Complete Streets Policies: Impacts on Urban Freight Transportation

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Complete Streets-oriented planning and policies are touted as offering a way to make streets safer and more accessible to all modes of transport, as well as to sidewalk life in general (children playing, restaurant seating, outdoor markets). Complete Streets policies have become increasingly popular in metropolitan areas across the U.S. and Canada. Smart Growth America reports that the number of Complete Streets policies in the U.S. climbed from 216 in 2010 to 712 in 2014 (Smart Growth America, 2014). The Complete Streets philosophy advocates for designing streets and sidewalks to accommodate all users. Significantly, many strategies tend to overlook the accommodations needed for urban freight transportation. While there are far fewer industrial and freight rail demands on our urban thoroughfares than there were a century ago, the rise of e-commerce in the twenty-first century has brought more delivery trucks into urban streets of all sizes.

Despite the fact that the Complete Streets mission is to make streets more accessible to all users, many Complete Streets policies do not address urban freight vehicles in a significant way. Nevertheless, as cities develop and share best practices over time, they are learning how to better accommodate urban freight transportation, rather than treating it as incompatible with streets that are safe for cyclists and pedestrians. This paper reviews examples of Complete Streets concepts that have posed challenges for urban freight transportation, and policies to broaden the concept of Complete Streets and better accommodate urban freight.

Introduction

Complete Streets (CS) policies have become increasingly popular in metropolitan areas across the U.S. and Canada. Smart Growth America reports that the number of CS policies in the U.S. climbed from 216 in 2010 to 712 in 2014 (Smart Growth America, 2014). The CS philosophy advocates for designing streets and sidewalks to accommodate all users. Nevertheless, many CS strategies tend to overlook the accommodations needed for urban freight transportation (UFT).

In some senses, CS policies can be more easily implemented in today's cities as compared to a century ago, as there are far fewer industrial and freight rail demands on today's urban thoroughfares, providing more and safer space for cyclists and pedestrians. Industrial facilities have largely moved out of urban areas in search of less expensive real estate, and the use of rail has diminished in comparison to the use of automobiles, for both freight and passenger movement. In this way, some of the challenges that CS policies may have once faced are no longer

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problematic. At the same time, the rise of e-commerce in the twenty-first century has brought more PUD (pickup and delivery) trucks into urban streets of all sizes, particularly residential areas that lack any kind of loading zone (Gevaers, Van de Voorde & Vaneslander, 2011). Deliveries to individual destinations, such as residences, in urban areas can lead to congestion due to the greater volume of vehicles on the road. Additionally, PUD trucks must often resort to double-parking or otherwise parking illegally when no loading zones are provided, such as in residential areas.

Despite the fact that the CS mission is to make streets more accessible to *all* users, many CS policies do not address UFT in a significant way. Chris Steele, COO of the strategic management advisory firm Investment Consulting Associates, suggests that this may be because freight stakeholders are not included in many of the conversations among other public space stakeholders, conversations that eventually produce CS policies and streetscape designs (Steele, 2014). Some CS design measures even hinder the ability of freight trucks to move through urban areas (Chapple, 2015), potentially worsening congestion. However, as CS policies become more popular and cities develop and share best practices, they are also learning how to better accommodate UFT, rather than treating it as incompatible with streets that are safe for cyclists and pedestrians.

An overview of the Complete Streets philosophy

Many planners and city officials tout CS-oriented policy and planning as offering a way to make streets safer and more accessible to all modes of transport, as well as to sidewalk life in general, such as children playing, restaurant seating, and outdoor markets. Because road and street design was largely oriented towards the automobile from World War II until the turn of the twenty-first century, Complete Streets policies generally favor non-motorized traffic in an effort to correct the bias towards cars. By correcting this imbalance, CS policies tend to make communities safer in terms of traffic accidents, and healthier through reduced automobile emissions. Therefore, most CS policies serve to provide more space and safer conditions for pedestrians and cyclists, and more resources for transit systems.

The most commonly implemented CS tools can be categorized into three interrelated types: (1) slowing down automobiles through techniques often described as road diets or traffic calming, (2) dedicating more space to pedestrians and bicycles in order to improve their experience in terms of safety and comfort, and (3) designing facilities to be accessible to people of all abilities. Table 1 lists a number of specific CS interventions, and categorizes them into one or more of the three types. This paper focuses solely on the first two categories and the conflicts they may introduce to UFT.

