. The student is given cab

coupons and can get reimbursed for up to \$25 for a cab fare in case of an emergency, missed bus, late work schedule and other.

Bicycle Advocates, a Parking and Transportation Services volunteer group, looks to improve campus cycling conditions. Each member agrees to monitor a small area of campus concentrating on bicycle issues. Members share what they have seen, for example: broken bottles in a bike lane or a severe parking shortage.

During snowy or rainy days, visitors can walk between most University buildings in the comfort of tunnels and skyways called the Gopher Way.

Bicycle lockers are provided

University of Washington, Seattle WA: U-Pass

Undergraduate	28, 691
Graduate/ Professional	10,559, 921
Total	39, 250

TDM Program Highlights

Binding agreement with Seattle to cap traffic to campus

Gradually increasing parking rates

Emphasis on perimeter parking

U-PASS (Unlimited access pass) reduced rates \$31 per quarter for students, \$42 per quarter for faculty and staff. Provides unlimited rides within King and Snohomish Counties.

The cost of parking permits was increased in 1994 to include the cost of a U-Pass permit. Every holder of a parking permit holds and pays for a U-Pass

Rideshare matching, vanpools, Night Ride shuttle, bicycle and pedestrian facility improvements

Promotional efforts that include merchant discounts

University of Washington experienced 5% reduction in traffic during 1990s, while student enrollment increased 7%

CASE STUDIES: CAMPUS CARSHARE PROGRAMS

Several campuses, such as Cranfield and Stanford University, give students access to cars without owning a car. Car share or rental programs allow groups of people to access shared vehicles. Participating cars are located in reserved areas throughout cities. Car share programs exist in Victoria, Toronto, San Francisco, Seattle, Portland, Washington DC, Long Beach, and Boulder. Most Co-ops require a one-time setup fee, hourly and mileage charges, and monthly administrative fees.

Insurance is covered through memberships costs, hourly and mileage rates. Zipcar (rent-a-car service that uses zipcards) and Flexcar sharing programs are also available in some cities. Such programs are affordable alternatives that allow mobility without owning a vehicle.

Cranfield University, Bedfordshire, United Kingdom



The Campus Car Program is a resource for students and staff.

Faculty tend to be day members (\$75 one-time joining fee and per hour/mile charge) Rental rates are \$1.00-\$1.50 per mile and \$10.00-\$20 per hour. Students usually obtain full membership. (\$72 one-time joining fee and \$30 monthly payment)



- Fees include gas and insurance. Campus Cars have accounts in specified gas stations.
- Car availability is posted on a website and allows a quick and easy access. The vehicles available are Aixam Microcar, Nissan Micra, Fiat Punto, Ford Fiesta and Toyota Corolla.

University of California, Davis

The University of California at Davis is considering a smart car-sharing program called Carlink Program. A fleet of vehicles, participating in the program, would be available for a short-term use. “Smart” technologies will monitor, reserve and collect payments.

CONCLUSION

Benefits of Traffic Control and Parking Management

Traffic control reduces congestion, peak-period trips and traffic jams. Lowering the amount of trips also reduces travel expenses and leads to consumer savings. Transportation alternatives allow more efficient use and decreased deterioration on road and parking facilities. Managed traffic creates less pollution and heat traps while supporting efficient land use. Diminished traffic increases safety by reducing accident rates, and creates a pleasant environment allowing for livable communities to exist. Additionally, walking and bicycling instead of driving increases exercise and improves public health. Transportation Demand Management programs that seek to improve access, reduce travel need and reduce single-occupant vehicle usage have an important role in the efficient management of university facilities and resources.

Resources for More Information

Universities

UCLA Transportation, CA	http://www.transportation.ucla.edu/tshome.htm
Stanford Transportation, Palo Alto, CA	http://transportation.stanford.edu
Cornell Transportation, NY	http://www.transportation.cornell.edu
Seattle Central Community College	http://www.seattlecolleges.com/services/
University of North Carolina, Chapel Hill Master Plan	http://www.unc.edu/planning/
University of Colorado, Boulder: Parking and Transit	http://ucbparking.colorado.edu/
University of California, Davis: Transportation and Parking	http://www.taps.ucdavis.edu/
University of New Hampshire Office of Sustainability	http://www.sustainableunh.unh.edu/
Lewis and Clark State College, Portland Housing	http://www.lclark.edu/~reslife/
Virginia Tech Office of Transportation	http://www.ot.vt.edu/default.asp
University of Washington, Seattle	http://www.washington.edu/transportation/
Ohio State University, Columbus	http://www.osu.edu/osutoday/stuinfo.html http://www.acs.ohio-state.edu/org/osucp/execsum.htm
University of Colorado Environmental Center	www.colorado.edu/ecenter
Cranfield University Car Share, UK	http://www.cranfield.ac.uk/campuscars/
University of Illinois, Urbana-Champaign	http://www.vcadmin.uiuc.edu
City of Boulder, CO	www.ci.boulder.co.us/goboulder

Car Share Programs

San Francisco, CA	http://www.sfcarsshare.org/
Flexcar	http://www.flexcar.com/
Zipcar	http://www.zipcar.com/

Other

Shoup and Hess	http://www.sppsr.ucla.edu/its/ua/
The Victoria Transport Policy Institute: Campus TDM strategies	http://www.vtppi.org/tdm
Car Free places/cities	http://www.carfree.com/carfree_places.html
Mode Split in Urban Areas (Pucher and Lefevre, 1996)	http://www.vtppi.org/tdm/tdm93.htm Table 1
If Health Matters (Litman, T. 2002)	http://www.vtppi.org/health.pdf
B-Link (High-Security Bike Racks)	http://www.bikeracks.com/html/link.html