	1. Road Diets	2. More Space to Bike/Ped	3. Accessible Design
Adding/improving bike lanes		x	
Narrowing automobile lanes	x		
Reducing speed limits	x	x	
Bump-outs	x	x	x
Traffic circles/chicanes/speed bumps	x		
Signal retiming	x	x	x
Improving transit facilities			x
Refuge islands		x	x
Raised or otherwise well-marked crosswalks	x	x	x

Table 1. Examples of Complete Streets Tools and Their Focus Areas

Challenges to Complete Streets goals

Delivery trucks often contribute to congestion in urban areas. This occurs not only because they occupy a greater amount of space than most private vehicles, but also because the trucks need to stop and pull off the road more frequently in order to pick up and deliver goods. They may have to double-park to make deliveries, or make careful maneuvers to back into or pull out of tight areas not designed to accommodate PUD trucks. Urban congestion can increase drivers' impatience, which can result in rash or hurried decisions that endanger pedestrians. Additionally, unprotected bike lanes frequently become the victims of double-parked motor vehicles. Therefore, double-parked delivery trucks can reduce the safety and convenience of bike travel (Geeting, 2015).

The conflicts between PUD trucks and other users of the public right-of-way are most often associated with the final delivery stage of freight movement. The completion of delivery is the final transition points in the freight movement process. The types of urban freight transition points are delineated by M. Scott et al. (2009), and are summarized in Table 2. Conflicts may also occur at other freight transition points that are located in urban areas, such as at production and distribution facilities. If a high volume of goods moves through these facilities and/or if site design permits, the facilities will have on-site, off-street loading and staging areas. These areas help PUD trucks to avoid some conflict with other users of the roadway, as the trucks are not taking up parking spaces, sidewalk spaces, bike lanes, or driving lanes while loading or unloading.

	Off-street loading zone?	Size of ship-ment?	Where in city?	Is truck picking up or dropping off?
Industrial/light industrial facilities	Yes	Large	Areas zoned for industrial, usually not mixed with residential or downtown commercial	Both
Warehouse/ distribution sites	Yes	Large	Auto-oriented retail areas (and sometimes denser areas), areas zoned for industrial and storage	Both
Wholesale supplier	Usually	Large	Areas zoned for storage or large-format commercial	Mostly pick-up, may allow drop-in buyers
Regular deliveries	Not typically	Varies	Commercial areas of any density	Drop-off
Small package deliveries	No	Small	Residential areas	

Table 2. Comparison of Freight Transition Points
Source: Adapted from M. Scott, S. Anderka & E. O'Donnell. (2009). *Improving Freight Movement in Delaware Central Business Districts.* Newark, DE: University of Delaware, Institute for Public Administration.

Challenges posed by Complete Streets policies

All cities must manage the conflicts that occur between UFT and other street uses. Some of the common practices of CS design, especially road dieting and traffic calming measures, can create additional difficulties for UFT, even as they seek to better accommodate a wider variety of travel modes. In particular, narrower driving lanes, more frequent turns, and smaller turning radii may be more difficult for a PUD truck to navigate, being larger than a personal vehicle (Green, 2005). Additionally, if CS programs increase the number of buses on the street, PUD trucks have a higher chance of getting stuck behind them and thus slowed down. These various factors pose the problem of causing the PUD truck to fall behind in its delivery schedule.

In addition to slowing down PUD trucks, bump-outs reduce the number of corner parking spaces. As Scott et al. mention:

> several studies suggest that loading zones are best located at the end of blocks in the direction of travel…This keeps at least two sides of the truck free of other parked vehicles, and also allows the driver to enter and leave the loading zone in a forward motion. (Scott et al., 2009, p. 10).

Finally, sidewalks may become crowded by more than just people when they adopt CS interventions. In order to make sidewalks more comfortable and interesting for pedestrians, CS programs often encourage the addition of benches, planters, and public art along sidewalks. These amenities may pose obstacles to people making on-street deliveries.

Case studies of current policy experiments

Despite, or because of, the numerous conflicts between UFT systems and CS strategies, many cities are introducing or fine-tuning CS policies to accommodate UFT. As CS policies gain

ground as an effective tool to better link urban planning with transportation planning, cities have been experimenting with strategies to allow PUD trucks to make deliveries more easily. This section highlights a number of specific CS strategies for UFT that are currently in use.

Generally, policies can tackle the issue from two dimensions: spatially, such as by regulating where PUD trucks may go; or temporally, by specifying time windows for deliveries to occur. One example of the latter tactic is Manhattan's Off-Hour Delivery (OHD) model, which piloted from 2002 to 2010 and has remained in use since then. In this project, participating companies agreed to make deliveries outside of the hours of 6 a.m. to 7 p.m., during which drivers made an estimated 95 percent of their deliveries prior to the implementation of the OHD program (Holguín-Veras, Wojtowicz & Hodge, 2014). By avoiding making deliveries when streets are congested, the participating companies were expected to save a combined $100 to $200 million per year. The project has been successful enough to inspire similar regulations in other cities. In 2015, Orlando and Washington, D.C. implemented similar programs (Burnley, 2015).

The success of Manhattan's OHD program has not caused the city to neglect spatial solutions. As discussed, PUD trucks may have difficulty navigating areas that have been road-dieted or made more pedestrian-friendly. They may also damage infrastructure that is not designed to hold up to frequent use by heavy vehicles. Furthermore, they contribute to, and their delivery schedules are affected by, congestion. In response, New York City has designated particular routes as preferred or required routes for PUD trucks in the city. New York's Truck Route Map helps drivers to find the most accessible routes, as well as to identify infrastructure weight limits, low bridges, and streets where commercial vehicles are prohibited (NYC DOT, n.d.).

Traffic congestion is a burden created by and shared by all drivers. Perhaps the most visible conflict that is associated exclusively with UFT (rather than all automobile traffic) is the need for PUD trucks to be able to stop to load or unload. Therefore, several policy responses deal with creating designated loading zones or allowing PUD trucks to obtain special permits to park in the general street-parking zone. For instance, in 2009, Philadelphia's Mobility Enhancement Initiative introduced a number of targeted policies that work at both the spatial and the temporal level. From 6 a.m. to 10 p.m., only PUD trucks may park on certain streets. Additionally, the city designated 70 loading zones in existing street parking areas to allow PUD trucks to make their deliveries more quickly and less obtrusively at any time of day. Andrew Stober, former chief of staff of the Mayor's Office of Transportation and Utilities in Philadelphia, stated that, in its first year of existence, the initiative reduced morning traffic congestion in the selected streets by 35 percent in the eastbound direction and 24 percent in the westbound direction (Burnley, 2015).

Similarly, Los Angeles implemented a policy that gives free reign to PUD trucks at certain times of day in certain areas. Under this policy, PUD trucks have full access to select alleyways at night. During the day, motorized traffic is prohibited in the alleyways, thereby transforming them into safe bicycle and pedestrian spaces. This program also shares features with Manhattan's OHD plan. In contrast to the Philadelphia policy, L.A.'s policy is also explicitly designed to promote other CS goals. This is not surprising, considering that it was part of the city's *Complete Streets Manual* (Los Angeles Department of City Planning, 2014). Philadelphia's program also contributes to CS principles because it makes streets more accessible to an oft-neglected group of users: PUD trucks.

The private sector of the UFT industry is also innovating in order to increase pickup and delivery efficiency. By creating more efficient delivery methods, companies can potentially reduce fuel consumption and increase customer satisfaction by reducing delivery times. Additionally, delivery companies are experiencing pressure from some consumers to reduce their ecological footprint. Some companies have begun to implement IT solutions to improve efficiency of deliveries. These tactics include using GPS to collect and share real time information on traffic conditions, and using data

analytics to better plot routes and consolidate deliveries (Gevaers et al., 2011; Hobson, 2015). The hub-and-spoke delivery model is another innovation that holds promise for combating congestion and loading zone issues during small-package delivery. The hub-and-spoke model entails driving a PUD truck to a central location in an urban area, and then using smaller vehicles to transport individual packages to their final destinations. The spokes in this model can be smaller motorized vehicles, bicycles, foot couriers or, perhaps sooner than we think, delivery drones (Geeting, 2015). Finally, companies that produce PUD equipment are developing quieter reverse signals, carts, refrigeration units, and tires in order to address noise complaints from residents living near the PUD truck's destination (Hobson, 2015). These activities indicate that the private sector is active on a variety of fronts to facilitate their UFT operations.

Conclusion

The current focus that planners and delivery companies are bringing to experiments in resolving UFT challenges indicate that we can expect other creative solutions in the years to come. Urban planners and engineers will need to be open to new methods, and should create policies, particularly CS policies, that offer flexibility regarding freight regulations. CS policies should be flexible enough that, as conditions change, they can continue to offer complete access to all users. The issues and case studies highlighted here also make it clear that freight friendly CS initiatives require citywide and private sector coordination, in order to determine the best routes, consistently enforce regulations, and promote cooperation between business owners and freight truck drivers. The solutions emerging from this improved coordination will continue to be relevant as e-commerce gains further importance, and as consumers and residents learn that they can demand quieter and more environmentally friendly delivery processes. Integrating urban freight delivery into CS frameworks helps mixed-use areas to thrive in all their uses, thereby supporting vibrant and healthy streets.

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